

**individualized
computation**



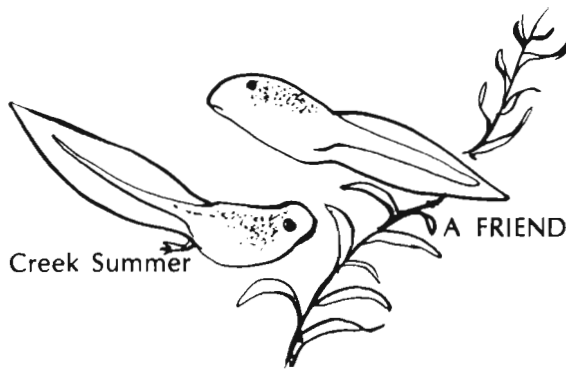
Cover Art

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A FRIENDLY MATH ASSOCIATES PROJECT

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Dear Reader:

I am a Greedy, Invisible Digit-Eating Gremlin. I eat digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9... but I try to be a considerate Gremlin.

I promise I'll try to eat nothing but unnecessary digits. I mean I always try to leave enough digits so you can figure out what I have eaten.

Can you tell what I had for dessert last night?

$$\begin{array}{r} \boxed{9} \\ - \boxed{} \\ \hline \boxed{1} \end{array} \quad \begin{array}{r} \boxed{7} \\ + \boxed{} \\ \hline \boxed{2} \end{array} \quad \begin{array}{r} \boxed{} \\ \times \boxed{3} \\ \hline \boxed{} \end{array}$$

$$\begin{array}{r} \boxed{} \\ \times \boxed{3} \\ \hline \boxed{} \end{array} \quad \begin{array}{r} \boxed{} \\ + \boxed{} \\ \hline \boxed{8} \end{array} \quad \begin{array}{r} \boxed{} \\ - \boxed{} \\ \hline \boxed{4} \end{array}$$

You'll find you have enough information so you know exactly what I ate.

I'll try very hard not to leave such questions as these:

$$\begin{array}{r} \boxed{7} \\ + \boxed{5} \\ \hline \boxed{} \end{array} \quad \begin{array}{r} \boxed{} \\ \times \boxed{3} \\ \hline \boxed{} \end{array} \quad \begin{array}{r} \boxed{} \\ \times \boxed{3} \\ \hline \boxed{2} \end{array}$$

But sometimes my hunger makes me careless. For example:

$$\begin{array}{r} \boxed{} \\ \times \boxed{} \\ \hline \boxed{3} \end{array} \quad \text{or} \quad \begin{array}{r} \boxed{} \\ \times \boxed{} \\ \hline \boxed{3} \end{array}$$

$$\begin{array}{r} \boxed{} \\ \times \boxed{} \\ \hline \boxed{6} \end{array} \quad \text{or} \quad \begin{array}{r} \boxed{} \\ \times \boxed{} \\ \hline \boxed{6} \end{array} \quad \text{or} \quad \begin{array}{r} \boxed{} \\ \times \boxed{} \\ \hline \boxed{6} \end{array}$$

I am attaching a brief note. Can you find what I ate for breakfast?

Sincerely,
G.I.D.E.G.

$$\begin{array}{r} \boxed{7} \\ - \boxed{} \\ \hline \boxed{3} \end{array} \quad \begin{array}{r} \boxed{} \\ + \boxed{2} \\ \hline \boxed{1} \end{array} \quad \begin{array}{r} \boxed{} \\ \times \boxed{7} \\ \hline \boxed{8} \end{array} \quad \begin{array}{r} \boxed{} \\ - \boxed{} \\ \hline \boxed{1} \end{array} \quad \begin{array}{r} \boxed{} \\ + \boxed{} \\ \hline \boxed{} \end{array}$$

$$\begin{array}{r} \boxed{9} \\ - \boxed{} \\ \hline \boxed{8} \end{array} \quad \begin{array}{r} \boxed{4} \\ - \boxed{} \\ \hline \boxed{6} \end{array} \quad \begin{array}{r} \boxed{6} \\ - \boxed{2} \\ \hline \boxed{} \end{array} \quad \begin{array}{r} \boxed{3} \\ - \boxed{5} \\ \hline \boxed{} \end{array}$$

	A	B	C	D
E	11	1	2	7
F	4	9	5	4
G	8	10	3	9
H	12	1	?	6
I	1	0	1	8

Tactics and Language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{5}{10} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{8}{12} = \frac{4}{6} = \frac{2}{3}$$

$$\frac{4}{16} = \frac{2}{8} = \frac{1}{4} \text{ A}$$

$$\frac{4}{8} = \frac{1}{2} = \frac{1}{2} \text{ B}$$

$$\frac{3}{9} = \frac{1}{3} = \frac{1}{3} \text{ C}$$

"Round off to
the nearest 10"

$$\frac{13}{16} \rightarrow \frac{10}{20}$$

$$\frac{127}{124} \rightarrow \frac{130}{120}$$

$$\frac{202}{28} \rightarrow \frac{200}{30}$$

$$\frac{31}{158} \rightarrow \frac{30}{160}$$

$$\frac{73}{73} \rightarrow \frac{70}{70}$$

$$\frac{28}{31} \rightarrow \frac{30}{30}$$

$$\frac{158}{73} \rightarrow \frac{160}{70}$$

$$\frac{73}{73} \rightarrow \frac{70}{70}$$

$$\frac{73}{73} \rightarrow \frac{70}{70}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{1}{2}, \frac{1}{4} = \frac{2}{4}, \frac{1}{4}$$

$$\frac{1}{2}, \frac{1}{3} = \frac{3}{6}, \frac{2}{6}$$

$$\frac{5}{6}, \frac{1}{3} = \frac{5}{6}, \frac{2}{6} \text{ D}$$

$$\frac{1}{3}, \frac{1}{4} = \frac{4}{12}, \frac{3}{12} \text{ E}$$

$$\frac{3}{4}, \frac{3}{8} = \frac{6}{8}, \frac{3}{8} \text{ F}$$

Change to
% (per cent)

$$\frac{1}{2} = \frac{50}{100} = 50\%$$

$$\frac{1}{2} = \frac{150}{100} = 150\%$$

$$\frac{1}{4} = \frac{\quad}{100} = \quad\% \text{ A}$$

$$\frac{1}{4} = \frac{\quad}{100} = \quad\% \text{ B}$$

$$\frac{3}{4} = \frac{\quad}{100} = \quad\% \text{ C}$$

Change to a
"proper fraction"
in "lowest terms"

$$1\frac{4}{8} = 1\frac{1}{2} = \frac{3}{2}$$

or

$$1\frac{4}{8} = \frac{12}{8} = \frac{3}{2} \text{ D}$$

$$2\frac{2}{7} = 2\frac{\quad}{7} = \frac{\quad}{7} \text{ E}$$

$$2\frac{2}{4} = \frac{\quad}{4} = \frac{\quad}{4} \text{ I}$$

$$1\frac{2}{6} = 1\frac{\quad}{6} = \frac{\quad}{6} \text{ J}$$

Change to a
"mixed number"
in "lowest terms"

$$\frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$$

or

$$\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2} \text{ A}$$

$$\frac{8}{6} = \frac{4}{3} = 1\frac{1}{3} \text{ B}$$

	A	B	C	D	E	F
G	5	10	$\frac{1}{3}$	$\frac{3}{2}$	20	30
H	25	$\frac{1}{2}$	75	160	4,3	$\frac{7}{8}$
I	$\frac{1}{4}$	$1\frac{1}{3}$	70	5,2	$\frac{5}{2}$	6,3
J	$1\frac{1}{2}$	125	15	25	200	$\frac{4}{3}$

Another tactic and more language:

“Estimate” the answer by “rounding off each factor to the nearest 10.”
Then compare the “estimate” with the actual product.

estimate: $\underline{10} \times \underline{10} = \underline{\hspace{2cm}}$ $\left\{ \begin{array}{l} \text{larger} \\ \text{smaller} \end{array} \right.$

$$\begin{array}{r} 14 \\ x 6 \\ \hline 84 \end{array}$$

----- 100 -----
----- 84 -----
difference
d

estimate: $\frac{\hspace{1cm}}{e} \times \frac{\hspace{1cm}}{a} = \frac{\hspace{2cm}}{b}$

$$\begin{array}{r} 13 \\ x 7 \\ \hline \end{array}$$

c

estimate: $\frac{\hspace{1cm}}{d} \times \frac{30}{e} = \frac{\hspace{2cm}}{a}$

$$\begin{array}{r} 32 \\ x 8 \\ \hline \end{array}$$

b

estimate: $\frac{\hspace{1cm}}{c} \times \frac{\hspace{1cm}}{d} = \frac{\hspace{2cm}}{e}$

$$\begin{array}{r} 51 \\ x 9 \\ \hline \end{array}$$

a

estimate: $\frac{\hspace{1cm}}{a} \times \frac{\hspace{1cm}}{c} = \frac{\hspace{2cm}}{d}$

$$\begin{array}{r} 17 \\ x 12 \\ \hline \end{array}$$

e

estimate: $\frac{\hspace{1cm}}{a} \times \frac{\hspace{1cm}}{b} = \frac{\hspace{2cm}}{c}$

$$\begin{array}{r} 26 \\ x 14 \\ \hline \end{array}$$

d

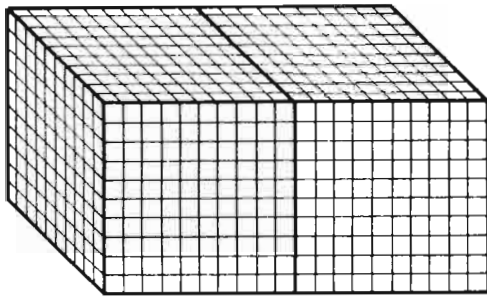
estimate: $\frac{\hspace{1cm}}{e} \times \frac{\hspace{1cm}}{a} = \frac{\hspace{2cm}}{b}$

$$\begin{array}{r} 43 \\ x 17 \\ \hline \end{array}$$

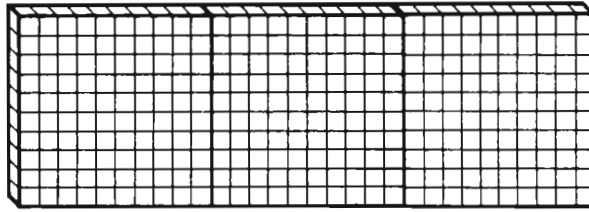
b

a	b	c	d	e
28	800	20	16	4
40	44	100	64	30
10	69	10	10	20
41	30	9	200	500
300	100	300	50	10

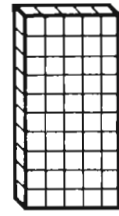
Cubes, Flats, Longs and Ones



2
cubes



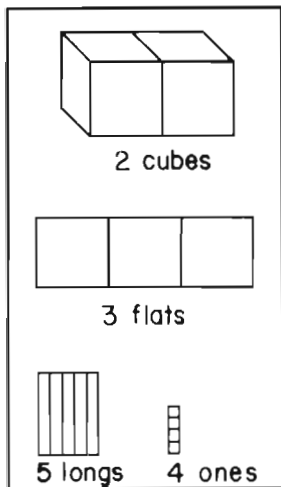
3
flats



5
longs



4
ones



cubes	flats	longs	ones
2	20	200	2000
.3, ($\frac{3}{10}$)	3	A.	B.
.05, ($\frac{5}{100}$)	C.	($\frac{5}{10}$)	5
.004, ($\frac{4}{1000}$)	E.	($\frac{4}{100}$)	A.
		($\frac{4}{10}$)	4

cubes	flats	longs	ones
1	D	E	
.1	1	D	E
.01	A	1	D
.001	B	A	1
2.3	D	E	A
B	3.5	C	D
E	C	5.4	

cubes	flats	longs	ones
2.354	B	C	2354
10	E		
A	10	E	
B	A	10	E

A.	B.	C.	D.	E.
2300	23.54	35	23	.04
30	.01	.54	10	230
.1	.35	.5	350	100
.4	300	235.4	50	.054

Different ways of reporting measurements.

	25¢	5¢	1¢
	1	3	4
+	1	2	3
-----	3	1	2

cents

44	¢

38	¢

	¢

b

	\$1	10¢	1¢
	3	4	8
+	1	3	5

c

cents

	¢

	¢

	¢

d

	yd.	ft.	in.
	3	2	0
-	1	1	1

a

inches

	in.

	in.

	in.

b

	m	dm	cm
	2	7	6
-	0	8	3

c

centimeters

	cm

	cm

	cm

c

	gal.	qt.	1/2 pt.
	1	1	3
x 2			

a

half-pints

	1/2 pts.

	1/2 pts.

	1/2 pts.

b

	\$1	10¢	10¢
	1	2	5
x 3			

e

cents

	¢

	¢

	¢

e

	24	6	cans
÷ 3			

a

cans

	cans

	cans

	cans

d

	m	dm	cm
	4	5	0
÷ 2			

e

centimeters

	cm

	cm

	cm

e

	da.	hr.	min.
	0	5	30
+		1	45

c

minutes

	min.

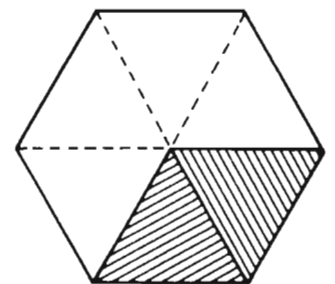
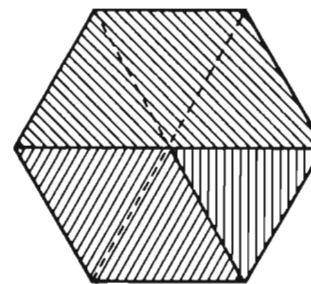
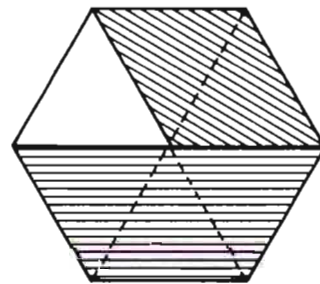
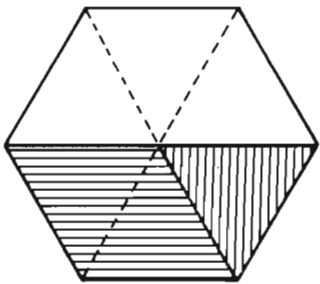
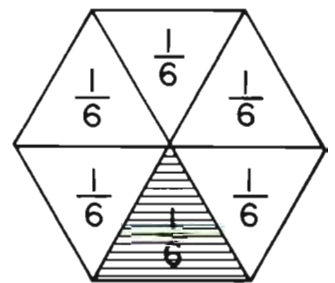
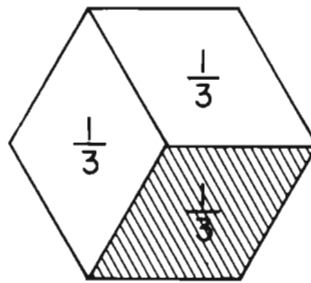
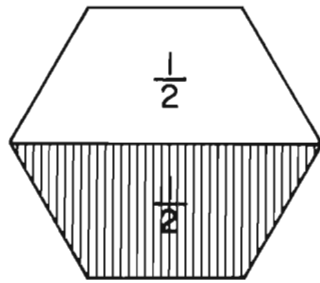
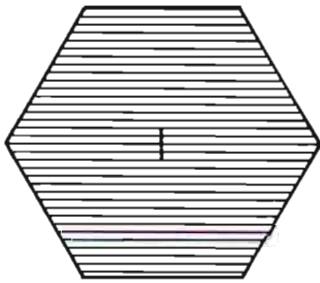
	min.

	min.

d

a	b	c	d	e
2,0,11	46	193	435	275
1,0,3	82	483	483	225
2,3,2	83	0,7,15	27	375

What Can You See?

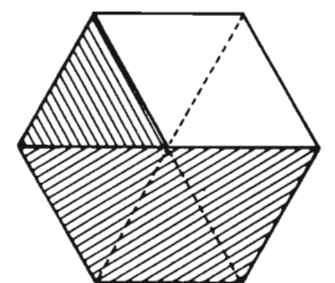
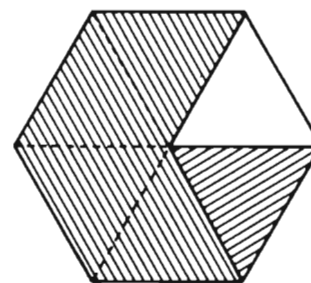
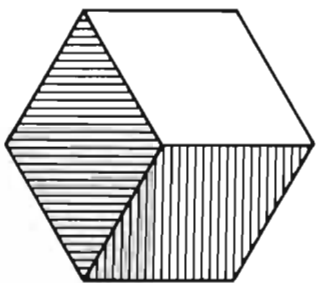
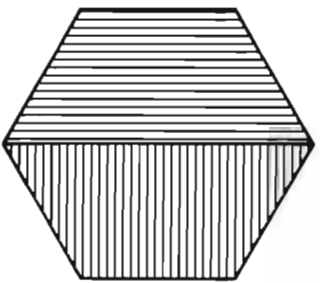


$$\frac{1}{3} + \frac{1}{6} = \text{---} a$$

$$\frac{1}{2} + \frac{1}{3} = \text{---} b$$

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \text{---} c$$

$$\frac{1}{6} + \frac{1}{6} = \text{---} d$$



$$\frac{1}{2} + \frac{1}{2} = \text{---} c$$

$$\frac{1}{3} + \frac{1}{3} = \text{---} a$$

$$\frac{2}{3} + \frac{1}{6} = \text{---} b$$

$$\frac{1}{2} + \frac{1}{6} = \text{---} a$$

and

$$1 - \frac{1}{2} = \text{---} a$$

$$\frac{2}{3} - \frac{1}{3} = \text{---} d$$

$$\frac{5}{6} - \frac{1}{6} = \text{---} a$$

$$1 - \frac{2}{3} = \text{---} d$$

$$\frac{1}{2} - \frac{1}{6} = \text{---} d$$

$$\frac{5}{6} - \frac{1}{3} = \text{---} a$$

$$\frac{1}{3} - \frac{1}{6} = \text{---} c$$

$$\frac{2}{3} - \frac{1}{6} = \text{---} a$$

$$1 - \frac{1}{3} = \text{---} a$$

$$1 - \frac{1}{6} = \text{---} d$$

a	b	c	d
$\frac{2}{3}$	$\frac{5}{6}$	1	$\frac{5}{6}$
$\frac{1}{2}$	1	$\frac{1}{6}$	$\frac{1}{3}$

Tactics and Language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{6}{18} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{16}{20} = \frac{4}{5} = \text{--- A.}$$

$$\frac{12}{28} = \frac{3}{7} = \text{--- B.}$$

$$\frac{8}{12} = \frac{2}{3} = \text{--- C.}$$

$$\frac{4}{100} = \frac{1}{25} = \text{--- D.}$$

Find denominators
that may be
"more convenient"

$$\frac{1}{2} = \frac{3}{6} = \frac{5}{10}$$

$$\frac{2}{3} = \frac{6}{9} = \frac{10}{15}$$

$$\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{4}{12}$$

$$\frac{5}{6} = \frac{10}{12} = \frac{25}{30}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{2}{3}, \frac{3}{4} = \frac{8}{12}, \frac{9}{12}$$

$$\frac{1}{2}, \frac{1}{4} = \frac{2}{4}, \frac{1}{4}$$

$$\frac{1}{3}, \frac{1}{2} = \frac{2}{6}, \frac{3}{6}$$

$$\frac{1}{4}, \frac{2}{3} = \frac{3}{12}, \frac{8}{12}$$

$$\frac{5}{6}, \frac{1}{2} = \frac{5}{6}, \frac{3}{6}$$

Change to an
"improper fraction"
in lowest terms"

$$1\frac{3}{6} = 1\frac{1}{2} = \frac{3}{2}$$

-or-

$$1\frac{3}{6} = \frac{9}{6} = \text{--- A.}$$

$$2\frac{4}{8} = 2\frac{1}{2} = \text{--- B.}$$

-or-

$$2\frac{4}{8} = \frac{20}{8} = \text{--- C.}$$

$$1\frac{5}{10} = \frac{15}{10} = \text{--- D.}$$

Change to a
"mixed number
in lowest terms"

$$\frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$$

-or-

$$\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$$

$$\frac{9}{6} = 1\frac{3}{6} = 1\frac{1}{2}$$

-or-

$$\frac{9}{6} = 1\frac{3}{6} = 1\frac{1}{2}$$

$$\frac{8}{6} = 1\frac{2}{6} = 1\frac{1}{3}$$

Change to
a "common fraction"
in "lowest terms"

$$.5 = \frac{5}{10} = \frac{1}{2}$$

$$.25 = \frac{25}{100} = \frac{1}{4}$$

$$.4 = \frac{40}{100} = \frac{2}{5}$$

	A	B	C	D	E	F
G.	$\frac{2}{4}, \frac{1}{4}$	$1\frac{1}{2}$	$\frac{3}{12}, \frac{8}{12}$	$\frac{1}{3}$	6, 12	10, 15
H.	$\frac{4}{5}$	$\frac{5}{2}$	$\frac{2}{3}$	$\frac{3}{2}$	$1\frac{1}{2}$	2, 3
I.	$\frac{1}{4}$	$\frac{3}{7}$	$\frac{5}{4}$	$\frac{5}{6}, \frac{3}{6}$	$1\frac{1}{3}$	8, 9
J.	$\frac{3}{2}$	$\frac{2}{6}, \frac{3}{6}$	$\frac{2}{5}$	$\frac{1}{25}$	3, 7	$1\frac{1}{2}$

Another tactic and more language:

“Estimate” the answer by “rounding off each factor to the nearest 10.”
Then compare the “estimate” with the actual product.

estimate: $10 \times 20 = 200$

$$\begin{array}{r} x \ 19 \\ \quad 12 \\ \hline \quad 38 \\ \quad 190 \\ \hline 228 \end{array}$$

$\rightarrow 228$ larger
 $- 200$ smaller
 difference
 d

estimate: $\frac{\quad}{e} \times \frac{\quad}{a} = \frac{\quad}{b}$

$$\begin{array}{r} x \ 18 \\ \quad 13 \\ \hline \end{array}$$

 c

estimate: $\frac{\quad}{d} \times \frac{\quad}{e} = \frac{\quad}{a}$

$$\begin{array}{r} x \ 17 \\ \quad 14 \\ \hline \end{array}$$

 b

estimate: $\frac{\quad}{c} \times \frac{\quad}{d} = \frac{\quad}{e}$

$$\begin{array}{r} x \ 14 \\ \quad 14 \\ \hline \end{array}$$

 a

estimate: $\frac{\quad}{b} \times \frac{\quad}{c} = \frac{\quad}{d}$

$$\begin{array}{r} x \ 16 \\ \quad 16 \\ \hline \end{array}$$

 e

estimate: $\frac{\quad}{a} \times \frac{\quad}{b} = \frac{\quad}{c}$

$$\begin{array}{r} x \ 19 \\ \quad 19 \\ \hline \end{array}$$

 d

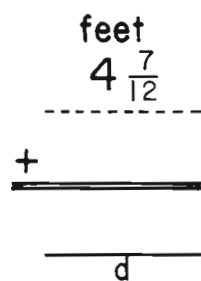
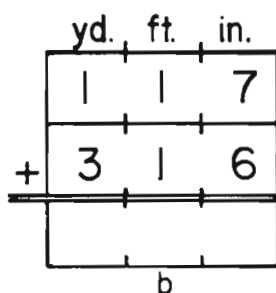
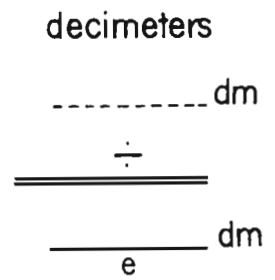
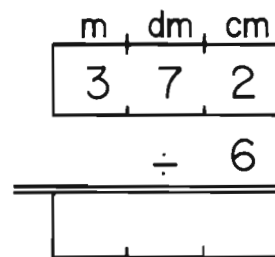
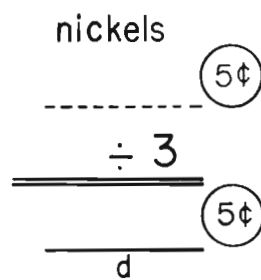
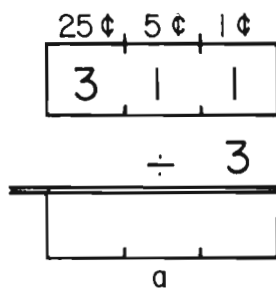
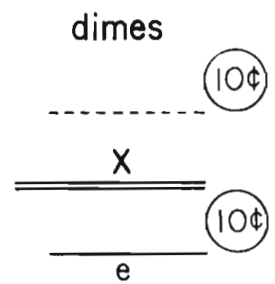
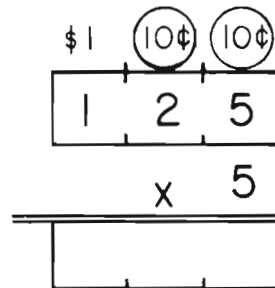
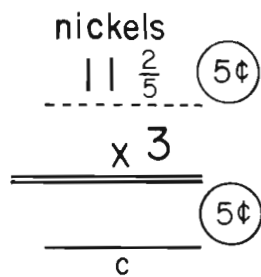
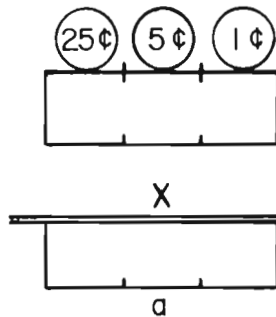
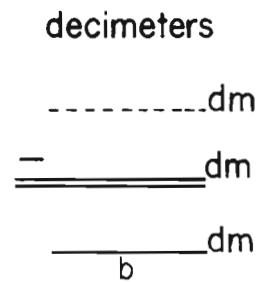
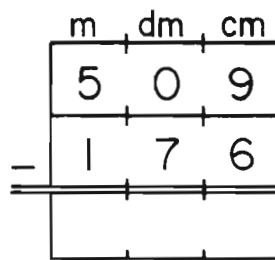
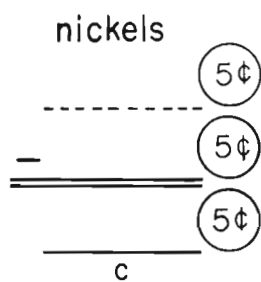
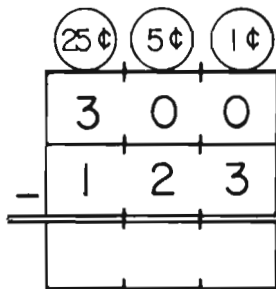
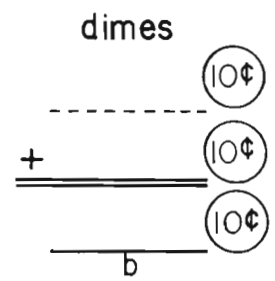
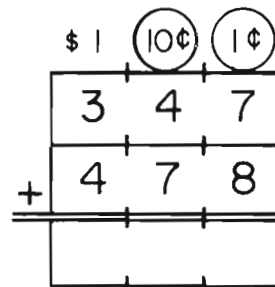
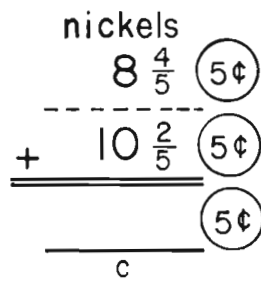
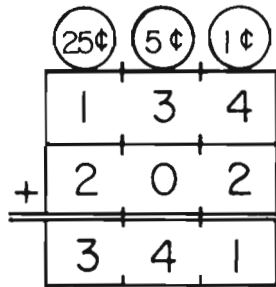
estimate: $\frac{\quad}{e} \times \frac{\quad}{a} = \frac{\quad}{e}$

$$\begin{array}{r} x \ 11 \\ \quad 11 \\ \hline \end{array}$$

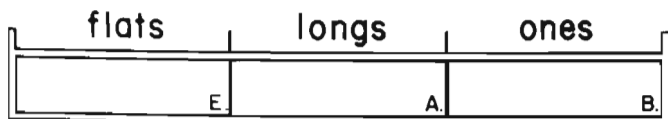
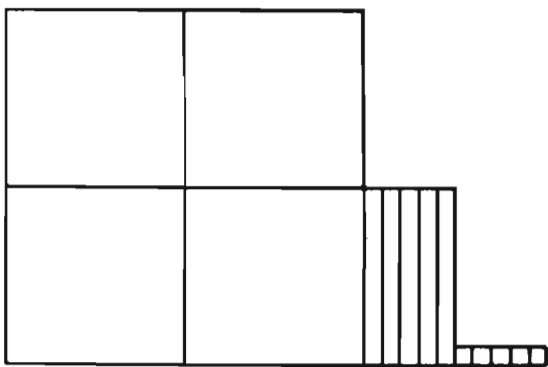
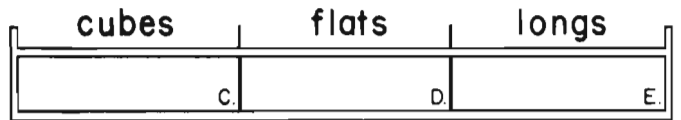
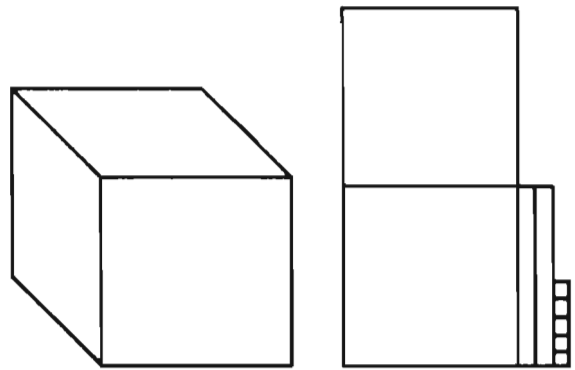
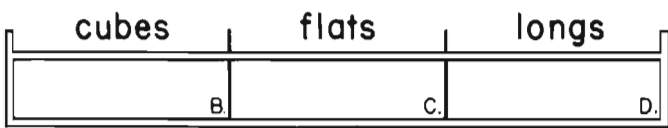
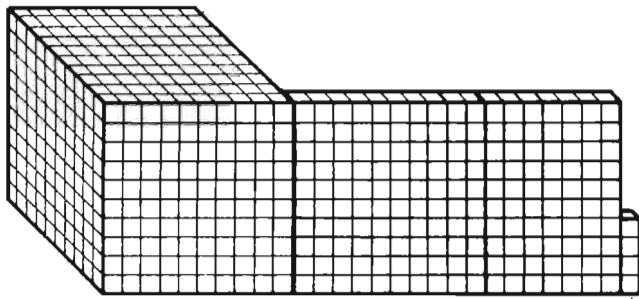
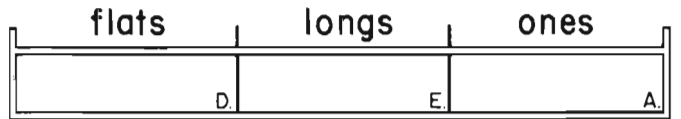
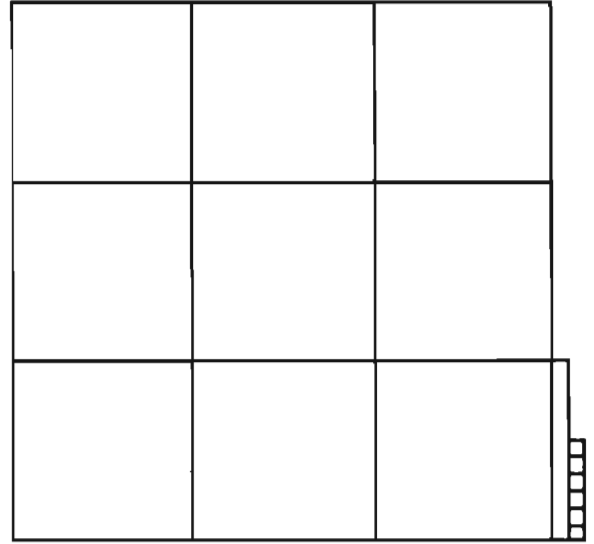
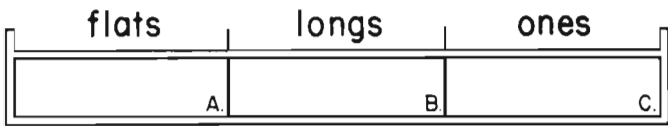
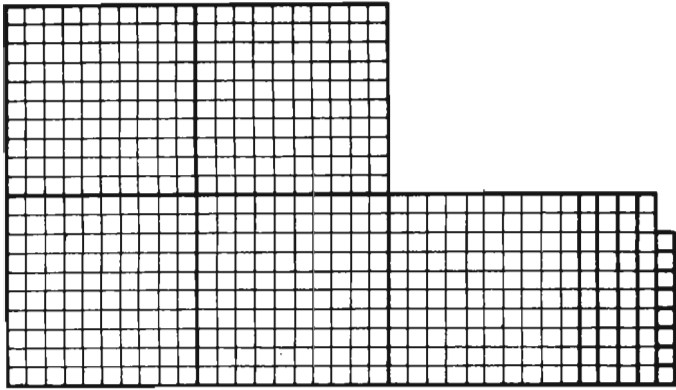
 c

a	b	c	d	e
200	37	20	47	10
20	38	400	28	13
19	121	34	10	144
10	200	10	39	100
96	20	21	400	20

Different ways of reporting measurements.



a	b	c	d	e
6,4,1	5,0,1	$19 \frac{1}{5}$	$14 \frac{1}{12}$	61.2
1,2,2	82.5	$7 \frac{2}{5}$	$5 \frac{2}{5}$	6.2
1,0,2	33.3	$34 \frac{1}{5}$	$15 \frac{1}{12}$	62.5



A.	B.	C.	D.	E.
916	455	548	117.4	122.5
4.98	1.174	1.345	9.16	12.12
5.48	345	11.74	12.25	4.55
45.5	54.8	1.225	8.75	91.6

Change to "simplest form" or "lowest terms".

Round off to the nearest 10.

Change to "equivalent fractions" with "least common denominator".

$$\frac{5}{10} = \frac{1}{2} = \frac{2}{4}$$

$$\frac{6}{9} = \frac{2}{3} = \frac{4}{6}$$

$$\frac{8}{100} = \frac{2}{25} = \frac{4}{50}$$

$$\frac{17}{34} \rightarrow \frac{1}{2}$$

$$\frac{34}{68} \rightarrow \frac{1}{2}$$

$$\frac{112}{224} \rightarrow \frac{1}{2}$$

$$\frac{358}{716} \rightarrow \frac{1}{2}$$

$$\frac{73}{146} \rightarrow \frac{1}{2}$$

$$\frac{96}{192} \rightarrow \frac{1}{2}$$

$$\frac{2}{3}, \frac{3}{4} \quad \frac{12}{12}, \frac{9}{12}$$

$$\frac{1}{2}, \frac{1}{4} \quad \frac{2}{4}, \frac{1}{4}$$

$$\frac{1}{3}, \frac{1}{2} \quad \frac{2}{6}, \frac{3}{6}$$

Estimate each answer by "rounding off each factor to the nearest 10." Then compare this "estimate" with the actual product.

estimate: $\underline{\quad} \times \underline{\quad} = \underline{\quad}$

$$\begin{array}{r} 17 \\ \times 13 \\ \hline \end{array}$$

----- larger
 =----- smaller
 ----- difference

estimate: $\underline{\quad} \times \underline{\quad} = \underline{\quad}$

$$\begin{array}{r} 18 \\ \times 18 \\ \hline \end{array}$$

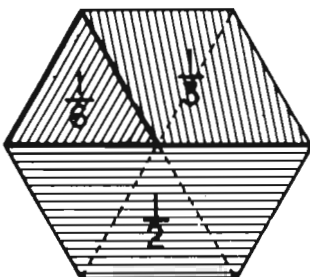
 =-----

	25¢	5¢	1¢
	2	0	4
+	1	3	3
<hr/>			

pennies
 ----- ¢
 =----- ¢
 ----- ¢

	\$1	10¢	1¢
	3	8	1
-	1	5	9
<hr/>			

dimes
 ----- 10¢
 =----- 10¢
 ----- 10¢



$$\frac{1}{2} + \frac{1}{3} + \frac{1}{6} =$$

$$\frac{1}{3} - \frac{1}{6} =$$

$$\frac{1}{2} - \frac{1}{3} =$$

$$\frac{1}{2} + \frac{1}{6} = \frac{2}{3}$$

$$\frac{5}{6} - \frac{1}{3} =$$



How do you feel?

The "Greedy Invisible Digit-Eating Gremlin" was here.

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \\ + \quad 4 \\ \hline \boxed{7} \end{array}$$

$$\begin{array}{r} \boxed{8} \\ - \quad \boxed{} \boxed{B} \\ \hline \boxed{3} \end{array}$$

$$\begin{array}{r} \boxed{9} \\ \times \boxed{} \boxed{A} \\ \hline \boxed{} \boxed{E} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{1} \\ + \quad \boxed{} \boxed{A} \\ \hline \boxed{1} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{F} \\ \times \quad 8 \\ \hline \boxed{2} \boxed{G} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{E} \\ \times \quad 7 \\ \hline \boxed{} \boxed{3} \boxed{G} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{D} \boxed{B} \\ - \quad \quad \quad \boxed{2} \\ \hline \quad \quad \quad \boxed{D} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \boxed{C} \\ + \quad \quad \quad 7 \\ \hline \boxed{2} \boxed{1} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{3} \boxed{A} \\ - \quad \quad \quad 3 \\ \hline \boxed{} \boxed{6} \boxed{A} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \boxed{C} \\ + \quad \quad \quad \boxed{C} \\ \hline \boxed{7} \boxed{0} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \boxed{B} \\ \times \quad \quad \quad \boxed{C} \\ \hline \boxed{4} \boxed{0} \end{array}$$

$$\begin{array}{r} \boxed{1} \boxed{2} \\ \times \quad \quad \quad \boxed{E} \\ \hline \boxed{2} \boxed{G} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \boxed{B} \\ + \quad \quad \quad \boxed{5} \\ \hline \boxed{} \boxed{} \boxed{A} \boxed{B} \boxed{0} \end{array}$$

$$\begin{array}{r} \boxed{9} \boxed{1} \boxed{} \boxed{C} \\ \boxed{} \boxed{} \boxed{} \boxed{D} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{} \boxed{4} \\ \boxed{} \boxed{} \boxed{E} \boxed{A} \boxed{6} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{C} \boxed{F} \\ \boxed{5} \boxed{} \boxed{} \boxed{0} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{E} \boxed{0} \\ \boxed{3} \boxed{6} \boxed{} \boxed{F} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{E} \\ \boxed{4} \boxed{1} \boxed{} \boxed{0} \boxed{E} \end{array}$$

$$\begin{array}{r} \boxed{2} \boxed{1} \\ + \quad \quad \quad \boxed{A} \\ \hline \boxed{} \boxed{0} \boxed{F} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{0} \boxed{A} \\ \times \quad 5 \\ \hline \boxed{} \boxed{} \boxed{E} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{2} \boxed{0} \\ \times \quad \quad \quad \boxed{G} \\ \hline \boxed{8} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{3} \boxed{4} \\ + \quad \quad \quad \boxed{A} \boxed{3} \\ \hline \boxed{4} \boxed{} \boxed{C} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{5} \boxed{G} \\ \times \quad \quad \quad \boxed{A} \\ \hline \boxed{7} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{} \boxed{A} \boxed{D} \\ \times \quad \quad \quad \boxed{E} \\ \hline \boxed{2} \boxed{2} \end{array}$$

$$\begin{array}{r} \boxed{1} \boxed{} \boxed{A} \\ \boxed{1} \boxed{} \boxed{E} \\ + \quad \quad \quad \boxed{A} \\ \hline \boxed{4} \boxed{7} \end{array}$$

$$\begin{array}{r} \boxed{} \boxed{8} \boxed{A} \\ \boxed{} \boxed{8} \boxed{D} \\ + \quad \quad \quad \boxed{B} \\ \hline \boxed{4} \boxed{4} \end{array}$$

$$\begin{array}{r} \boxed{1} \boxed{7} \\ \boxed{1} \boxed{7} \boxed{C} \\ + \quad \quad \quad \boxed{F} \\ \hline \boxed{5} \boxed{1} \end{array}$$

$$\begin{array}{r} \boxed{4} \boxed{5} \\ \boxed{} \boxed{} \boxed{3} \\ + \quad \quad \quad \boxed{F} \\ \hline \boxed{A} \boxed{1} \boxed{5} \end{array}$$

$$\begin{array}{r} \boxed{1} \boxed{5} \\ \boxed{} \boxed{} \boxed{6} \\ + \quad \quad \quad \boxed{A} \\ \hline \boxed{4} \boxed{B} \end{array}$$

$$\begin{array}{r} \boxed{2} \boxed{4} \\ \boxed{3} \boxed{5} \\ + \quad \quad \quad \boxed{B} \\ \hline \boxed{A} \boxed{} \boxed{E} \end{array}$$

G.I.D.E.G. must have been very hungry. There are at least 4 examples in which he ate too much. As you find them, please record them on page 63. For example:

$$\frac{9}{9} \times 1 \text{ and } \frac{9}{0} \times 0, \frac{10}{8} \text{ and } \frac{11}{9} \text{ and } 4 \overline{)16} \text{ and } 9 \overline{)36}$$

	A	B	C
D	1	8	?
E	9	5	2
F	3	0	7
G	6	?	4

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{40}{100} = \frac{4}{10} = \frac{2}{5}$$

$$\frac{27}{81} = \frac{1}{3} = \text{---} \text{ A}$$

$$\frac{16}{20} = \frac{4}{5} = \text{---} \text{ B}$$

$$\frac{9}{18} = \frac{1}{2} = \text{---} \text{ C}$$

$$\frac{3}{12} = \frac{1}{4} = \frac{3}{12} \text{ D}$$

Change to
% (per cent)

$$\frac{3}{4} = \frac{75}{100} = 75\%$$

$$\frac{1}{10} = \frac{10}{100} = 10\% \text{ E}$$

$$\frac{1}{5} = \frac{20}{100} = 20\% \text{ F}$$

$$\frac{2}{5} = \frac{40}{100} = 40\% \text{ A}$$

$$1 = \frac{100}{100} = 100\% \text{ B}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{1}{4}, \frac{1}{7} = \frac{7}{28}, \frac{4}{28}$$

$$\frac{1}{8}, \frac{1}{3} = \frac{3}{24}, \frac{8}{24} \text{ C}$$

$$\frac{1}{6}, \frac{1}{4} = \frac{2}{12}, \frac{3}{12} \text{ D}$$

$$\frac{2}{7}, \frac{3}{4} = \frac{6}{28}, \frac{21}{28} \text{ E}$$

$$\frac{2}{3}, \frac{5}{8} = \frac{10}{24}, \frac{15}{24} \text{ F}$$

"Round off to
the nearest 50"

$$\underline{26} \longrightarrow \underline{50}$$

$$\underline{174} \longrightarrow \underline{150}$$

$$\underline{277} \longrightarrow \underline{300}$$

$$\underline{70} \longrightarrow \underline{50}$$

$$\underline{140} \longrightarrow \text{---} \text{ A}$$

$$\underline{570} \longrightarrow \text{---} \text{ B}$$

$$\underline{680} \longrightarrow \text{---} \text{ C}$$

$$\underline{219} \longrightarrow \text{---} \text{ D}$$

$$\underline{498} \longrightarrow \text{---} \text{ E}$$

Change to a
"mixed number
in lowest terms"

$$\frac{14}{6} = 1 \frac{1}{3} = 2 \frac{1}{3}$$

-or-

$$\frac{14}{6} = \frac{7}{3} = \text{---}$$

$$\frac{15}{10} = \frac{3}{2} = \text{---} \text{ B}$$

$$\frac{25}{10} = \frac{5}{2} = \text{---} \text{ C}$$

$$\frac{25}{20} = \frac{5}{4} = \text{---} \text{ D}$$

Change to
a "common fraction"
in "lowest terms"

$$25\% = \frac{25}{100} = \frac{1}{4}$$

$$10\% = \frac{10}{100} = \frac{1}{10} \text{ E}$$

$$30\% = \frac{30}{100} = \frac{3}{10} \text{ F}$$

	A	B	C	D	E	F
	150	$1 \frac{1}{2}$	700	2,3	500	20%
	40%	550	$18 \frac{1}{2}$	200	$\frac{8}{28}, \frac{21}{28}$	$\frac{3}{10}$
	$\frac{3}{9}, \frac{1}{3}$	100%	$2 \frac{1}{2}$	18,6	$\frac{1}{10}$	200
	1050	$\frac{8}{10}, \frac{4}{5}$	$\frac{8}{10}, \frac{4}{5}$	$1 \frac{1}{4}$	10%	$\frac{16}{24}, \frac{15}{24}$

Another tactic and more language:

“Estimate” the answer by “rounding off” the “dividend” to the nearest 100, and the “divisor” to the nearest 10.

Then, please compare the “estimate” with the computed result.

estimate: $\frac{600}{a} \div \frac{20}{b} = \frac{30}{f}$

$$\begin{array}{r} 31 \\ 19 \overline{)589} \\ \underline{57} \\ 19 \end{array}$$

$$\begin{array}{r} 31 \\ \underline{30} \\ \text{difference} \end{array}$$

larger
smaller

estimate: $\frac{\quad}{e} \div \frac{\quad}{f} = \frac{\quad}{a}$

$$\begin{array}{r} \quad \\ 19 \overline{)703} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

$\underline{\quad}$
b

estimate: $\frac{\quad}{c} \div \frac{\quad}{d} = \frac{\quad}{e}$

$$\begin{array}{r} \quad \\ 19 \overline{)912} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

$\underline{\quad}$
f

estimate: $\frac{\quad}{a} \div \frac{\quad}{b} = \frac{\quad}{c}$

$$\begin{array}{r} \quad \\ 19 \overline{)1026} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

$\underline{\quad}$
d

estimate: $\frac{\quad}{e} \div \frac{\quad}{f} = \frac{\quad}{a}$

$$\begin{array}{r} \quad \\ 19 \overline{)1235} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

$\underline{\quad}$
b

estimate: $\frac{\quad}{c} \div \frac{\quad}{d} = \frac{\quad}{e}$

$$\begin{array}{r} \quad \\ 19 \overline{)1406} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

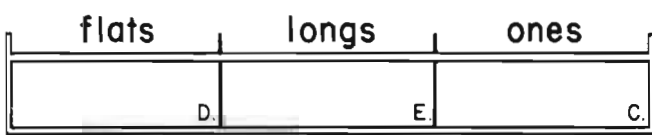
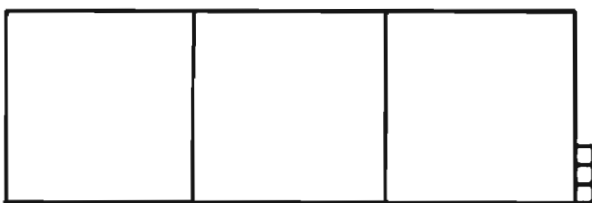
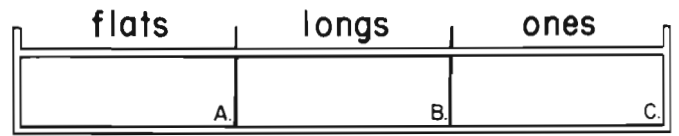
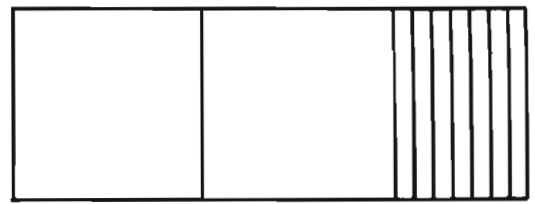
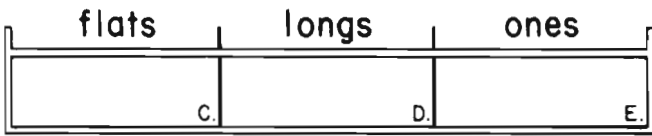
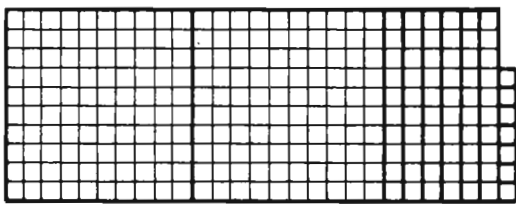
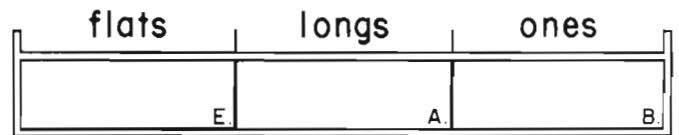
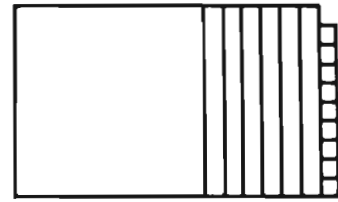
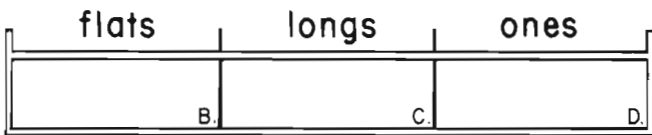
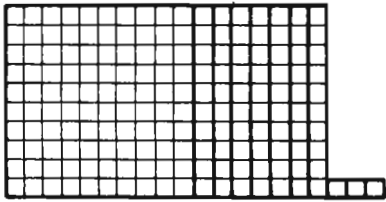
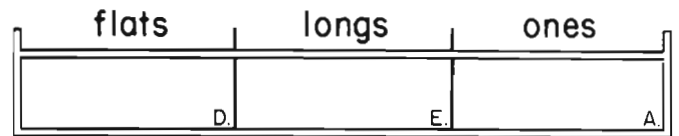
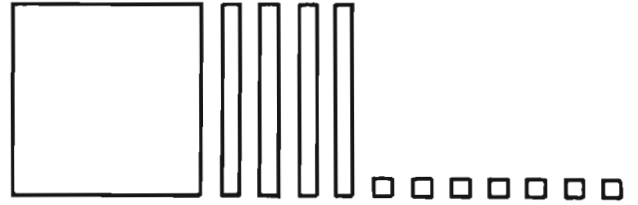
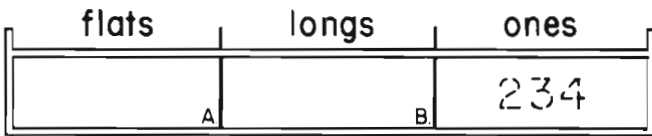
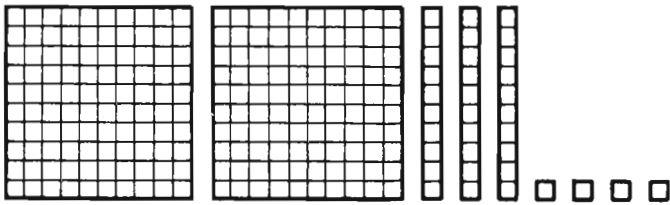
$\underline{\quad}$
f

estimate: $\frac{\quad}{a} \div \frac{\quad}{b} = \frac{\quad}{c}$

$$\begin{array}{r} \quad \\ 19 \overline{)1767} \\ \underline{\quad} \\ \quad \\ \underline{\quad} \\ \quad \end{array}$$

$\underline{\quad}$
d

a	b	c	d	e	f
600	7	40	1	50	0
1000	5	50	7	700	3
35	8	900	3	45	4
60	20	90	20	70	20
1800	2	1400	4	1200	30



	A.	B.	C.	D.	E.
F.	16.9	27	303	3.03	1.69
G.	2.7	23.4	2.67	173	147
H.	147	169	17.3	1.47	267
I.	2.34	1.73	270	26.7	30.3

Different ways of reporting measurements.

gal.	qt.	pt.
1	1	2
<hr/>		
+	1	3
<hr/>		
3	0	3

quarts

$$5 \frac{1}{2} \text{ qts.}$$

$$+ 7 \frac{1}{4} \text{ qts.}$$

$$12 \frac{3}{4} \text{ qts.}$$

\$	1	10¢	1¢
3	2	2	
<hr/>			
+	4	6	3
<hr/>			

dimes

$$32.2$$

$$+$$

d

yd.	ft.	in.
2	1	6
<hr/>		
-	0	2
<hr/>		

a

feet

$$7 \frac{1}{2} \text{ ft.}$$

$$- 2 \frac{1}{6} \text{ ft.}$$

b

m	dm	cm
5	4	3
<hr/>		
-	1	0
<hr/>		

decimeters

_____ dm

_____ dm

_____ dm

e

25¢	5¢	1¢
1	1	1
<hr/>		
		x 3
<hr/>		

c

nickels

$$6 \frac{1}{5} \text{ (5¢)}$$

$$\times 3$$

_____ (5¢)

d

\$	1	10¢	1¢
1	4	3	
<hr/>			
		x 3	
<hr/>			

dimes

_____ (10¢)

$$\times 3$$

_____ (10¢)

a

25¢	5¢	1¢
6	4	1
<hr/>		
		÷ 3
<hr/>		

e

nickels

_____ (5¢)

$$\div$$

_____ (5¢)

a

m	dm	cm
<hr/>		
		÷
<hr/>		

decimeters

$$45.0 \text{ dm}$$

$$\div 2$$

_____ dm

b

cases

6-paks	24	6	cans
1	2	3	
<hr/>			
+	2	0	5
<hr/>			

b

6-paks

_____ 6-paks

$$+$$

_____ 6-paks

_____ 6-paks

c

a	b	c	d	e
$11 \frac{2}{5}$	22.5	3,3,3	78.5	8,1,2
1,2,4	3,3,2	$15 \frac{1}{3}$	$18 \frac{3}{5}$	43.4
42.9	$5 \frac{1}{3}$	14	16	2,1,2

Different ways of reporting measurements.

	yd.	ft.	in.
	1	2	6
+	1	2	6
<hr/>			

a

feet

$$5\frac{1}{2} \text{ ft.}$$

$$+ 5\frac{1}{2} \text{ ft.}$$

b

	1	10¢	1¢
	2	5	2
+	3	5	6
<hr/>			

dimes

$$25.2 \text{ } 10¢$$

$$+ \text{ } 10¢$$

$$\text{ } 10¢$$

c

	25¢	5¢	1¢
	3	3	3
-	1	1	1
<hr/>			

a

nickels

$$18\frac{3}{5} \text{ } 5¢$$

$$- \text{ } 5¢$$

$$\text{ } 5¢$$

b

	m	dm	cm
	7	0	8
-	1	6	5
<hr/>			

decimeters

dm

dm

e

	yd.	ft.	in.
	2	1	6
			x 2
<hr/>			

a

feet

$$7\frac{1}{2} \text{ ft.}$$

$$\times 2$$

b

	1	10¢	1¢
	1	1	4
			x 5
<hr/>			

dimes

$$\text{ } 10¢$$

$$\times 5$$

$$\text{ } 10¢$$

e

	yd.	ft.	in.
	4	2	6
			÷ 2
<hr/>			

c

feet

$$14\frac{1}{2} \text{ ft.}$$

$$\div 2$$

d

	m	dm	cm
	6	2	4
			÷ 3
<hr/>			

decimeters

dm

$$\div 3$$

e

	gal.	qts.	$\frac{1}{2}$ pt.
	2	1	2
+	1	2	2
<hr/>			

c

quarts

$$9\frac{1}{2} \text{ qt.}$$

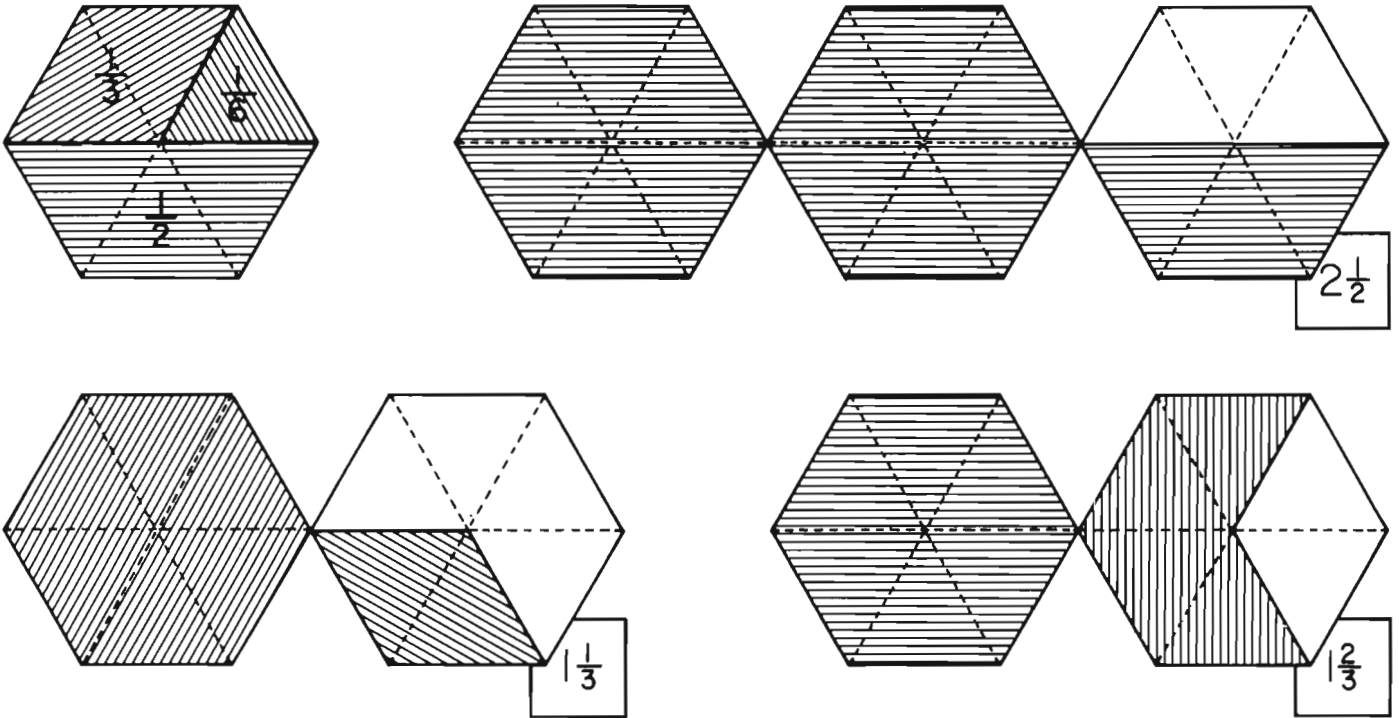
$$+ \text{ } \text{qt.}$$

$$\text{ } \text{qt.}$$

d

a	b	c	d	e
2,2,2	$12\frac{2}{5}$	2,1,3	$6\frac{3}{4}$	20.8
3,2,0	11	60.8	16	54.3
5,0,0	15	4,0,0	$7\frac{1}{4}$	57.0

What Can You See?



$$\frac{1}{3} + \frac{1}{6} = \text{---}^a$$

$$1\frac{1}{2} + 1 = \text{---}^b$$

$$\frac{5}{6} + \frac{1}{2} = \text{---}^c$$

$$\frac{5}{6} + \frac{5}{6} = \text{---}^d$$

$$2\frac{1}{2} - \frac{1}{2} = \text{---}^e$$

$$1\frac{1}{3} - \frac{1}{6} = \text{---}^a$$

$$1\frac{2}{3} - \frac{1}{6} = \text{---}^b$$

$$1\frac{2}{3} - \frac{1}{2} = \text{---}^a$$

$$2\frac{1}{2} - 1\frac{1}{2} = \text{---}^c$$

$$2\frac{1}{2} - 1\frac{1}{6} = \text{---}^c$$

$$2\frac{1}{2} - \frac{1}{3} = \text{---}^d$$

$$1\frac{1}{3} - \frac{2}{3} = \text{---}^e$$

$$2\frac{1}{2} = \frac{5}{2}$$

$$1\frac{1}{3} = \frac{4}{3}^b$$

$$2 = \frac{12}{6}^b$$

$$1\frac{1}{6} = \frac{7}{6}^e$$

$$2\frac{1}{2} = \frac{5}{2}$$

$$1\frac{1}{2} = \frac{3}{2}^a$$

$$1\frac{1}{2} = \frac{3}{2}^c$$

$$1\frac{2}{3} = \frac{5}{3}^d$$

$$\frac{1}{2} = \frac{3}{6}^a$$

$$\frac{1}{3} = \frac{2}{6}^e$$

$$\frac{2}{3} = \frac{4}{6}^b$$

$$1\frac{1}{2} = \frac{3}{2}^a$$

$$2\frac{1}{3} = \frac{5}{3}^e$$

$$3\frac{1}{3} = \frac{10}{3}^d$$

a	b	c	d	e
$\frac{1}{6}$	$2\frac{1}{2}$	1	$2\frac{1}{6}$	$\frac{2}{3}$
$\frac{1}{2}$	4	9	$1\frac{2}{3}$	2
3	$1\frac{1}{2}$	$1\frac{1}{3}$	10	7

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{8}{4} = \frac{2}{1} = 2$$

$$\frac{4}{8} = \frac{2}{4} = \text{---} \text{ A}$$

$$\frac{8}{12} = \frac{2}{3} = \text{---} \text{ B}$$

$$\frac{18}{6} = \frac{3}{1} = \text{---} \text{ C}$$

$$\frac{8}{36} = \frac{2}{9} = \text{---} \text{ D}$$

"Round off to
the nearest 10"

$$\frac{16}{14} \longrightarrow \frac{20}{10}$$

$$\frac{47}{103} \longrightarrow \frac{\text{---}}{\text{---}} \text{ E}$$

$$\frac{98}{52} \longrightarrow \frac{\text{---}}{\text{---}} \text{ F}$$

$$\frac{116}{211} \longrightarrow \frac{\text{---}}{\text{---}} \text{ H}$$

$$\frac{33}{52} \longrightarrow \frac{\text{---}}{\text{---}} \text{ G}$$

$$\frac{116}{116} \longrightarrow \frac{\text{---}}{\text{---}} \text{ I}$$

$$\frac{211}{33} \longrightarrow \frac{\text{---}}{\text{---}} \text{ J}$$

$$\frac{33}{33} \longrightarrow \frac{\text{---}}{\text{---}} \text{ E}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{1}{5}, \frac{1}{3} = \frac{3}{15}, \frac{5}{15}$$

$$\frac{2}{5}, \frac{2}{3} = \frac{\text{---}}{15}, \frac{\text{---}}{15} \text{ A}$$

$$\frac{3}{4}, \frac{2}{3} = \frac{\text{---}}{\text{---}}, \frac{\text{---}}{\text{---}} \text{ B}$$

$$\frac{1}{9}, \frac{1}{3} = \frac{\text{---}}{\text{---}}, \frac{\text{---}}{\text{---}} \text{ C}$$

$$\frac{3}{8}, \frac{1}{2} = \frac{\text{---}}{\text{---}}, \frac{\text{---}}{\text{---}} \text{ D}$$

"Round off to
the nearest 100"

$$\frac{187}{113} \longrightarrow \frac{200}{100}$$

$$\frac{275}{225} \longrightarrow \frac{300}{\text{---}} \text{ A}$$

$$\frac{860}{755} \longrightarrow \frac{\text{---}}{800} \text{ B}$$

$$\frac{745}{168} \longrightarrow \frac{\text{---}}{\text{---}} \text{ I}$$

$$\frac{1,283}{\text{---}} \longrightarrow \frac{\text{---}}{\text{---}} \text{ J}$$

Change to a
"mixed number
in lowest terms"

$$\frac{10}{8} = 1\frac{2}{8} = 1\frac{1}{4}$$

- or -

$$\frac{10}{8} = \frac{5}{4} = \text{---}$$

$$\frac{15}{6} = \frac{5}{2} = 2\frac{\text{---}}{\text{---}}$$

$$\frac{14}{4} = \frac{\text{---}}{\text{---}} = \text{---}$$

$$3\frac{8}{12} = 3\frac{2}{3} = \text{---}$$

Change to a
"common fraction"
in "lowest terms"

$$.75 = \frac{\text{---}}{100} = \text{---} \text{ D}$$

$$.8 = \frac{\text{---}}{10} = \text{---} \text{ E}$$

$$.02 = \frac{\text{---}}{100} = \text{---} \text{ F}$$

	A	B	C	D	E	F
B	2600	$\frac{2}{3}$	$3\frac{2}{3}$	1500	50	40
H	6,10	900	$\frac{1}{3}, \frac{3}{9}$	$\frac{2}{9}$	30	100
C	200	$\frac{9}{12}, \frac{8}{12}$	3	$\frac{3}{4}$	120	$\frac{1}{50}$
J	$\frac{1}{2}$	$3\frac{1}{2}$	1300	$\frac{3}{8}, \frac{4}{8}$	$\frac{4}{5}$	210

Another tactic and more language:

“Estimate” the answer by “rounding off” the “dividend” to the nearest 100, and the “divisor” to the nearest 10. Then, please compare the “estimate” with the computed result.

estimate: $\frac{200}{f} \div \frac{10}{e} = \frac{20}{b}$

$$\begin{array}{r} 23 \\ 8 \overline{)184} \\ \underline{16} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

$\frac{23}{} \xrightarrow{\text{larger}}$
 $\frac{20}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{e} \div \frac{}{f} = \frac{}{a}$

$$\begin{array}{r} \\ 9 \overline{)378} \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{c} \div \frac{}{d} = \frac{}{e}$

$$\begin{array}{r} 12 \\ 12 \overline{)144} \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{a} \div \frac{}{b} = \frac{}{c}$

$$\begin{array}{r} \\ 18 \overline{)468} \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{e} \div \frac{}{f} = \frac{}{a}$

$$\begin{array}{r} \\ 23 \overline{)437} \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{c} \div \frac{}{d} = \frac{}{e}$

$$\begin{array}{r} \\ 36 \overline{)972} \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

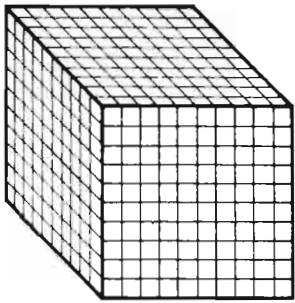
$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

estimate: $\frac{}{a} \div \frac{}{b} = \frac{}{c}$

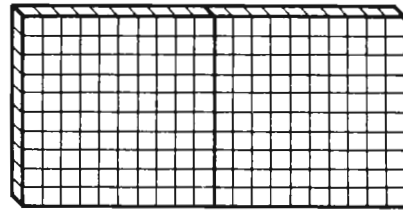
$$\begin{array}{r} \\ 34 \overline{)1224} \\ \underline{} \\ \\ \underline{} \\ \end{array}$$

$\frac{}{} \xrightarrow{\text{larger}}$
 $\frac{}{} \xleftarrow{\text{smaller}}$
 $\frac{}{} \xrightarrow{\text{difference}}$

a	b	c	d	e	f
20	9	1100	40	500	200
7	2	100	1	400	2
40	20	40	3	10	20
1200	30	25	10	300	100
500	1	1000	4	25	10



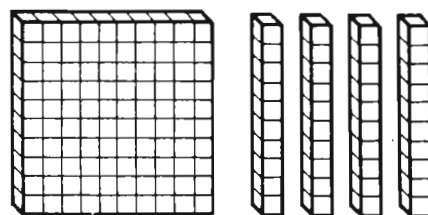
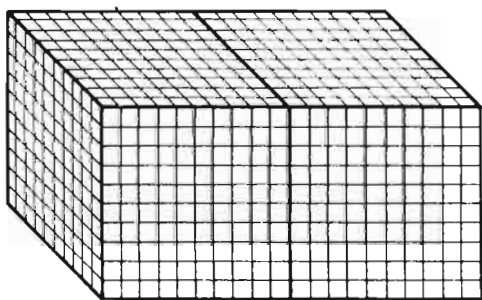
1 cube
10 flats
100 longs
1000 ones



.2 cube
2 flats
___ longs
___ ones

cubes	flats	longs
$\begin{array}{r} 1 \\ \times 2 \\ \hline \end{array}$ A.	$\begin{array}{r} 10 \\ \times 2 \\ \hline \end{array}$ B.	$\begin{array}{r} 100 \\ \times 2 \\ \hline \end{array}$ F.
E. $2 \overline{)1.0}$	A. $2 \overline{)10}$	B. $2 \overline{) \quad}$ C.
C. $4 \overline{)1.00}$	D. $4 \overline{)10.0}$	E. $4 \overline{) \quad}$ J.

flats	longs	ones
$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$ A.	$\begin{array}{r} 20 \\ \times 2 \\ \hline \end{array}$ B.	$\begin{array}{r} 200 \\ \times 2 \\ \hline \end{array}$ C.
E. $4 \overline{)2.0}$	A. $4 \overline{)20}$	B. $4 \overline{) \quad}$
C. $8 \overline{)2.00}$	D. $8 \overline{)20.0}$	E. $8 \overline{) \quad}$



2.14 cubes
___ A. flats
___ B. longs
___ C. ones

cubes	flats	longs	ones
A. $2 \overline{)2.14}$	B. $2 \overline{)21.4}$	C. $2 \overline{)214}$	D. $2 \overline{)2140}$
E. $4 \overline{)2.140}$	F. $4 \overline{) \quad}$	D. $4 \overline{) \quad}$	$4 \overline{) \quad}$
D. $5 \overline{)2.140}$	E. $5 \overline{) \quad}$	$5 \overline{) \quad}$	$5 \overline{) \quad}$

	A.	B.	C.	D.	E.
F.	1.07	214	107	200	5.35
G.	2	50	400	53.5	25
H.	4	20	.25	1070	.5
I.	5	10.7	2140	2.5	.535
J.	2.14	40	100	428	4.28

Change to "equivalent fractions" with the "least common denominator"

"Round off to the nearest 100"

Change to a "common fraction" in "simplest form" or "lowest terms"

$$\frac{1}{2}, \frac{3}{8} = \frac{\quad}{8}, \frac{\quad}{8}$$

$$\frac{1}{5}, \frac{1}{3} = \frac{\quad}{\quad}, \frac{\quad}{\quad}$$

$$\frac{2}{3}, \frac{3}{4} = \frac{\quad}{\quad}, \frac{\quad}{\quad}$$

$$\frac{175}{\quad} \rightarrow \underline{\quad}$$

$$\frac{113}{\quad} \rightarrow \underline{\quad}$$

$$\frac{909}{\quad} \rightarrow \underline{\quad}$$

$$\frac{990}{\quad} \rightarrow \underline{\quad}$$

$$\frac{1346}{\quad} \rightarrow \underline{\quad}$$

$$50\% = \frac{\quad}{\quad}$$

$$25\% = \frac{\quad}{\quad}$$

$$10\% = \frac{\quad}{\quad}$$

$$75\% = \frac{\quad}{\quad}$$

Estimate answers by "rounding off" the "divisor" to the nearest 10 and the "dividend" to the nearest 100. Then compare this "estimate" with the actual result.

estimate: $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \frac{\quad}{\quad}$

$$22 \overline{) 396}$$

----- larger
 ===== smaller
 _____ difference

estimate: $\frac{\quad}{\quad} \div \frac{\quad}{\quad} = \frac{\quad}{\quad}$

$$37 \overline{) 1184}$$

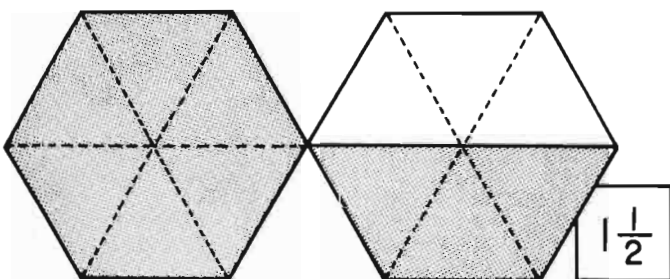
 =====

yd.	ft.	in.
4	0	6
-	1	19

feet
 ----- ft.
 ===== ft.
 _____ ff.

m	dm	cm
3	4	6
+	2	77

centimeters
 ----- cm
 ===== cm
 _____ cm



$$\frac{1}{2} = \frac{\quad}{2}$$

$$\frac{1}{2} = \frac{\quad}{6}$$

$$\frac{1}{2} - 1 = \frac{\quad}{\quad}$$

$$\frac{1}{2} - \frac{1}{3} = \frac{\quad}{\quad}$$

$$\frac{1}{2} - \frac{2}{3} = \frac{\quad}{\quad}$$



How do you feel ?

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{20}{6} = 3\frac{2}{6} = \quad \text{A}$$

or

$$\frac{20}{6} = \frac{10}{3} = \quad \text{B}$$

$$\frac{30}{4} = \quad = \quad \text{C}$$

$$\frac{50}{8} = \quad = \quad \text{D}$$

$$\frac{44}{8} = \quad = \quad \text{E}$$

Change to a
"decimal fraction"

$$10\% = \frac{\quad}{100} = .1$$

$$5\% = \frac{\quad}{100} = \quad \text{F}$$

$$15\% = \frac{\quad}{100} = \quad \text{A}$$

$$35\% = \frac{\quad}{100} = \quad \text{B}$$

$$85\% = \frac{\quad}{100} = \quad \text{C}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{1}{8}, \frac{1}{7} = \frac{\quad}{\quad}, \frac{\quad}{\quad} \text{D}$$

$$\frac{2}{5}, \frac{5}{6} = \frac{\quad}{\quad}, \frac{\quad}{\quad} \text{E}$$

$$\frac{1}{8}, \frac{1}{6} = \frac{\quad}{\quad}, \frac{\quad}{\quad} \text{F}$$

$$\frac{3}{7}, \frac{2}{5} = \frac{\quad}{\quad}, \frac{\quad}{\quad} \text{A}$$

$$\frac{2}{9}, \frac{5}{6} = \frac{\quad}{\quad}, \frac{\quad}{\quad} \text{B}$$

"Round off to
the nearest 10"

$$\underline{15.5} \longrightarrow \underline{20}$$

$$\underline{43.97} \longrightarrow \underline{40}$$

$$\underline{1487} \longrightarrow \underline{1490}$$

$$\underline{24.5} \longrightarrow \underline{\quad} \text{C}$$

$$\underline{97.13} \longrightarrow \underline{\quad} \text{D}$$

$$\underline{105.9} \longrightarrow \underline{\quad} \text{E}$$

$$\underline{104.9} \longrightarrow \underline{\quad} \text{F}$$

$$\underline{9 \times 7} \longrightarrow \underline{\quad} \text{A}$$

$$\underline{6 \times 8} \longrightarrow \underline{\quad} \text{B}$$

Change to
"equivalent fractions
with other denominators"

$$1\frac{1}{2} = \frac{9}{6} = \frac{\quad}{30} \text{E}$$

$$1\frac{3}{4} = \frac{\quad}{8} = \frac{\quad}{12} \text{F}$$

$$2\frac{1}{3} = \frac{\quad}{18} = \frac{\quad}{12} \text{A}$$

$$1\frac{2}{3} = \frac{\quad}{6} = \frac{\quad}{24} \text{B}$$

$$2\frac{1}{5} = \frac{\quad}{10} = \frac{\quad}{100} \text{C}$$

Change to a
"mixed number"
in "lowest terms"

$$150\% = \frac{\quad}{100} = 1\frac{1}{2}$$

$$225\% = \frac{\quad}{100} = \quad \text{D}$$

$$110\% = \frac{\quad}{100} = \quad \text{E}$$

A	B	C	D	E	F
60	40	20	60	$1\frac{1}{10}$	.05
$3\frac{1}{3}$	$\frac{4\frac{15}{18}}$	$7\frac{1}{2}$	$\frac{7\frac{8}{56}}$	90	100
28	.35	70	100	$5\frac{1}{2}$	21
$\frac{15\frac{14}{35}}$	50	220	$6\frac{1}{4}$	110	$\frac{3\frac{4}{24}}$
.15	$3\frac{1}{3}$	.85	$2\frac{1}{4}$	$\frac{12\frac{25}{30}}$	19

Another tactic and more language:

“Estimate” the answer by “rounding off each factor to the nearest 10”.
Then compare the “estimate” with the actual product.

estimate: $20 \times 30 = 600$

$$\begin{array}{r} 26 \\ \times 24 \\ \hline \end{array}$$

larger
smaller
difference
d

estimate: $\frac{\quad}{e} \times \frac{\quad}{a} = \frac{\quad}{b}$

$$\begin{array}{r} 21 \\ \times 21 \\ \hline \end{array}$$

c

estimate: $\frac{\quad}{a} \times \frac{\quad}{e} = \frac{\quad}{a}$

$$\begin{array}{r} 24 \\ \times 24 \\ \hline \end{array}$$

b

estimate: $\frac{\quad}{c} \times \frac{\quad}{d} = \frac{\quad}{e}$

$$\begin{array}{r} 26 \\ \times 26 \\ \hline \end{array}$$

a

estimate: $\frac{\quad}{b} \times \frac{\quad}{c} = \frac{\quad}{d}$

$$\begin{array}{r} 29 \\ \times 29 \\ \hline \end{array}$$

e

estimate: $\frac{\quad}{a} \times \frac{\quad}{b} = \frac{\quad}{c}$

$$\begin{array}{r} 23 \\ \times 58 \\ \hline \end{array}$$

d

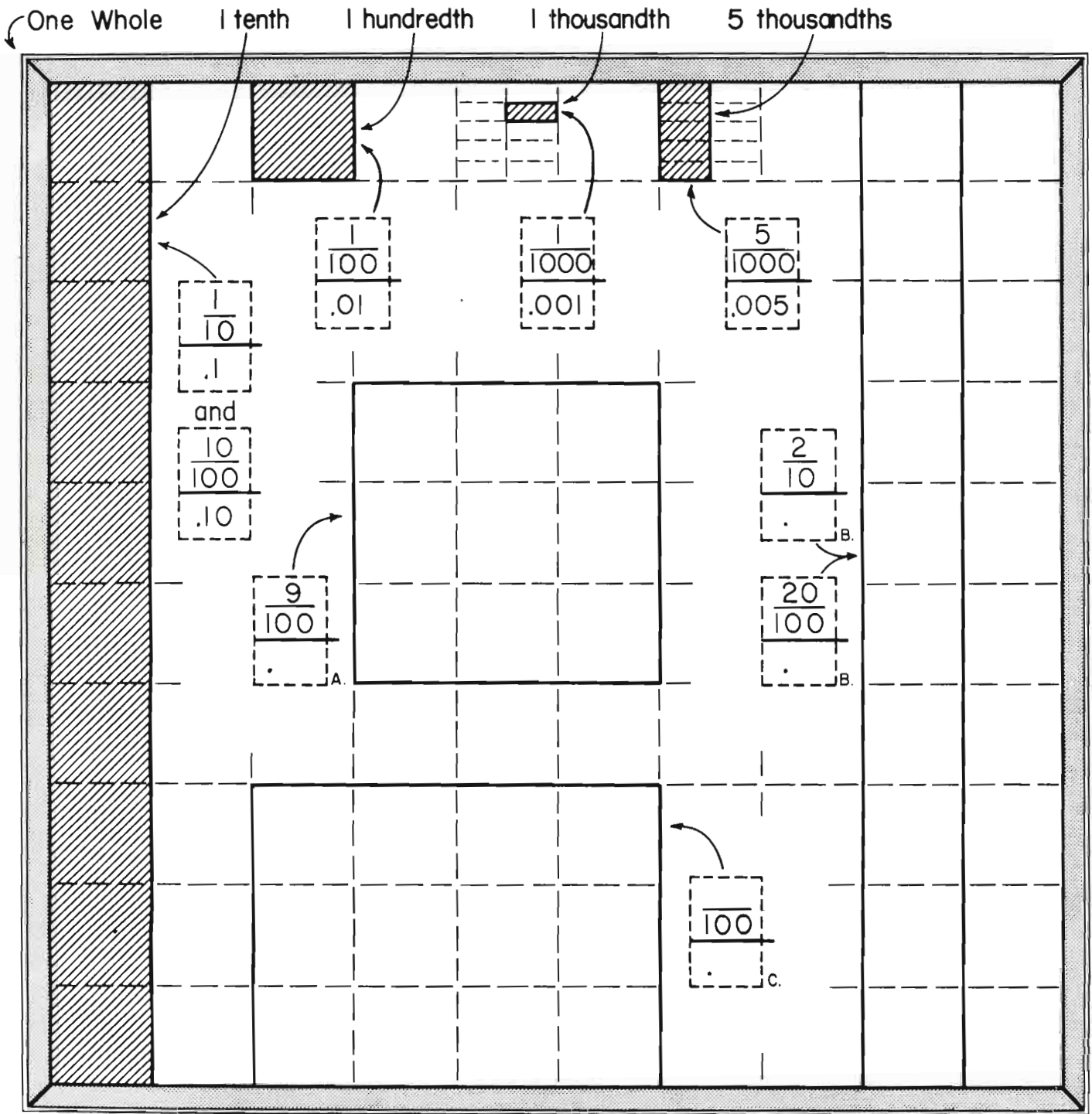
estimate: $\frac{\quad}{e} \times \frac{\quad}{a} = \frac{\quad}{b}$

$$\begin{array}{r} 28 \\ \times 53 \\ \hline \end{array}$$

c

a	b	c	d	e
124	400	1200	256	59
224	176	30	134	20
20	60	16	24	512
400	1500	41	900	900
50	30	30	30	30

Thousands . . . Hundreds . . . Tens . . . Ones . . . Tenths . . . Hundredths . . . Thousandths



$$\frac{2}{10} + \frac{3}{10} = \frac{\quad}{\quad}$$

$$. \text{ }_{\text{B}} + . \text{ }_{\text{D}} = . \text{ }_{\text{A}}$$

$$\frac{12}{100} - \frac{3}{100} = \frac{\quad}{\quad} \text{ }_{\text{D}}$$

$$. \text{ }_{\text{C}} - . \text{ }_{\text{C}} = . \text{ }_{\text{A}}$$

A.	B.	C.	D.
.5	.20	.03	.3
.09	.2	.12	$\frac{9}{100}$

Different ways of reporting measurements.

yd.	ft.	in.	
2	0	8	
<hr/>			
+	1	2	11
<hr/>			
4	0	7	

feet

6 $\frac{8}{12}$	ft.	
<hr/>		
+	5 $\frac{11}{12}$	ft.
<hr/>		
_____	ft.	
d		

\$1	10¢	1¢	
4	9	6	
<hr/>			
+	3	0	8
<hr/>			

cents

_____	¢	
<hr/>		
+	_____	¢
<hr/>		
_____	¢	
b		

yd.	ft.	in.	
3	2	0	
<hr/>			
-	1	1	7
<hr/>			

a			

feet

_____	ft.	
<hr/>		
-	_____	ft.
<hr/>		
_____	ft.	
d		

m	dm	cm	
6	0	0	
<hr/>			
-	1	2	8
<hr/>			

centimeters

_____	cm	
<hr/>		
-	_____	cm
<hr/>		
_____	cm	
b		

yd.	ft.	in.
1	1	6
<hr/>		
x	4	
<hr/>		

a		

feet

_____	ft.
<hr/>	
x	4
<hr/>	
_____	ft.
c	

\$1	10¢	1¢
1	6	5
<hr/>		
x	3	
<hr/>		

dimes

_____	10¢
<hr/>	
x	3
<hr/>	
_____	10¢
c	

yd.	ft.	in.
6	1	9
<hr/>		
÷	3	
<hr/>		

a		

feet

_____	ft.
<hr/>	
÷	
<hr/>	
_____	ft.
d	

m	dm	cm
3	2	4
<hr/>		
÷	6	
<hr/>		

decimeters

_____	dm
<hr/>	
÷	6
<hr/>	
_____	dm
c	

wk.	da.	hrs.
1	0	15
<hr/>		
+	1	10
<hr/>		

b		

hours

_____	hr.	
<hr/>		
+	_____	hr.
<hr/>		
_____	hr.	
e		

a	b	c	d	e
6,0,0	1,2,1	18	6 $\frac{5}{12}$	149
2,0,7	804	49.5	6 $\frac{7}{12}$	217
2,0,5	472	5,4	12 $\frac{7}{12}$	304

A General Plan for adding and subtracting "proper fractions"

. . . using "least common denominator" or "smallest common unit."

$$\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6} = \frac{7}{6} = 1\frac{1}{6} \leftarrow \text{"changed to simplest forms"}$$

↑ ↑
"least common denominator"

$$\frac{1}{2} - \frac{1}{6} = \frac{3}{6} - \frac{1}{6} = \frac{2}{6} = \frac{1}{3} \text{ A.}$$

$$\frac{3}{5} - \frac{1}{10} = \frac{6}{10} - \frac{1}{10} = \frac{5}{10} = \frac{1}{2} \text{ B.}$$

$$\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12} \text{ C.}$$

$$\frac{1}{2} - \frac{3}{10} = \frac{5}{10} - \frac{3}{10} = \frac{2}{10} = \frac{1}{5} \text{ D.}$$

$$\frac{1}{6} + \frac{1}{4} = \frac{2}{12} + \frac{3}{12} = \frac{5}{12} \text{ E.}$$

$$\frac{2}{3} + \frac{3}{4} = \frac{8}{12} + \frac{9}{12} = \frac{17}{12} = 1\frac{5}{12} \text{ A.}$$

$$\frac{2}{3} - \frac{1}{6} = \frac{4}{6} - \frac{1}{6} = \frac{3}{6} = \frac{1}{2} \text{ B.}$$

$$\frac{3}{5} + \frac{1}{3} = \frac{6}{15} + \frac{5}{15} = \frac{11}{15} \text{ C.}$$

$$\frac{3}{8} + \frac{2}{3} = \frac{9}{24} + \frac{16}{24} = \frac{25}{24} = 1\frac{1}{24} \text{ D.}$$

$$\frac{1}{2} - \frac{2}{7} = \frac{7}{14} - \frac{4}{14} = \frac{3}{14} \text{ E.}$$

Sometimes it is useful to change a "mixed number" to an "improper fraction".

$$1\frac{1}{2} - \frac{1}{3} = \frac{3}{2} - \frac{1}{3} = \frac{9}{6} - \frac{2}{6} = \frac{7}{6} = 1\frac{1}{6} \text{ A}$$

$$1\frac{2}{5} + 2\frac{1}{10} = \frac{7}{5} + \frac{2}{10} = \frac{14}{10} + \frac{2}{10} = \frac{16}{10} = 1\frac{8}{10} = 1\frac{4}{5} \text{ B.}$$

$$1\frac{1}{4} + 1\frac{1}{2} = \frac{5}{4} + \frac{2}{2} = \frac{5}{4} + \frac{4}{4} = \frac{9}{4} = 2\frac{1}{4} \text{ C.}$$

$$1\frac{1}{3} - \frac{3}{4} = \frac{4}{3} - \frac{3}{4} = \frac{16}{12} - \frac{9}{12} = \frac{7}{12} \text{ C.}$$

$$\frac{1}{2} + 1\frac{1}{3} = \frac{1}{2} + \frac{4}{3} = \frac{3}{6} + \frac{8}{6} = \frac{11}{6} = 1\frac{5}{6} \text{ D.}$$

$$1\frac{1}{4} - \frac{5}{6} = \frac{5}{4} - \frac{5}{6} = \frac{15}{12} - \frac{10}{12} = \frac{5}{12} \text{ E.}$$

A	B	C	D	E
$1\frac{1}{6}$	$\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{1}{24}$	$\frac{5}{12}$
$1\frac{5}{12}$	$\frac{3}{4}$	$\frac{7}{12}$	$1\frac{5}{6}$	$\frac{3}{14}$
$\frac{1}{3}$	$3\frac{1}{2}$	$\frac{14}{15}$	$\frac{1}{5}$	$\frac{7}{8}$

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$$

$$\frac{8}{4} = \frac{2}{1} = 2 \quad \text{A}$$

$$\frac{15}{10} = \frac{3}{2} = 1\frac{1}{2} \quad \text{B}$$

$$\frac{12}{18} = \frac{2}{3} = 0\frac{2}{3} \quad \text{C}$$

$$\frac{14}{12} = 1\frac{1}{3} = 1\frac{2}{6} \quad \text{D}$$

"Round off to
the nearest 100"

$$\frac{175.8}{758} \longrightarrow \frac{200}{1000} \quad \text{E}$$

$$\frac{75.81}{187\frac{1}{2}} \longrightarrow \frac{100}{200} \quad \text{F}$$

$$\frac{75.81}{187\frac{1}{2}} \longrightarrow \frac{100}{200} \quad \text{F}$$

$$\frac{187\frac{1}{2}}{459.1} \longrightarrow \frac{200}{500} \quad \text{A}$$

$$\frac{459.1}{954.1} \longrightarrow \frac{500}{1000} \quad \text{B}$$

$$\frac{954.1}{945.1} \longrightarrow \frac{1000}{1000} \quad \text{C}$$

$$\frac{945.1}{95.41} \longrightarrow \frac{1000}{100} \quad \text{D}$$

$$\frac{95.41}{94.51} \longrightarrow \frac{1000}{100} \quad \text{D}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{1}{3}, \frac{1}{7} = \frac{7}{21}, \frac{3}{21} \quad \text{A}$$

$$\frac{1}{4}, \frac{1}{6} = \frac{3}{12}, \frac{2}{12} \quad \text{B}$$

$$\frac{3}{4}, \frac{5}{8} = \frac{6}{8}, \frac{5}{8} \quad \text{C}$$

$$\frac{1}{7}, \frac{1}{9} = \frac{9}{63}, \frac{7}{63} \quad \text{D}$$

$$\frac{1}{5}, \frac{1}{6} = \frac{6}{30}, \frac{5}{30} \quad \text{E}$$

Change to
"equivalent fractions
with other denominators"

$$\frac{2}{3} = \frac{4}{6} = \frac{2}{3} \quad \text{F}$$

$$\frac{3}{4} = \frac{6}{8} = \frac{9}{12} \quad \text{A}$$

$$\frac{1}{7} = \frac{2}{14} = \frac{3}{21} \quad \text{B}$$

$$\frac{2}{9} = \frac{4}{18} = \frac{2}{9} \quad \text{C}$$

$$\frac{5}{6} = \frac{10}{12} = \frac{5}{6} \quad \text{D}$$

Change to a
"decimal fraction"

$$\frac{1}{5} = \frac{2}{10} = 0.2 \quad \text{E}$$

$$\frac{1}{10} = \frac{1}{10} = 0.1 \quad \text{F}$$

$$\frac{1}{20} = \frac{5}{100} = 0.05 \quad \text{A}$$

$$\frac{1}{25} = \frac{4}{100} = 0.04 \quad \text{B}$$

$$\frac{7}{25} = \frac{28}{100} = 0.28 \quad \text{C}$$

Change to a
"common fraction"
in "lowest terms"

$$10\% = \frac{10}{100} = \frac{1}{10} \quad \text{D}$$

$$5\% = \frac{5}{100} = \frac{1}{20} \quad \text{E}$$

$$15\% = \frac{15}{100} = \frac{3}{20} \quad \text{F}$$

	A	B	C	D	E	F
A	6, 9	$\frac{3}{12}, \frac{2}{12}$	900	15, 25	$\frac{6}{30}, \frac{5}{30}$	.1
B	500	.04	$\frac{2}{3}$	$1\frac{1}{6}$	9500	4, 6
C	2	$1\frac{1}{2}$	4, 20	100	$\frac{1}{20}$	$\frac{3}{20}$
	$\frac{7}{21}, \frac{3}{21}$	2, 3	$\frac{6}{8}, \frac{5}{8}$	$\frac{1}{10}$	800	9400
	.05	1000	.28	$\frac{9}{63}, \frac{1}{63}$	.2	200

Another tactic and more language:

“Estimate” the answer by “rounding off each factor to the nearest 10”.
Then compare the “estimate” with the actual product.

estimate: $70 \times 40 = 2800$

$$\begin{array}{r} 39 \\ x 69 \\ \hline \end{array}$$

----- larger
 - smaller
 = difference

estimate: $\frac{}{e} \times \frac{}{a} = \frac{}{b}$

$$\begin{array}{r} 76 \\ x 78 \\ \hline \end{array}$$

 -
 =
 c

estimate: $\frac{}{d} \times \frac{}{e} = \frac{}{a}$

$$\begin{array}{r} 78 \\ x 97 \\ \hline \end{array}$$

 -
 =
 b

estimate: $\frac{}{c} \times \frac{}{d} = \frac{}{e}$

$$\begin{array}{r} 74 \\ x 56 \\ \hline \end{array}$$

 -
 =
 a

estimate: $\frac{}{b} \times \frac{}{c} = \frac{}{d}$

$$\begin{array}{r} 79 \\ x 64 \\ \hline \end{array}$$

 -
 =
 e

estimate: $\frac{}{a} \times \frac{}{b} = \frac{}{c}$

$$\begin{array}{r} 68 \\ x 42 \\ \hline \end{array}$$

 -
 =
 a

estimate: $\frac{}{e} \times \frac{}{a} = \frac{}{b}$

$$\begin{array}{r} 88 \\ x 73 \\ \hline \end{array}$$

 -
 =
 c

a	b	c	d	e
90	70	124	100	127
56	6400	60	66	80
8000	6300	2800	501	256
40	434	80	4800	4200
80	60	472	70	70

Different ways of reporting measurements.

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ 2 \quad 2 \quad 4 \\ + 2 \quad 2 \quad 4 \\ \hline \end{array}$$

a

quarters

$$\begin{array}{r} 2 \frac{14}{25} \textcircled{25\text{¢}} \\ + 2 \frac{14}{25} \textcircled{25\text{¢}} \\ \hline 5 \frac{3}{25} \textcircled{25\text{¢}} \end{array}$$

$$\begin{array}{r} \$1 \textcircled{10\text{¢}} \textcircled{1\text{¢}} \\ 3 \quad 4 \quad 6 \\ + 1 \quad 9 \quad 7 \\ \hline \end{array}$$

dollars

$$\begin{array}{r} \$3.46 \\ + \\ \hline \end{array}$$

c

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ 4 \quad 0 \quad 0 \\ - 1 \quad 0 \quad 1 \\ \hline \end{array}$$

a

$$\begin{array}{r} 4 \textcircled{25\text{¢}} \\ - 1 \frac{1}{25} \textcircled{25\text{¢}} \\ \hline \end{array}$$

b

$$\begin{array}{r} \text{m} \quad \text{dm} \quad \text{cm} \\ 3 \quad 4 \quad 6 \\ - 1 \quad 9 \quad 7 \\ \hline \end{array}$$

meters

$$\begin{array}{r} \text{---} \text{m} \\ - \\ \hline \text{---} \text{m} \\ \hline \text{---} \text{m} \end{array}$$

e

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ \\ \times \\ \hline \end{array}$$

a

$$\begin{array}{r} 1 \frac{8}{25} \textcircled{25\text{¢}} \\ \times 2 \\ \hline \end{array}$$

b

$$\begin{array}{r} \$1 \textcircled{10\text{¢}} \textcircled{1\text{¢}} \\ 1 \quad 4 \quad 6 \\ \times 6 \\ \hline \end{array}$$

dollars

$$\begin{array}{r} \$ \\ \times 6 \\ \hline \end{array}$$

e

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ 6 \quad 2 \quad 2 \\ \div 2 \\ \hline \end{array}$$

c

$$\begin{array}{r} \textcircled{25\text{¢}} \\ \div 2 \\ \hline \end{array}$$

d

$$\begin{array}{r} \text{m} \quad \text{dm} \quad \text{cm} \\ 8 \quad 6 \quad 1 \\ \div 7 \\ \hline \end{array}$$

meters

$$\begin{array}{r} \text{---} \text{m} \\ \div 7 \\ \hline \text{---} \text{m} \end{array}$$

e

$$\begin{array}{r} \text{yd.} \quad \text{ft.} \quad \text{in.} \\ 1 \quad 1 \quad 3 \\ + 1 \quad 1 \quad 4 \\ \hline \end{array}$$

c

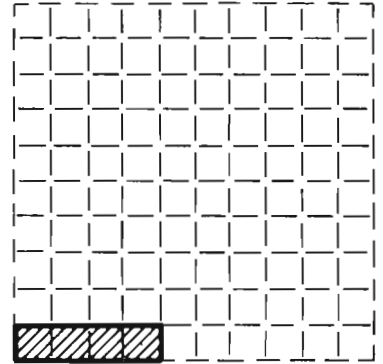
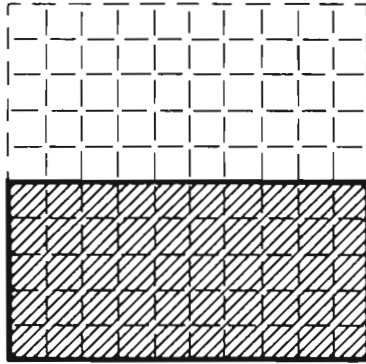
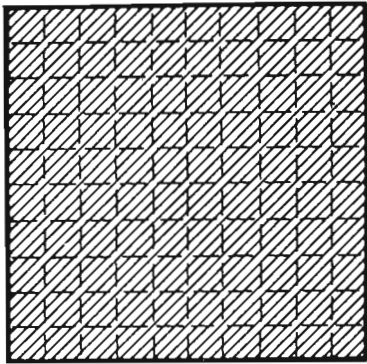
yards

$$\begin{array}{r} 1 \frac{15}{36} \text{yd.} \\ + \\ \hline \end{array}$$

d

a	b	c	d	e
2,4,4	2 $\frac{21}{25}$	2,2,7	3 $\frac{6}{25}$	1.23
5,0,3	2 $\frac{16}{36}$	3,1,1	4 $\frac{25}{36}$	1.49
2,3,1	2 $\frac{24}{25}$	5,4,3	2 $\frac{31}{36}$	8.76

One . . . Tenths . . . Hundredths . . .



1	$\frac{10}{10}$	$\frac{100}{100}$
1	1.0	1.00

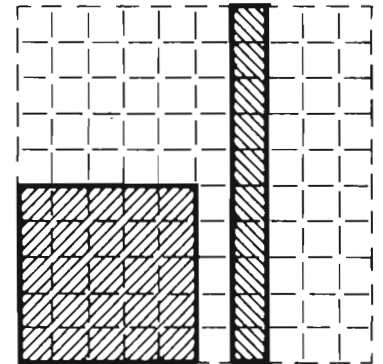
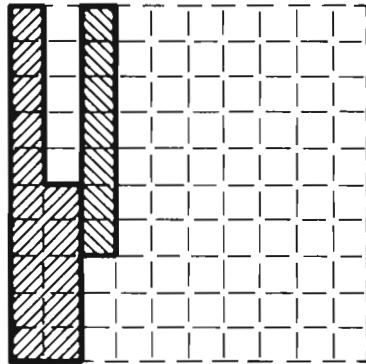
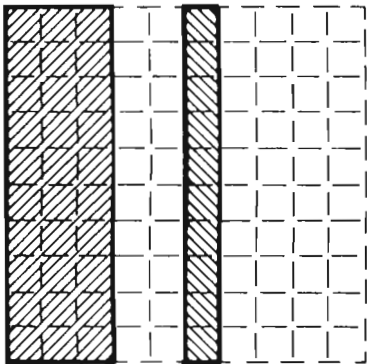
$\frac{10}{10}$	$\frac{100}{100}$
.	.

$\frac{100}{100}$
.

A.

B.

C.



$\frac{3}{10}$	+	$\frac{1}{10}$	=		B.
A.	+	B.	=		D.

$\frac{15}{100}$	+	$\frac{7}{100}$	=		C.
C.	+	E.	=		E.

$\frac{25}{100}$	+	$\frac{1}{10}$	=		D.
A.	+	B.	=		A.

$\frac{3}{10}$	-	$\frac{1}{10}$	=		E.
A.	-	B.	=		B.

$\frac{22}{100}$	-	$\frac{7}{100}$	=		C.
E.	-	E.	=		C.

$\frac{4}{10}$	+	$\frac{3}{10}$	=		D.
D.	+	A.	=		D.

$\frac{7}{100}$	+	$\frac{7}{100}$	=		D.
E.	+	E.	=		E.

A.	B.	C.	D.	E.
.3	$\frac{4}{10}$	$\frac{15}{100}$	.4	.07
.5	.1	.15	$\frac{35}{100}$	.22
.25	.2	.04	$\frac{14}{100}$	.14
.35	.50	$\frac{22}{100}$	.7	$\frac{2}{10}$

Change to a "mixed number" in "simplest form" or "lowest terms"

Change to "equivalent fractions with other denominators"

Change to a decimal fraction

$$\frac{14}{6} = 2\frac{2}{6} =$$

$$\frac{2}{3} = \frac{2}{9} = \frac{2}{15}$$

$$25\% = \frac{\quad}{100} =$$

$$\frac{22}{4} = \quad =$$

$$\frac{5}{7} = \frac{5}{14} = \frac{5}{35}$$

$$\frac{3}{5} = \frac{3}{10} =$$

$$\frac{34}{8} = \quad =$$

$$\frac{4}{5} = \frac{4}{10} = \frac{4}{100}$$

$$\frac{3}{25} = \frac{3}{100} =$$

Estimate each answer by "rounding off each factor to the nearest 10". Then compare this "estimate" with the actual product.

estimate: $\quad \times \quad = \quad$

$$\begin{array}{r} 76 \\ \times 54 \\ \hline \end{array}$$

----- larger

===== smaller

_____ difference

estimate: $\quad \times \quad = \quad$

$$\begin{array}{r} 83 \\ \times 78 \\ \hline \end{array}$$

=====

nickels

 $\times 2$

dollars
 \$ -----
 $\times 3$
 \$ _____

$$\frac{\frac{10}{10}}{.2} + \frac{\frac{10}{10}}{.5} = \frac{\quad}{\quad}$$

$$\frac{\frac{100}{100}}{.15} - \frac{\frac{7}{100}}{\quad} = \frac{\quad}{100}$$

$$\frac{\frac{7}{100}}{\quad} + \frac{\quad}{.07} = \frac{\quad}{\quad}$$

$$.4 + .3 = \quad$$

$$.12 - .03 = \quad$$



How do you feel?

G.I.D.E.G. was here . . .
 . . . Did he eat too much?

$$\begin{array}{r} \\ \\ \times 3 \\ \hline 4 \\ \end{array}$$

C

$$\begin{array}{r} 7 \\ \\ + \\ \hline 6 \\ \end{array}$$

A

$$\begin{array}{r} 7 \\ \\ \times \\ \hline 6 \\ \end{array}$$

B

$$\begin{array}{r} 2 4 \\ \\ \times \\ \hline \end{array}$$

G

$$\begin{array}{r} 3 1 \\ \\ + \\ \hline 4 \end{array}$$

B

$$\begin{array}{r} \\ \\ - 7 \\ \hline 1 7 \end{array}$$

C A

$$\begin{array}{r} 2 \\ \\ + 4 \\ \hline 9 9 \end{array}$$

B A

$$\begin{array}{r} \\ \\ \times 9 \\ \hline 9 \end{array}$$

A G

$$\begin{array}{r} 0 \\ \\ - 3 3 \\ \hline 3 \end{array}$$

E A

$$\begin{array}{r} 5 \\ \\ + 2 \\ \hline 1 1 1 \end{array}$$

C B

$$\begin{array}{r} \\ 9 \\ \\ \hline 4 \end{array}$$

B C

$$\begin{array}{r} \\ 7 5 \\ \\ \hline \end{array}$$

D E

$$\begin{array}{r} 1 \\ \\ \\ \hline 6 8 \end{array}$$

B A

$$\begin{array}{r} 9 \\ \\ \\ \hline 5 9 \end{array}$$

A B

$$\begin{array}{r} 3 \\ \\ 7 5 9 \\ \hline \end{array}$$

F E

$$\begin{array}{r} \\ \\ \times 8 \\ \hline 6 \end{array}$$

D A

$$\begin{array}{r} 6 \\ \\ \times \\ \hline 3 \end{array}$$

E B

$$\begin{array}{r} 8 \\ \\ \times \\ \hline 7 \end{array}$$

G F

$$\begin{array}{r} \\ \\ \times 6 \\ \hline 5 \end{array}$$

C A

$$\begin{array}{r} \\ \\ \times 9 \\ \hline 8 \end{array}$$

C A

$$\begin{array}{r} \\ \\ \times 7 \\ \hline 4 \end{array}$$

E C

$$\begin{array}{r} 9 \\ \\ \times 3 \\ \hline 5 \\ \\ \hline 1 \end{array}$$

D A

$$\begin{array}{r} 3 \\ \\ \times 3 \\ \hline 5 \\ \\ \hline 1 \end{array}$$

D C E G

$$\begin{array}{r} 2 \\ \\ 3 8 \\ \hline 1 2 \\ \\ \hline 3 \end{array}$$

D B C

$$\begin{array}{r} 5 \\ \\ 5 2 \\ \hline 1 \\ \\ \hline \end{array}$$

A B D E

$$\begin{array}{r} 3 \\ \\ \times \\ \hline 2 \\ \\ \hline 5 3 \\ \\ \hline 7 \end{array}$$

B A C F

$$\begin{array}{r} 3 7 \\ \\ \times \\ \hline \\ \\ \hline 4 4 4 \end{array}$$

A C

$$\begin{array}{r} 7 \\ \\ 3 1 0 0 1 \\ \hline \end{array}$$

A

	A	B	C
D	?	3	8
E	7	5	6
F	4	?	2
G	1	0	9

Tactics and language you may find useful.

Change to "simplest form" or "lowest terms"

$$\frac{74}{8} = \frac{\quad}{4} = 9\text{---}^A$$

$$\frac{51}{6} = \frac{\quad}{6} = \text{---}^B$$

$$\frac{84}{9} = \quad = \quad^C$$

$$\frac{57}{6} = \quad = \quad^D$$

$$\frac{62}{8} = \quad = \quad^E$$

Change to an "improper fraction with a different denominator"

$$1\frac{3}{4} = \frac{\quad}{4} = \frac{\quad}{12}^F$$

$$\frac{8}{3} = \frac{\quad}{6} = \frac{\quad}{15}^A$$

$$3\frac{1}{8} = \frac{\quad}{8} = \frac{\quad}{24}^B$$

$$1\frac{7}{10} = \frac{\quad}{10} = \frac{\quad}{100}^C$$

$$2\frac{4}{9} = \frac{\quad}{9} = \frac{\quad}{27}^D$$

Change to "equivalent mixed numbers" with the "least common denominator"

$$3\frac{1}{2}, 1\frac{1}{5} = 3\frac{5}{10}, 1\frac{2}{10}^E$$

$$1\frac{3}{4}, 6\frac{1}{3} = 1\text{---}, 6\text{---}^F$$

$$3\frac{7}{8}, 4\frac{3}{16} = 3\text{---}, 4\text{---}^A$$

$$3\frac{2}{3}, 2\frac{4}{7} = 3\text{---}, 2\text{---}^B$$

$$5\frac{3}{10}, 7\frac{1}{3} = 5\text{---}, 7\text{---}^C$$

"Round off to the nearest thousand"

$$\underline{1,784} \longrightarrow \underline{2000}$$

$$\underline{856} \longrightarrow \underline{\quad}^D$$

$$\underline{9,300} \longrightarrow \underline{\quad}^E$$

$$\underline{2,495} \longrightarrow \underline{\quad}^F$$

$$\underline{2,549} \longrightarrow \underline{\quad}^A$$

$$\underline{3,751.4} \longrightarrow \underline{\quad}^B$$

$$\underline{11,800} \longrightarrow \underline{\quad}^C$$

$$\underline{1,485.9} \longrightarrow \underline{\quad}^D$$

$$\underline{3,750} \longrightarrow \underline{\quad}^B$$

Change to a decimal fraction

$$150\% = \frac{150}{100} = 1.5^E$$

$$225\% = \quad = \quad^F$$

$$35\% = \quad = \quad^A$$

$$\frac{3}{4} = \quad = \quad^B$$

$$\frac{11}{5} = \quad = \quad^C$$

Change to a "common fraction" in "lowest terms"

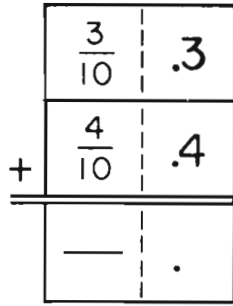
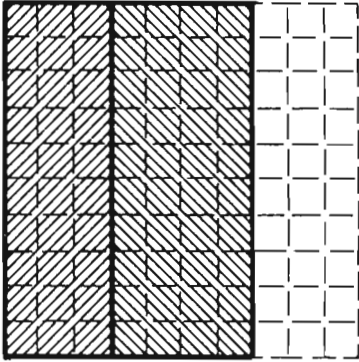
$$75\% = \quad = \quad^D$$

$$.12 = \quad = \quad^E$$

$$\frac{125}{1000} = \quad = \quad^F$$

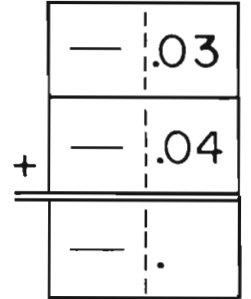
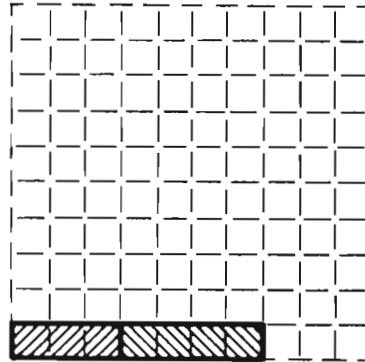
	A	B	C	D	E	F
A	$9\frac{1}{4}$	.75	170	1000	2	21
B	$\frac{14,3}{16,16}$	4000	2.2	$9\frac{1}{2}$	$\frac{3}{25}$	2.25
	.35	$8\frac{1}{2}$	$\frac{9,10}{30,30}$	66	1.5	$\frac{9,4}{12,12}$
C	40	$\frac{14,12}{21,21}$	$9\frac{1}{3}$	54,000	9,000	$\frac{1}{8}$
	3000	75	12000	$\frac{3}{4}$	$7\frac{3}{4}$	2000

$$\frac{1}{10} = \frac{10}{100} = .1 = .10$$

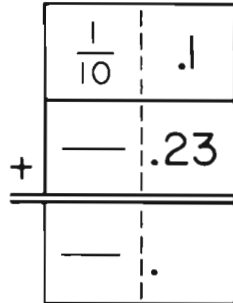
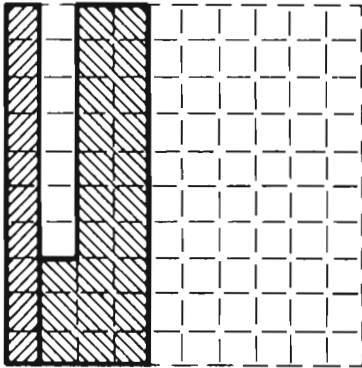


A.

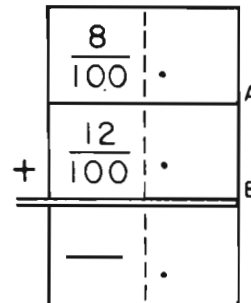
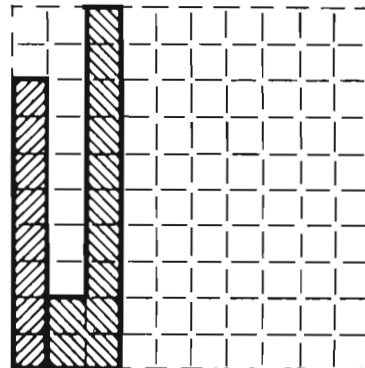
$$\frac{7}{10} = \frac{70}{100} = .7 = .70$$



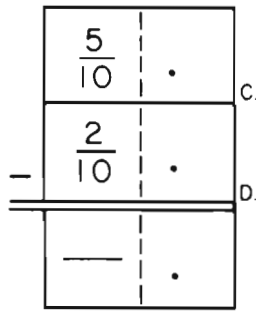
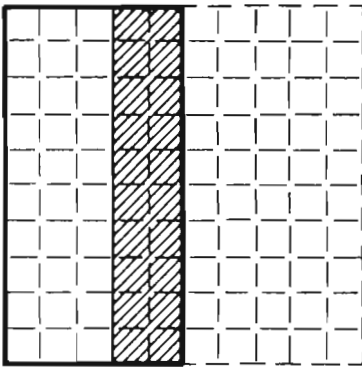
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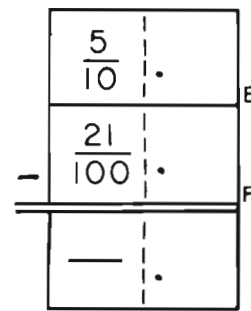
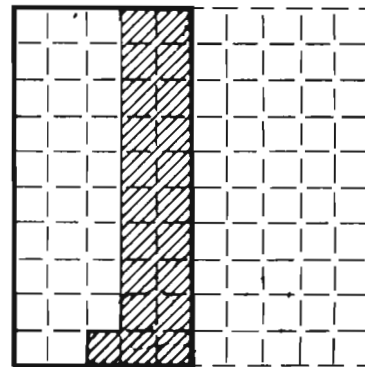
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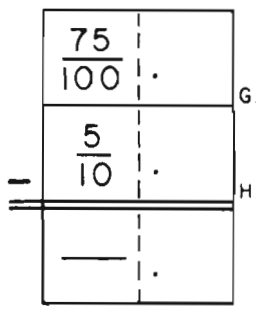
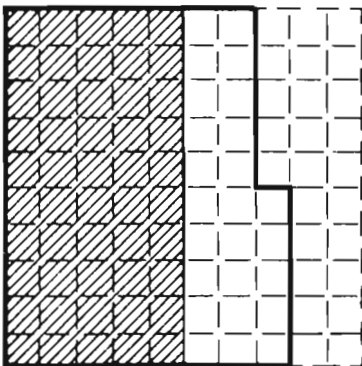
D.



E.



F.

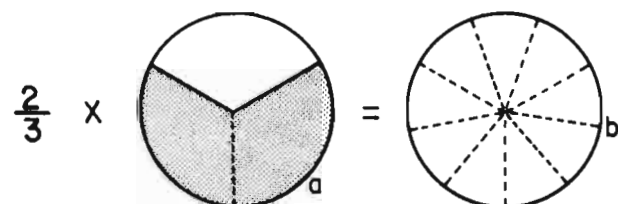
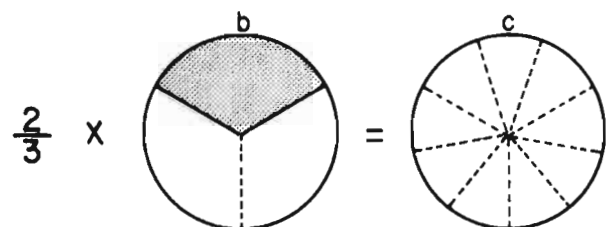
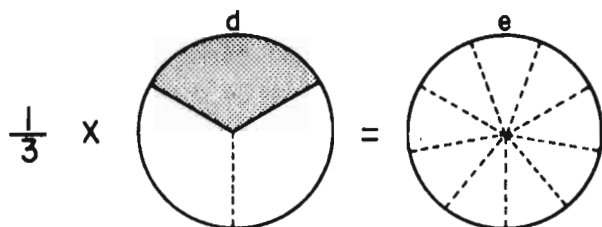
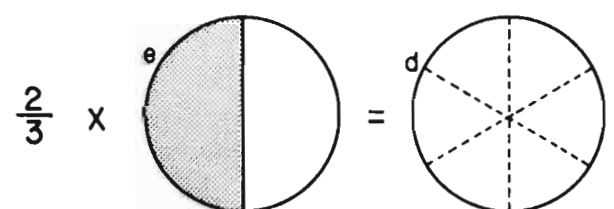
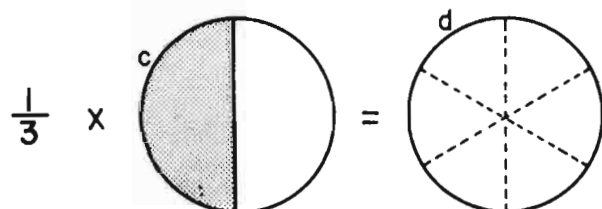
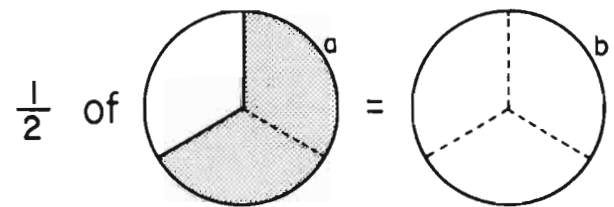
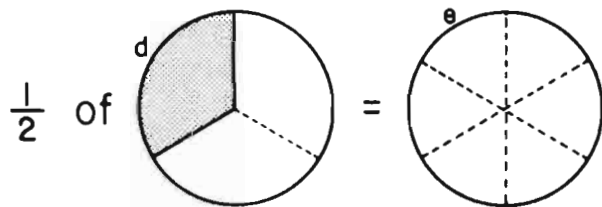
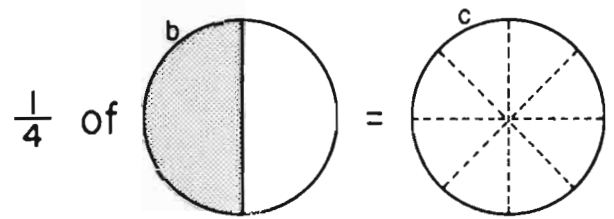
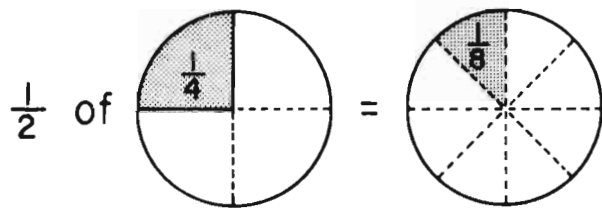
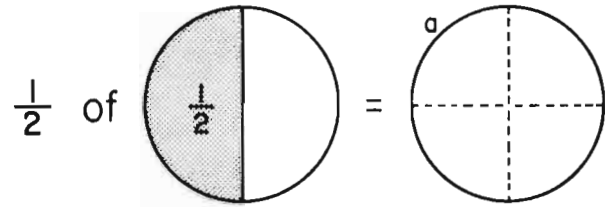
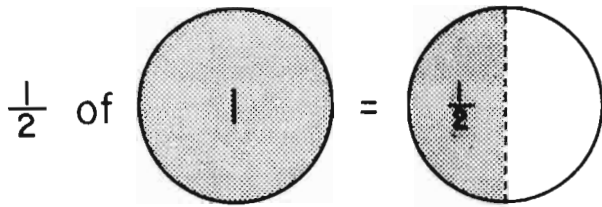


G.

$\frac{.2}{.5}$	$\frac{.7}{.4}$	$\frac{.18}{+.03}$	$\frac{.30}{-.01}$
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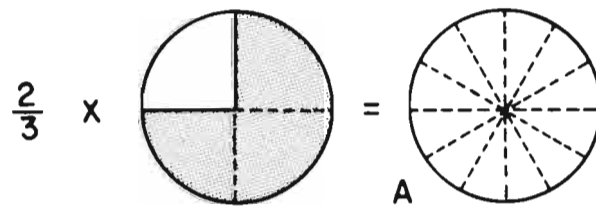
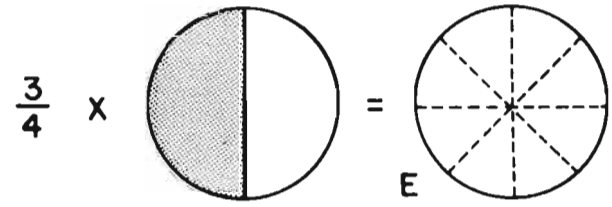
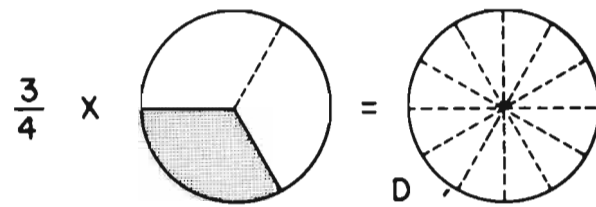
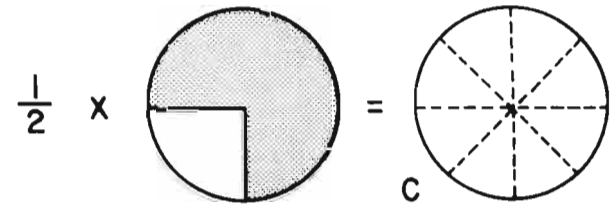
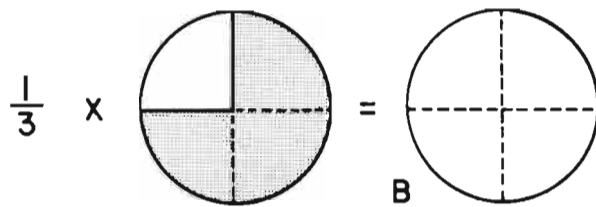
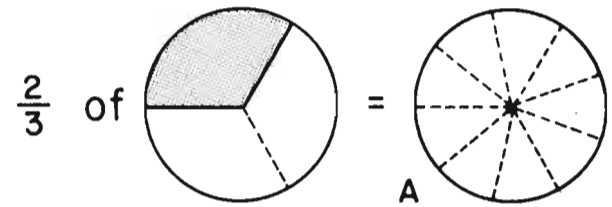
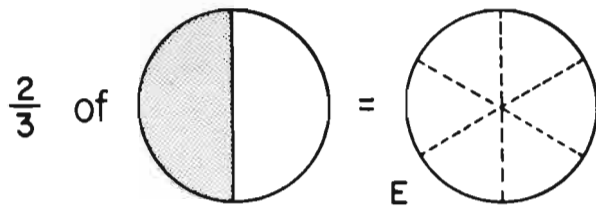
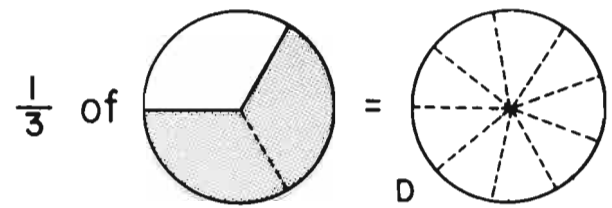
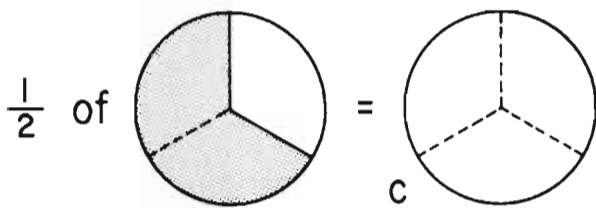
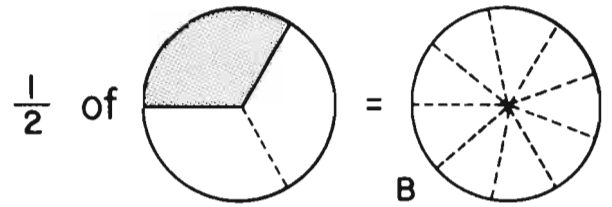
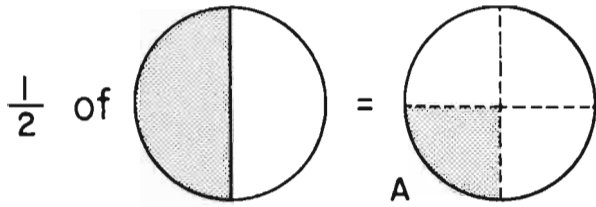
A.	B.	C.	D.	E.	F.	G.	H.
.9	.12	.23	.20	.50	.38	.15	.1
.7	.01	.33	.2	.43	.29	.75	.50
.08	.07	.5	.18	.3	.21	.25	.12

$\frac{1}{2}$ of 14 = 7 and $\frac{1}{2} \times 14 = 7$



a	b	c	d	e
$\frac{1}{8}$	$\frac{1}{3}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{4}{9}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{9}$
$\frac{2}{3}$	$\frac{1}{2}$	$\frac{2}{9}$	$\frac{7}{8}$	$\frac{1}{6}$

$\frac{1}{2}$ of 14 = 7 and $\frac{1}{2} \times 14 = 7$



A	B	C	D	E
$\frac{2}{9}$	$\frac{1}{9}$	$\frac{1}{7}$	$\frac{1}{4}$	$\frac{3}{8}$
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{8}$	$\frac{1}{3}$
$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{2}{9}$	$\frac{7}{12}$

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{70}{8} = 8 \frac{7}{8} = 8 \frac{1}{4} \text{ A.}$$

$$\frac{66}{9} = \frac{22}{3} = 7 \frac{1}{3} \text{ B.}$$

$$\frac{78}{8} = 9 \frac{3}{4} = 9 \frac{3}{4} \text{ C.}$$

$$\frac{46}{6} = 7 \frac{1}{3} = 7 \frac{1}{3} \text{ D.}$$

$$\frac{87}{9} = 9 \frac{2}{3} = 9 \frac{2}{3} \text{ E.}$$

Change to an
"improper fraction"
in "lowest terms"

$$\frac{24}{18} = \frac{4}{3} = \frac{4}{3} \text{ F.}$$

$$\frac{81}{36} = \frac{9}{4} = \frac{9}{4} \text{ A.}$$

$$\frac{56}{49} = \frac{8}{7} = \frac{8}{7} \text{ B.}$$

$$\frac{42}{28} = \frac{3}{2} = \frac{3}{2} \text{ C.}$$

$$\frac{72}{63} = \frac{8}{7} = \frac{8}{7} \text{ D.}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{13}{4}, \frac{2}{3} = \frac{39}{12}, \frac{8}{12} \text{ E.}$$

$$\frac{9}{7}, \frac{3}{4} = \frac{36}{28}, \frac{21}{28} \text{ F.}$$

$$\frac{7}{6}, \frac{8}{5} = \frac{35}{30}, \frac{48}{30} \text{ A.}$$

$$\frac{5}{8}, \frac{6}{7} = \frac{35}{56}, \frac{48}{56} \text{ B.}$$

$$\frac{8}{5}, \frac{11}{9} = \frac{72}{45}, \frac{55}{45} \text{ C.}$$

Change to an
"improper fraction"
with the indicated
denominator

$$2 \frac{2}{3} = \frac{8}{3} = \frac{24}{18}$$

$$1 \frac{3}{4} = 1 \frac{9}{12} = \frac{12}{12} \text{ D.}$$

$$2 \frac{1}{2} = \frac{5}{2} = \frac{5}{2} \text{ E.}$$

$$3 \frac{2}{5} = \frac{17}{5} = \frac{17}{5} \text{ F.}$$

$$1 \frac{1}{4} = \frac{5}{4} = \frac{5}{4} \text{ A.}$$

Change to a
"mixed number"
with indicated
denominator

$$\frac{11}{4} = 2 \frac{3}{4} = 2 \frac{3}{20} \text{ B.}$$

$$\frac{5}{2} = 2 \frac{1}{2} = 2 \frac{1}{14} \text{ C.}$$

$$\frac{15}{8} = 1 \frac{7}{8} = 1 \frac{7}{24} \text{ D.}$$

$$\frac{13}{5} = 2 \frac{3}{5} = 2 \frac{3}{15} \text{ E.}$$

$$\frac{38}{9} = 4 \frac{2}{9} = 4 \frac{2}{18} \text{ F.}$$

Change to a
"common fraction"
in "lowest terms"

$$.18 = \frac{18}{100} = \frac{9}{50} \text{ A.}$$

$$.08 = \frac{8}{100} = \frac{2}{25} \text{ B.}$$

$$.84 = \frac{84}{100} = \frac{21}{25} \text{ C.}$$

A	B	C	D	E	F
$2 \frac{1}{4}$	$\frac{35}{56}, \frac{48}{56}$	7	$1 \frac{1}{7}$	$9 \frac{2}{3}$	4
125	$7 \frac{1}{3}$	$\frac{21}{25}$	17	9	$\frac{36}{28}, \frac{21}{28}$
3	$\frac{4}{25}$	$1 \frac{1}{2}$	21	$\frac{39}{12}, \frac{8}{12}$	$1 \frac{1}{3}$
$\frac{35}{30}, \frac{48}{30}$	15	$9 \frac{3}{4}$	$1 \frac{1}{2}$	20	17
9	$1 \frac{1}{7}$	$\frac{72}{45}, \frac{55}{45}$	$7 \frac{2}{3}$	90	34

“Estimate” the answer by “rounding off” the “dividend” to the nearest 100. Round off “divisor” to nearest 10. Please compare the “estimate” with the computed results (to the nearest whole number).

estimate: $\frac{600}{40} = 15$

$$\begin{array}{r} 16\frac{22}{38} \\ 38 \overline{) 630} \\ \underline{38} \\ 250 \\ \underline{228} \\ 22 \end{array}$$

$\frac{17}{15}$ larger
 $\frac{15}{17}$ smaller
 difference

estimate: $\frac{\quad}{e} \div \frac{\quad}{f} = \frac{\quad}{a}$

$$62 \overline{) 1528}$$

 =

 b

estimate: $\frac{\quad}{c} \div \frac{\quad}{d} = \frac{\quad}{e}$

$$57 \overline{) 1780}$$

 =

 b

estimate: $\frac{\quad}{a} \div \frac{\quad}{b} = \frac{\quad}{c}$

$$29 \overline{) 2071}$$

 =

 b

estimate: $\frac{\quad}{e} \div \frac{\quad}{f} = \frac{\quad}{a}$

$$82 \overline{) 3197}$$

 =

 b

estimate: $\frac{\quad}{c} \div \frac{\quad}{d} = \frac{\quad}{e}$

$$67 \overline{) 3485}$$

 =

 f

estimate: $\frac{\quad}{a} \div \frac{\quad}{b} = \frac{\quad}{c}$

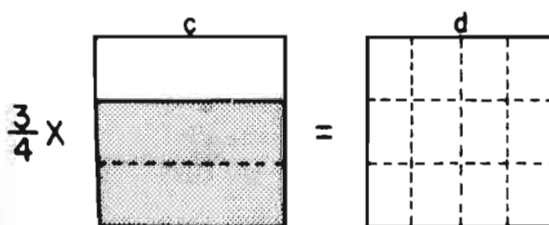
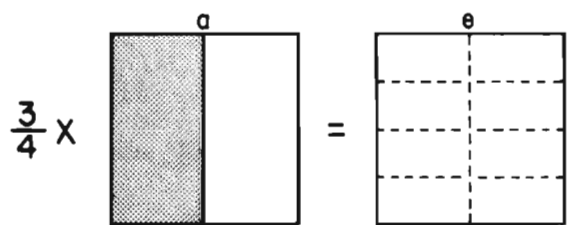
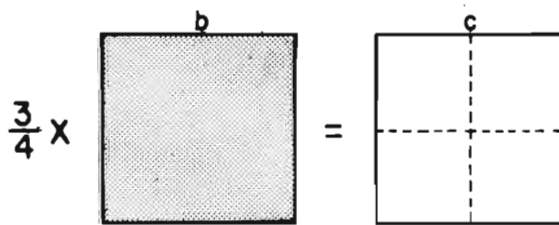
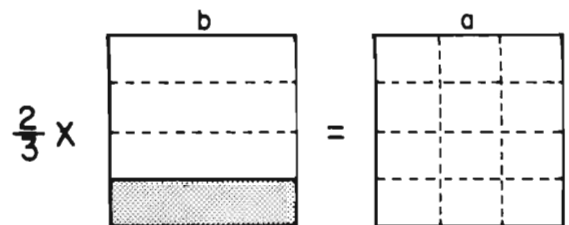
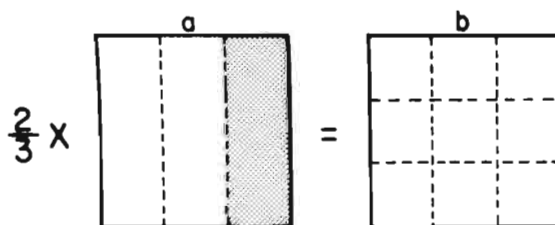
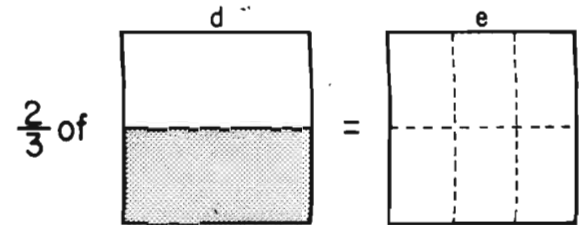
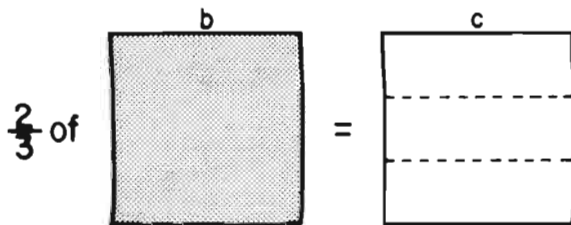
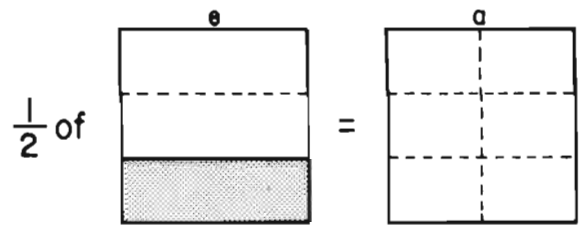
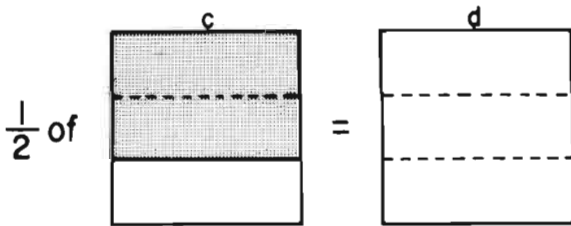
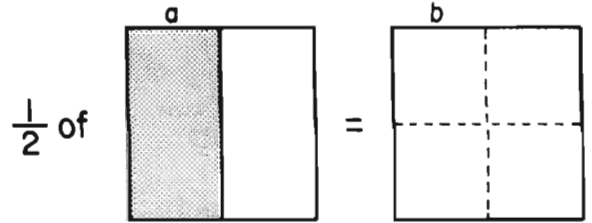
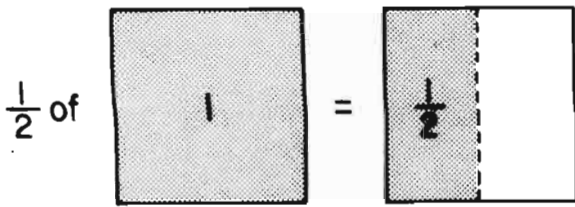
$$38 \overline{) 2222}$$

 =

 d

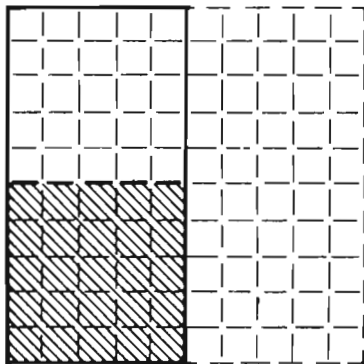
a	b	c	d	e	f
2000	0	600	7	30	75
2100	40	70	4	1500	80
2200	20	3500	3	50	7
40	30	1800	60	70	2
25	1	55	70	3200	60

$\frac{1}{2}$ of 10 = 5 and $\frac{1}{2} \times 10 = 5$

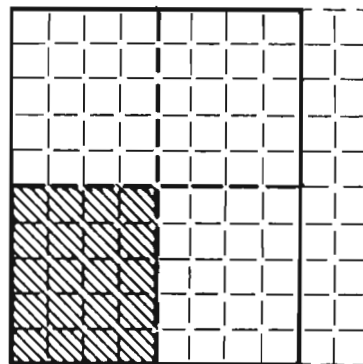


a	b	c	d	e
$\frac{1}{3}$	1	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{8}$
$\frac{1}{2}$	$\frac{2}{9}$	$\frac{2}{3}$	$\frac{1}{7}$	$\frac{3}{8}$
$\frac{1}{6}$	$\frac{1}{4}$	$\frac{5}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

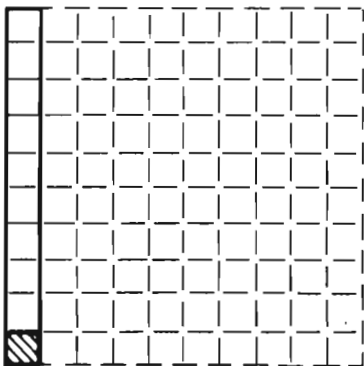
What Can You See? . . . Large Square = 1 = $\frac{10}{10} = \frac{100}{100}$



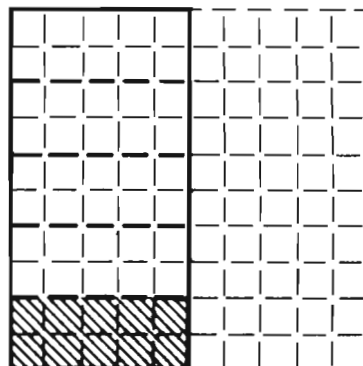
$$\begin{array}{r} \frac{5}{10} \quad | \quad .5 \\ \times \quad \frac{1}{2} \text{ or } .5 \\ \hline \frac{25}{100} \quad | \quad .25 \end{array}$$



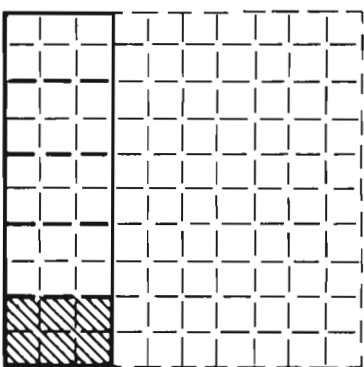
$$\begin{array}{r} \frac{8}{10} \quad | \quad .8 \\ \times \quad \frac{1}{4} \text{ or } .25 \\ \hline \text{A. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$



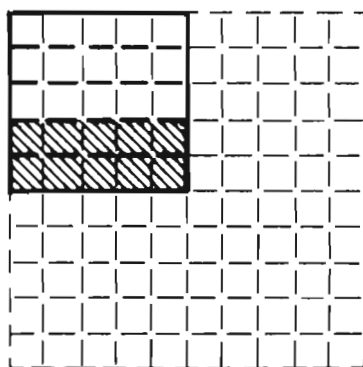
$$\begin{array}{r} \frac{1}{10} \quad | \quad \cdot \\ \times \quad \frac{1}{10} \text{ or } .1 \\ \hline \text{D. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$



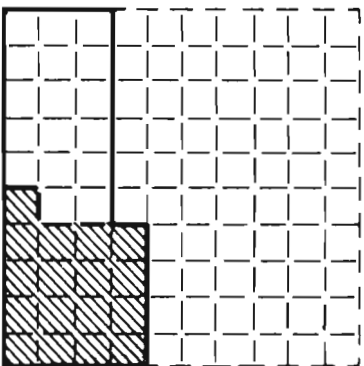
$$\begin{array}{r} \frac{1}{2} \quad | \quad \cdot \\ \times \quad \frac{1}{5} \text{ or } .2 \\ \hline \text{A. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$



$$\begin{array}{r} \frac{30}{100} \quad | \quad \cdot \\ \times \quad \frac{1}{5} \text{ or } .2 \\ \hline \text{D. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$



$$\begin{array}{r} \frac{25}{100} \quad | \quad \cdot \\ \times \quad \frac{2}{5} \text{ or } .4 \\ \hline \text{F. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$



$$\begin{array}{r} \frac{\quad}{100} \quad | \quad \cdot \\ \times \quad \frac{1}{2} \text{ or } \cdot \\ \hline \text{C. } \frac{\quad}{100} \quad | \quad \cdot \end{array}$$

$$\frac{1}{10} = \frac{10}{100} = \frac{100}{1000} = .1 = .10 = .100$$

$$\frac{2}{10} = \frac{20}{100} = \frac{200}{1000} = .2 = .20 = .200$$

A.	B.	C.	D.	E.	F.
20	.09	17	7	.01	.5
.3	.10	.1	.17	.25	19
.34	.20	.11	1	.06	10
10	.5	.13	6	1.7	34

Change to "equivalent mixed numbers" with the "least common denominator"

Show other members of the same family

Change to a decimal fraction

$$3\frac{1}{5}, 1\frac{1}{2} = 3\frac{2}{10}, 1\frac{5}{10}$$

$$2\frac{2}{3} = 2\frac{4}{12} = 2\frac{10}{30}$$

$$125\% = \frac{\quad}{100} =$$

$$1\frac{3}{16}, 2\frac{7}{8} = 1\text{---}, 2\text{---}$$

$$3\frac{3}{5} = 3\frac{6}{10} = 3\frac{12}{100}$$

$$45\% = \frac{\quad}{100} =$$

$$1\frac{2}{3}, 3\frac{2}{7} = 1\text{---}, 3\text{---}$$

$$1\frac{5}{6} = 1\frac{10}{12} = 1\frac{25}{42}$$

$$\frac{4}{5} = \frac{\quad}{10} =$$

Estimate answers by rounding off "divisor" to nearest 10 and "dividend" to nearest 100. Then compare this "estimate" with the actual result.

estimate: $\underline{\quad} \div \underline{\quad} = \underline{\quad}$

$$39 \overline{) 3198}$$

----- larger
 = smaller
 _____ difference

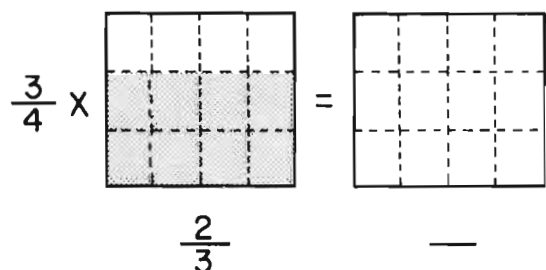
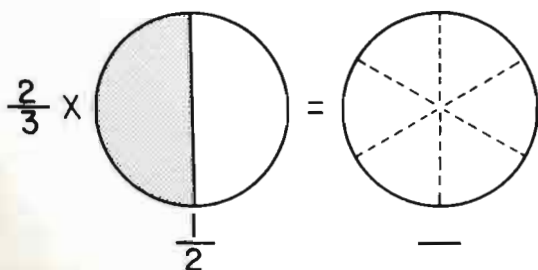
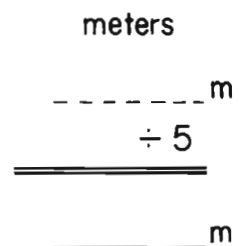
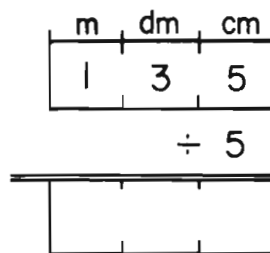
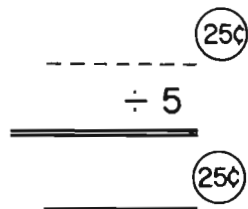
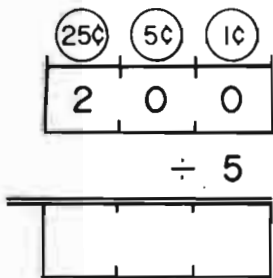
estimate: $\underline{\quad} \div \underline{\quad} = \underline{\quad}$

$$53 \overline{) 3551}$$

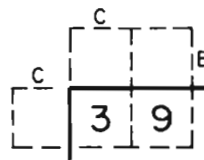
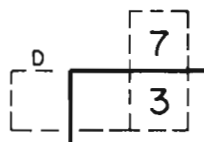
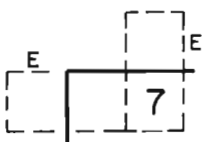
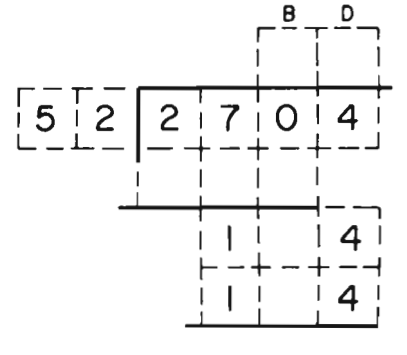
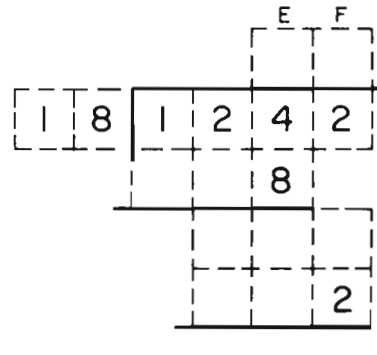
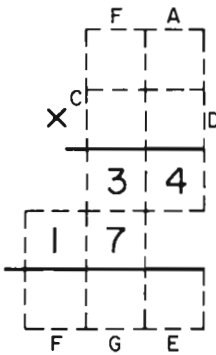
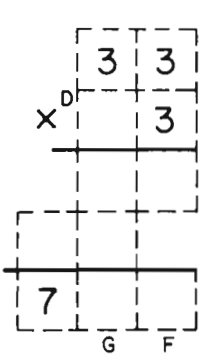
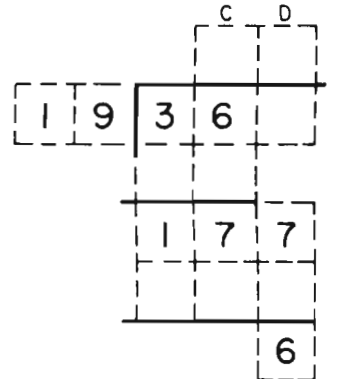
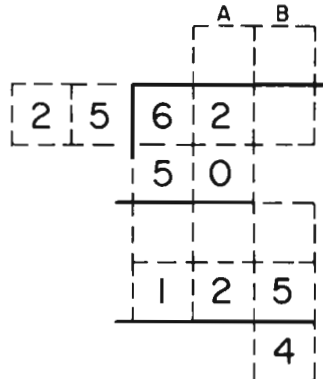
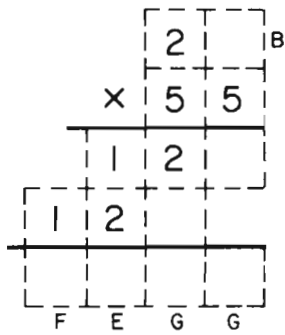
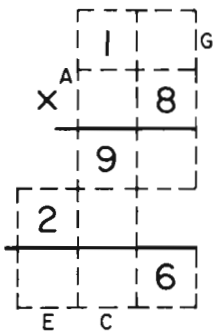
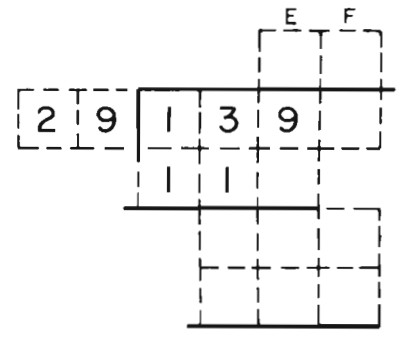
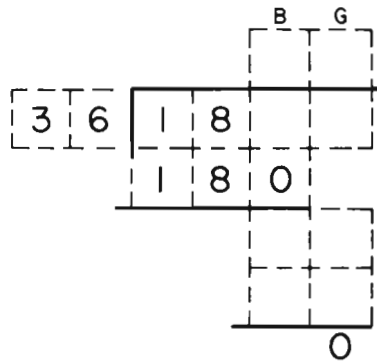
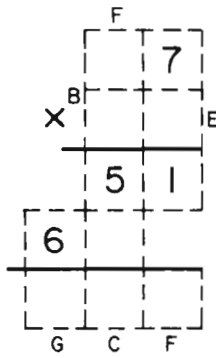
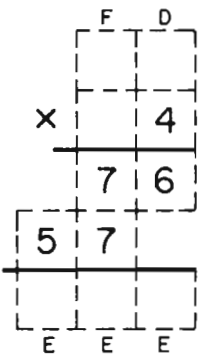
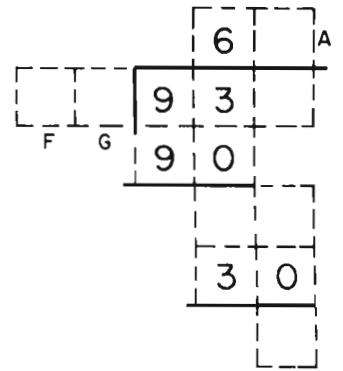
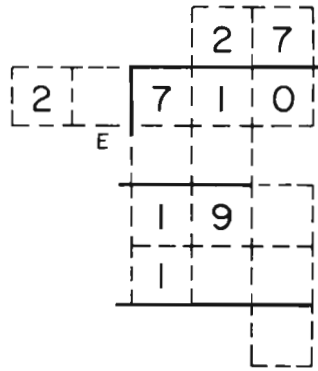
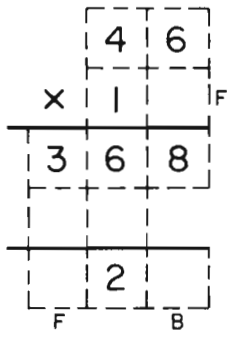
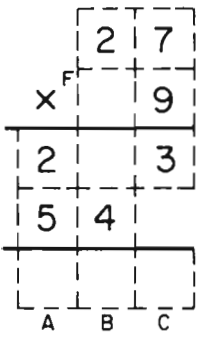
 =



How do you feel?



G.I.D.E.G. was here. Did he eat too much?



	A	B	C	D
E	9	4	3	6
F	2	8	1	9
G	7	5	0	2

Tactics and Language you may find useful.

Change to "simplest form" or "lowest terms"

$$\frac{100}{8} = \frac{25}{2} = 12\frac{1}{2}$$

$$\frac{40}{6} = \quad = \quad \text{A}$$

$$\frac{57}{9} = \quad = \quad \text{B}$$

$$\frac{106}{8} = \quad = \quad \text{C}$$

$$\frac{92}{12} = \frac{\quad}{3} = \quad \text{D}$$

"Round off to the nearest whole number"

$$3\frac{1}{4} \longrightarrow 3$$

$$7\frac{5}{6} \longrightarrow 8$$

$$1.3 \longrightarrow 1$$

$$325\% \longrightarrow 3$$

$$5\frac{3}{4} \longrightarrow \quad \text{E}$$

$$4.25 \longrightarrow \quad \text{F}$$

$$175\% \longrightarrow \quad \text{A}$$

$$4\frac{7}{8} \longrightarrow \quad \text{B}$$

$$3\frac{9}{20} \longrightarrow \quad \text{C}$$

Change to "equivalent mixed numbers" with the "least common denominator"

$$2\frac{1}{3}, 3\frac{1}{6} = 2\frac{2}{6}, 3\frac{1}{6}$$

$$7\frac{2}{3}, 4\frac{3}{4} = 7\text{---}, 4\text{---D}$$

$$1\frac{9}{10}, 3\frac{1}{4} = 1\text{---}, 3\text{---E}$$

$$6\frac{1}{7}, 4\frac{3}{4} = 6\text{---}, 4\text{---F}$$

$$5\frac{3}{8}, 6\frac{4}{5} = 5\text{---}, 6\text{---A}$$

Change to a "mixed number" with an "improper fraction", and change denominators

$$4\frac{1}{2} = 3\frac{3}{2} = 3\frac{6}{4}$$

$$3\frac{2}{3} = 2\frac{3}{3} = 2\frac{9}{9} \text{B}$$

$$4\frac{5}{6} = 3\frac{6}{6} = 3\frac{12}{12} \text{C}$$

$$3\frac{5}{7} = 2\frac{6}{7} = 2\frac{21}{21} \text{D}$$

$$6\frac{7}{9} = 5\frac{8}{9} = 5\frac{27}{27} \text{E}$$

Change to "equivalent fractions" with convenient denominators

$$\frac{5}{6} = \frac{10}{12} = \frac{25}{30}$$

$$\frac{7}{8} = \frac{\quad}{24} = \frac{\quad}{40} \text{F}$$

$$\frac{9}{4} = \frac{\quad}{12} = \frac{\quad}{16} \text{A}$$

$$\frac{7}{10} = \frac{\quad}{30} = \frac{\quad}{100} \text{B}$$

$$\frac{12}{7} = \frac{\quad}{21} = \frac{\quad}{49} \text{C}$$

Change to a "common fraction" in "lowest terms"

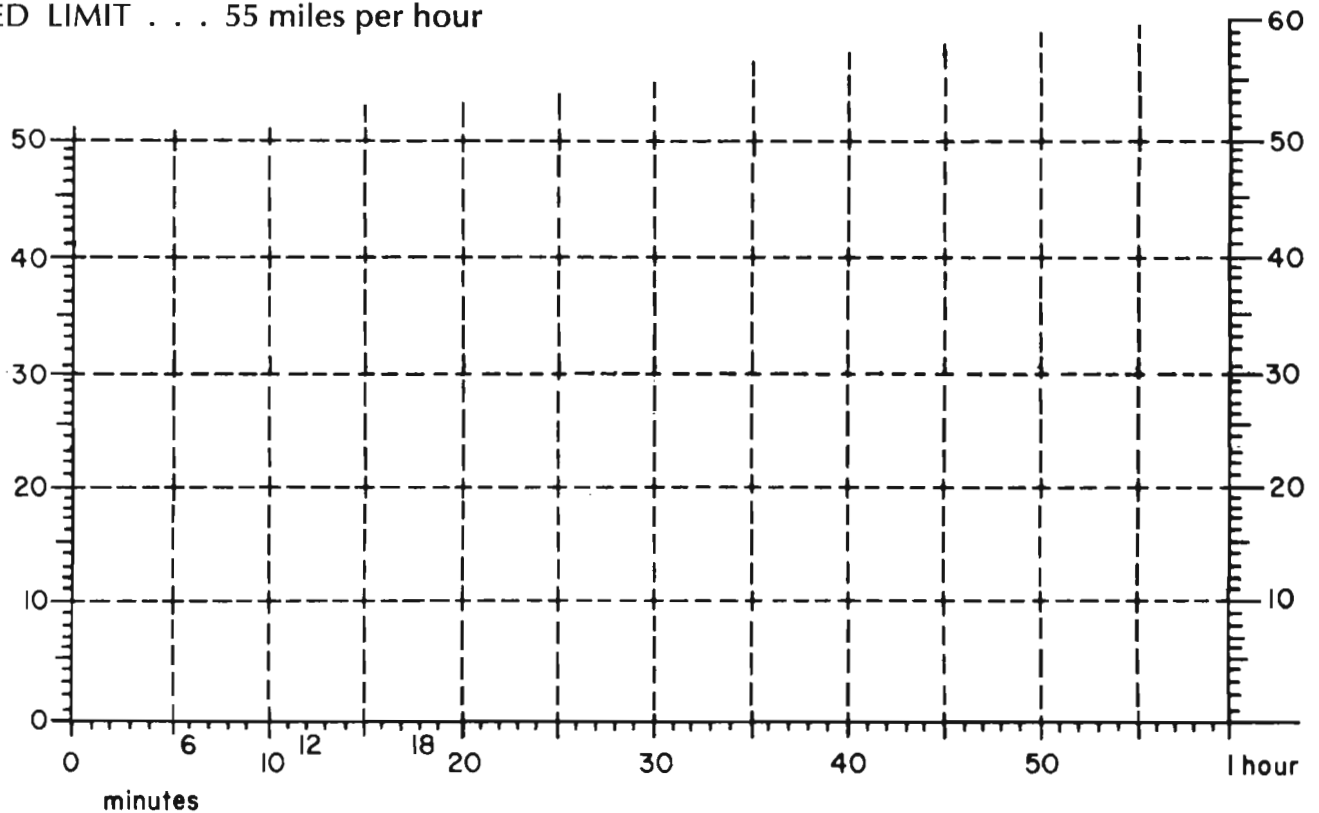
$$.024 = \frac{\quad}{1000} = \quad \text{D}$$

$$2\frac{1}{2}\% = \quad = \quad \text{E}$$

$$.375 = \quad = \quad \text{F}$$

A	B	C	D	E	F
27,36	6 $\frac{1}{3}$	11,22	3 $\frac{3}{25}$	16,48	4
15,30 40,40	5	36,84	7 $\frac{2}{3}$	1 40	4,21 28,28
6 $\frac{2}{3}$	5,15	3	8,9 12,12	6	21,35
2	21,70	13 $\frac{1}{4}$	12,36	36,10 40,40	3 8

SPEED LIMIT . . . 55 miles per hour



6 min. = .1 hr. and .1 of 55 miles = miles

minutes →	6	12	18	24	30	36	42	48	54	60
miles ↑										
	A	B	C	D	E	F	A	B	C	D

Please find these points and connect them with a line.

Using this graph, please fill in the following table with approximate distances:

in ___ minutes	10	20	40	50	66	90	100	120	150	180
about ___ miles										
	E	F	A	B	C	D	E	F	A	B

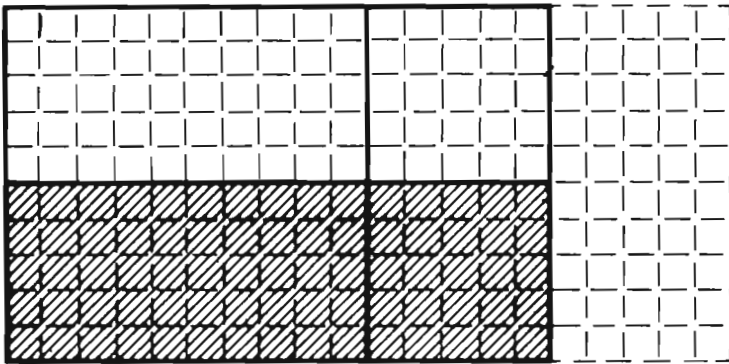
If the Speed Limit is 40 m.p.h.

minutes →	30	60	15	45	90
miles ↑					
	C	D	E	F	A

Please find these points and connect them with a line.

A	B	C	D	E	F
37	46	30.5	22	92	90
60	11	20	82.5	9	110
5.5	165	49.5	40	27.5	30
38.5	17.5	16.5	55	11	18
138	44	60.5	37	10	33

What Can You See? . . . Large Square = 1 = $\frac{10}{10}$ = $\frac{100}{100}$



$$\begin{array}{r} 1 \frac{5}{10} \\ \hline \end{array} \quad 1.5$$

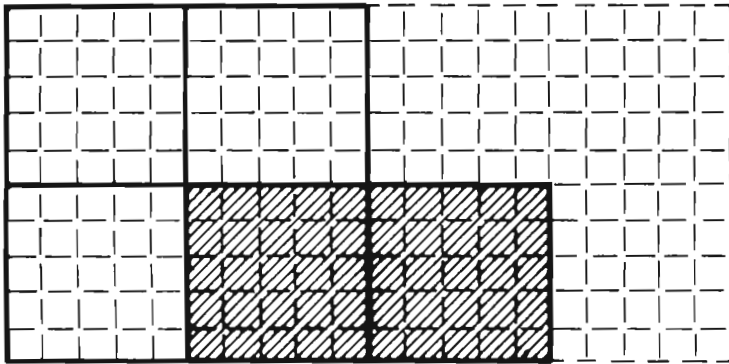
$$\begin{array}{r} 1 \frac{7}{10} \\ \hline \end{array} \quad \text{C.}$$

$$\times \frac{1}{2} \text{ or } .5$$

$$\times \frac{1}{2} \text{ or } .5$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{A.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{B.}$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{D.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{E.}$$



$$\begin{array}{r} 1 \frac{25}{100} \\ \hline \end{array} \quad \text{F.}$$

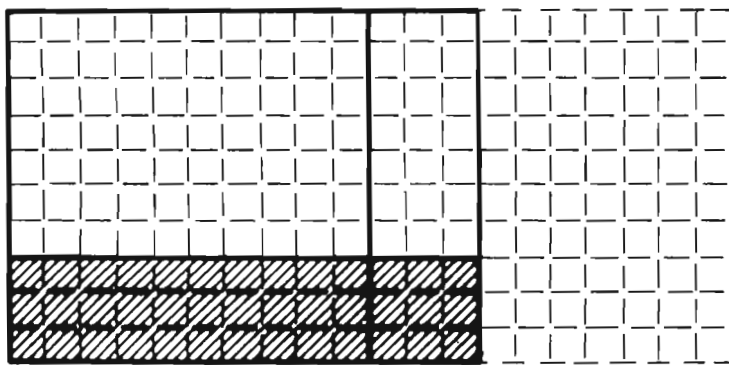
$$\begin{array}{r} 1 \frac{5}{100} \\ \hline \end{array} \quad \text{C.}$$

$$\times \frac{2}{5} \text{ or } .4$$

$$\times \frac{2}{5} \text{ or } .4$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{A.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{B.}$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{D.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{E.}$$



$$\begin{array}{r} 1 \frac{3}{10} \\ \hline \end{array} \quad \text{F.}$$

$$\begin{array}{r} 1 \frac{9}{10} \\ \hline \end{array} \quad \text{C.}$$

$$\times \frac{3}{10} \text{ or } .3$$

$$\times \frac{3}{10} \text{ or } .3$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{A.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{B.}$$

$$\begin{array}{r} \hline \hline \end{array} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{D.} \quad \begin{array}{r} \hline \hline \end{array} \quad \text{E.}$$

Please add "decimal points"

$$\begin{array}{r} 1.5 \\ \times .5 \\ \hline \end{array} \quad \begin{array}{r} 1.7 \\ \times .5 \\ \hline \end{array} \quad \begin{array}{r} 1.25 \\ \times .4 \\ \hline \end{array} \quad \begin{array}{r} 1.05 \\ \times .4 \\ \hline \end{array} \quad \begin{array}{r} 1.3 \\ \times .3 \\ \hline \end{array} \quad \begin{array}{r} 1.9 \\ \times .3 \\ \hline \end{array}$$

B. D. B. E. B. E.

$$\begin{array}{r} .5 \\ \times .5 \\ \hline \end{array} \quad \begin{array}{r} .25 \\ \times .8 \\ \hline \end{array} \quad \begin{array}{r} .1 \\ \times .1 \\ \hline \end{array} \quad \begin{array}{r} .7 \\ \times .4 \\ \hline \end{array} \quad \begin{array}{r} .25 \\ \times .4 \\ \hline \end{array} \quad \begin{array}{r} .34 \\ \times .5 \\ \hline \end{array}$$

A. B. C. D. E. F.

$$.5 = .50 = .500$$

$$1.3 = 1.30 = 1.300$$

A.	B.	C.	D.	E.	F.
50	400	1.9	.85	.57	1.3
.25	.75	1.05	.28	.42	11.5
75	.500	.01	42	.85	.170
39	.39	1.7	57	.100	1.25

$$\begin{array}{cccc} \frac{1}{2} \times 1 = \frac{1}{2} & \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} & \frac{1}{2} \times \frac{1}{4} = \frac{1}{8} & \frac{1}{4} \times \frac{1}{2} = \frac{1}{8} \\ \frac{1}{2} \times \frac{1}{3} = \frac{1}{6} & \frac{1}{2} \times \frac{2}{3} = \frac{1}{3} & \frac{1}{3} \times \frac{1}{2} = \frac{1}{6} & \frac{2}{3} \times \frac{1}{2} = \frac{1}{3} \\ \frac{1}{3} \times \frac{1}{3} = \frac{1}{9} & \frac{2}{3} \times \frac{1}{3} = \frac{2}{9} & \frac{2}{3} \times 1 = \frac{2}{3} & \frac{2}{3} \times \frac{1}{4} = \frac{1}{6} \\ \frac{3}{4} \times 1 = \frac{3}{4} & \frac{3}{4} \times \frac{1}{2} = \frac{3}{8} & \frac{3}{4} \times \frac{2}{3} = \frac{1}{2} & \frac{2}{3} \times \frac{3}{4} = \frac{1}{2} \end{array}$$

In most examples you will notice this pattern:

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d} \quad \text{such as} \quad \frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$$

If we write 1 as $\frac{1}{1}$ the pattern holds

$$\frac{1}{2} \times \frac{1}{1} = \frac{1}{2} \quad \frac{2}{3} \times \frac{1}{1} = \frac{2}{3} \quad \frac{3}{4} \times \frac{1}{1} = \frac{3}{4}$$

Let's try the pattern on other examples, and then find simplest form of the answer.

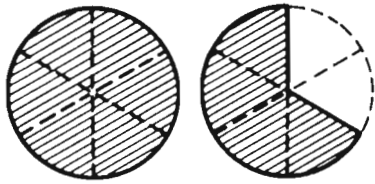
$$\begin{array}{ccc} \frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3} & \frac{2}{3} \times \frac{1}{2} = \text{---} = \text{---} \text{ A} & \frac{2}{3} \times \frac{1}{4} = \text{---} = \text{---} \text{ B} \\ \frac{3}{4} \times \frac{2}{3} = \text{---} = \text{---} \text{ C} & \frac{2}{3} \times \frac{3}{4} = \text{---} = \text{---} \text{ D} \end{array}$$

Please use this pattern in the following examples.

$$\begin{array}{cc} \frac{1}{3} \times \frac{3}{4} = \text{---} = \text{---} \text{ F} & \frac{1}{2} \times \frac{2}{5} = \text{---} = \text{---} \text{ A} \\ \frac{2}{3} \times \frac{3}{5} = \text{---} = \text{---} \text{ B} & \frac{1}{10} \times \frac{2}{3} = \text{---} = \text{---} \text{ C} \\ \frac{3}{4} \times \frac{1}{6} = \text{---} = \text{---} \text{ A} & \frac{2}{3} \times \frac{3}{8} = \text{---} = \text{---} \text{ B} \end{array}$$

	A	B	C
D	$\frac{3}{24}, \frac{1}{8}$	$\frac{6}{15}, \frac{2}{3}$	$\frac{6}{12}, \frac{1}{2}$
E	$\frac{2}{6}, \frac{1}{3}$	$\frac{6}{24}, \frac{1}{4}$	$\frac{2}{30}, \frac{1}{15}$
F	$\frac{2}{10}, \frac{1}{5}$	$\frac{2}{12}, \frac{1}{6}$	$\frac{3}{12}, \frac{1}{4}$

An Idea . . .
 . . . and a family of names.



$$1 \frac{A}{3}^*$$

simplest
name

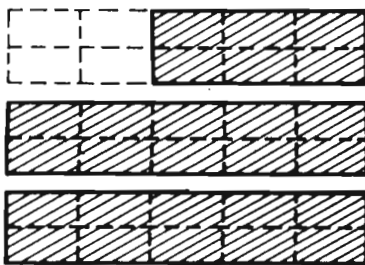
Some other members of the family:

$\frac{D}{6}$	$\frac{D}{12}$	$\frac{G}{24}$	$\frac{A}{3}$	$\frac{B}{6}$	$\frac{F}{9}$
$\frac{B}{9}$	$\frac{E}{30}$	$\frac{L}{60}$	$\frac{E}{12}$	$\frac{H}{30}$	$\frac{I}{60}$

Some related families of names:

$1 \frac{1}{3}^*$	$\frac{B}{6}$	$\frac{D}{12}$	$\frac{D}{3}$	$\frac{D}{6}$	$\frac{D}{9}$
$2 \frac{2}{3}^*$	$\frac{D}{3}$	$\frac{A}{3}$	$2 \frac{D}{6}$	$\frac{B}{6}$	$\frac{G}{6}$

Another idea . . .
 . . . and a family of names



$$2 \frac{C}{5}^*$$

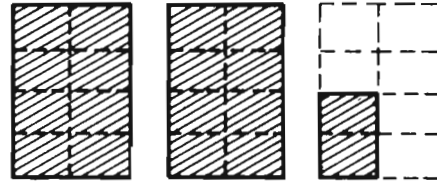
Some other members of the family:

$\frac{I}{5}$	$\frac{D}{5}$	$2 \frac{B}{10}$	$\frac{G}{10}$	$\frac{F}{10}$	$\frac{N}{100}$
---------------	---------------	------------------	----------------	----------------	-----------------

A related family of names:

$3 \frac{1}{5}^*$	$\frac{G}{5}$	$\frac{C}{5}$	$2 \frac{B}{5}$	$\frac{O}{10}$	$\frac{K}{100}$
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Another idea . . .
 . . . and a family of names



$$2 \frac{A}{4}^*$$

Some other members of the family:

$\frac{A}{4}$	$\frac{G}{8}$	$\frac{G}{12}$	$\frac{I}{16}$	$\frac{J}{40}$	$\frac{K}{100}$
$\frac{A}{4}$	$\frac{B}{8}$	$\frac{E}{16}$	$\frac{E}{20}$	$\frac{L}{60}$	$\frac{M}{100}$

Some related families of names:

$3 \frac{1}{4}^*$	$\frac{I}{4}$	$2 \frac{A}{4}$	$\frac{A}{4}$	$2 \frac{B}{8}$	$\frac{G}{8}$
$1 \frac{3}{4}^*$	$\frac{C}{4}$	$\frac{B}{8}$	$\frac{E}{8}$	$\frac{A}{12}$	$\frac{F}{12}$

Some more related families of names:

$1 \frac{1}{2}^*$	$\frac{C}{2}$	$\frac{B}{4}$	$\frac{F}{10}$	$\frac{L}{50}$	$\frac{M}{100}$
$2 \frac{3}{4}^*$	$\frac{C}{4}$	$\frac{G}{8}$	$2 \frac{C}{100}$	$\frac{M}{100}$	$\frac{O}{100}$
$1 \frac{1}{6}^*$	$\frac{C}{6}$	$\frac{B}{12}$	$\frac{E}{12}$	$\frac{H}{24}$	$\frac{O}{30}$

	A	B	C	D	E	F	G	H	I	J
K	225	2	11	8	225	21	18	28	75	320
L	9	30	75	12	14	40	16	50	13	65
M	2	6	3	150	25	15	175	24	36	125
N	1	10	17	4	260	26	27	14	150	90
O	5	150	7	32	20	35	22	175	275	85

Tactics and Language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{46}{6} = \frac{23}{3} = 7\frac{2}{3}$$

$$\frac{96}{9} = \text{---} = \text{---} \quad \text{A}$$

$$\frac{74}{8} = \text{---} = \text{---} \quad \text{B}$$

$$\frac{69}{9} = \text{---} = \text{---} \quad \text{C}$$

$$\frac{50}{4} = \text{---} = \text{---} \quad \text{D}$$

Change to
"equivalent fractions" with
"convenient denominators"

$$\frac{5}{4} = \frac{15}{12} = \frac{20}{16}$$

$$\frac{3}{7} = \frac{\text{---}}{14} = \frac{\text{---}}{35} \quad \text{E}$$

$$\frac{2}{9} = \frac{\text{---}}{18} = \frac{\text{---}}{36} \quad \text{F}$$

$$\frac{8}{3} = \frac{\text{---}}{12} = \frac{\text{---}}{21} \quad \text{A}$$

$$\frac{2}{5} = \frac{\text{---}}{35} = \frac{\text{---}}{75} \quad \text{B}$$

Change to
"equivalent fractions"
with the "least common
denominator"

$$\frac{3}{4}, \frac{3}{7} = \frac{21}{28}, \frac{12}{28}$$

$$\frac{7}{8}, \frac{4}{5} = \text{---}, \text{---} \quad \text{C}$$

$$\frac{7}{6}, \frac{5}{9} = \text{---}, \text{---} \quad \text{D}$$

$$\frac{3}{8}, \frac{5}{9} = \text{---}, \text{---} \quad \text{E}$$

$$\frac{4}{7}, \frac{9}{8} = \text{---}, \text{---} \quad \text{F}$$

Change to a
"mixed number" with all
improper fractions

$$3\frac{1}{2} = 2\frac{3}{2}$$

$$4\frac{1}{3} = 3\text{---} \quad \text{A}$$

$$2\frac{2}{3} = 1\text{---} \quad \text{B}$$

$$4\frac{1}{5} = 3\text{---} \quad \text{C}$$

$$9\frac{4}{5} = 8\text{---} \quad \text{D}$$

Change to a
"decimal fraction"

$$13\% = \frac{\text{---}}{100} = \text{---} \quad \text{E}$$

$$7\frac{1}{2} = \text{---} = \text{---} \quad \text{F}$$

$$\frac{7}{28} = \text{---} = \text{---} \quad \text{A}$$

$$\frac{27}{45} = \text{---} = \text{---} \quad \text{B}$$

$$\frac{19}{25} = \text{---} = \text{---} \quad \text{C}$$

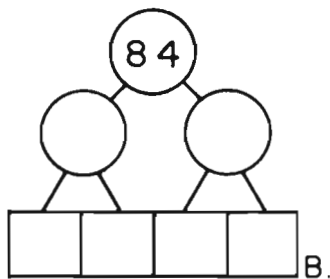
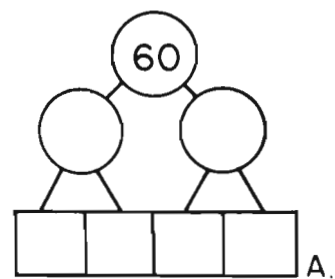
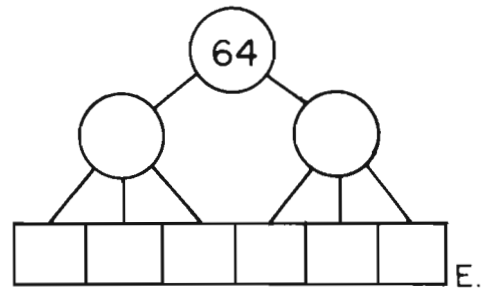
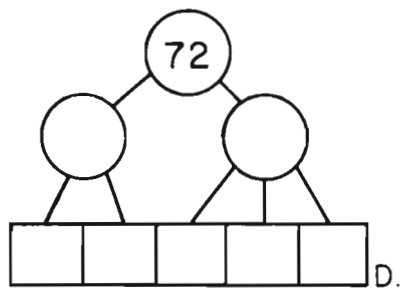
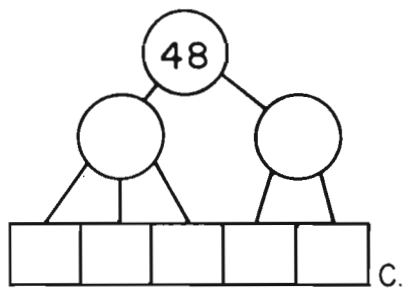
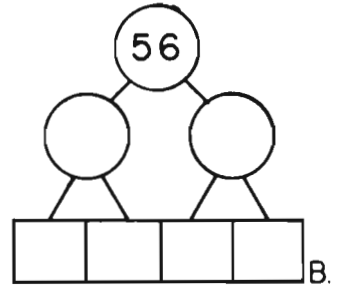
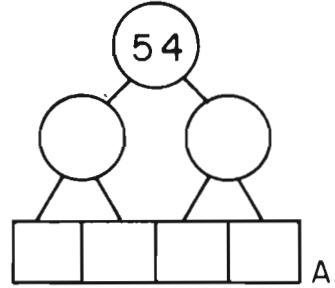
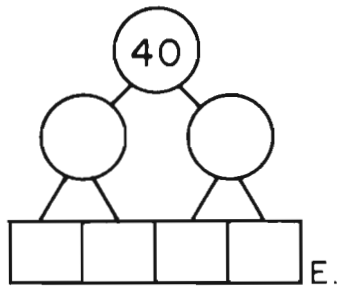
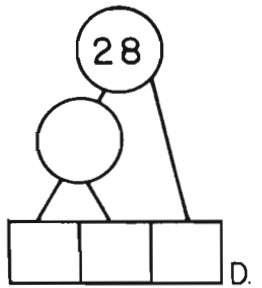
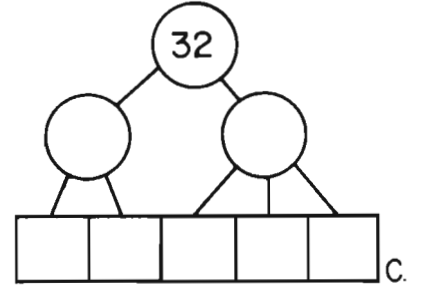
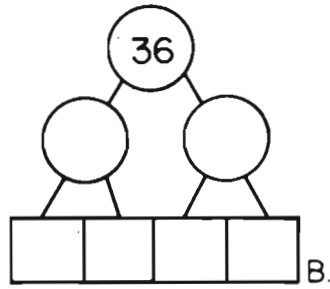
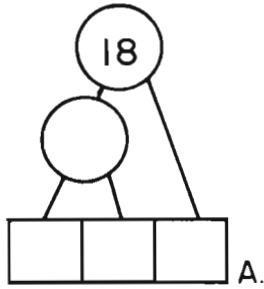
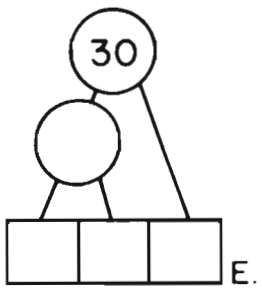
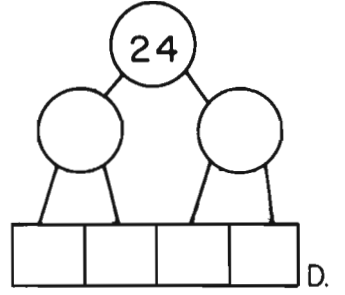
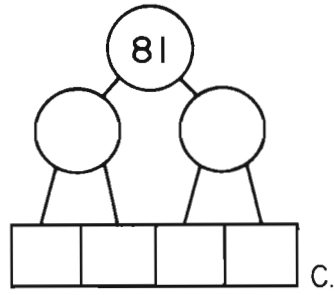
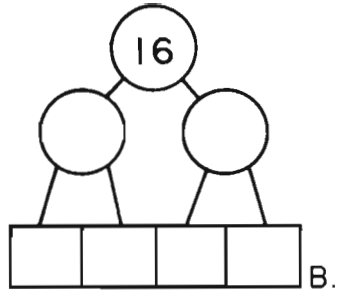
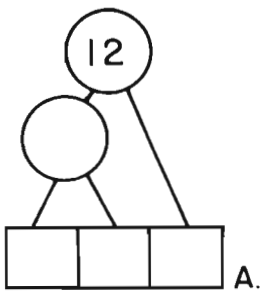
Change to a
"common fraction"
in 'lowest terms'

$$6\% = \frac{\text{---}}{100} = \text{---} \quad \text{D}$$

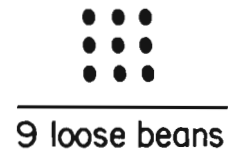
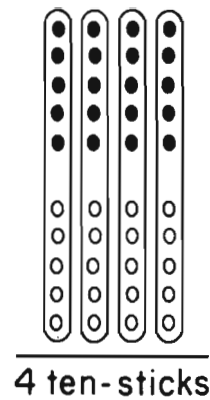
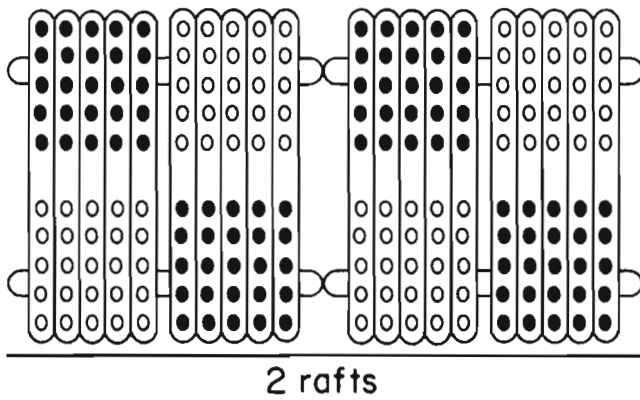
$$.16 = \text{---} = \text{---} \quad \text{E}$$

$$.004 = \text{---} = \text{---} \quad \text{F}$$

A	B	C	D	E	F
$\frac{4}{3}$	.6	$7\frac{2}{3}$	$\frac{9}{5}$	.13	4, 8
$10\frac{2}{8}$	$\frac{5}{3}$	.76	$\frac{21}{18}, \frac{10}{18}$	6, 15	7.5
.25	14, 30	$\frac{6}{5}$	$12\frac{1}{2}$	$\frac{4}{25}$	$\frac{32}{56}, \frac{63}{56}$
32, 56	$9\frac{1}{4}$	$\frac{35}{40}, \frac{32}{40}$	$\frac{3}{50}$	$\frac{27}{72}, \frac{40}{72}$	$\frac{1}{250}$



A	B	C	D	E
2,3,3,3	2,2,3,7	2,2,2,2,2	2,2,2,3	5,5,5,5
2,3,3	2,2,2,2	2,3,11	2,7,7	2,2,2,5
2,2,3	2,2,2,7	2,2,2,2,3	2,2,7	3,5,2
2,2,3,5	2,2,3,3	3,3,3,3	2,2,2,3,3	2,2,2,2,2,2



1 loose bean is one tenth ($1/10$ or $.1$) of a ten-stick

9 loose beans are nine tenths ($.9$) of a ten-stick

249 beans are ____ ten-sticks and $.9$ of a ten-stick . . . or 24.9 ten-sticks

1 10-stick is one tenth ($.1$) of a raft.

1 bean is one hundredth ($1/100$ or $.01$) of a raft.

49 beans are $.49$ of a raft plus $.09$ of a raft . . . or $.49$ of a raft.

249 beans are 2.49 (or $2 \frac{49}{100}$) rafts.

beans	249	537	F	H	28	999	1000
10-sticks	B	D	10.5	I	J	B	A
rafts	C	E	G	6.00	A	C	B

a penny is $.1$ ($1/10$) of a dime and $.01$ ($1/100$) of a dollar

a dime is $.1$ of a dollar

pennies	249	186	9		
dimes	G	D	G	9	C
dollars	F			A	9

	A	B	C
D	.28	53.7	18.6
E	24	99.9	5.37
F	100.0	105	2.49
G	1.05	24.9	.9
H	100	600	9.99
I	60.0	10	60
J	.9	2.8	90

Results from earlier examples

$$\begin{array}{r} .2 \\ +.3 \\ \hline .5 \end{array} \quad \begin{array}{r} .12 \\ -.03 \\ \hline .09 \end{array} \quad \begin{array}{r} .5 \\ -.21 \\ \hline .29 \end{array} \quad \begin{array}{r} .25 \\ +.1 \\ \hline .35 \end{array} \quad \begin{array}{r} .22 \\ -.17 \\ \hline .05 \end{array} \quad \begin{array}{r} .03 \\ +.04 \\ \hline .07 \end{array} \quad \begin{array}{r} .08 \\ +.12 \\ \hline .20 \end{array} \quad \begin{array}{r} .30 \\ -.07 \\ \hline .23 \end{array}$$

$$\begin{array}{r} .5 \\ \times .5 \\ \hline .25 \end{array} \quad \begin{array}{r} 1.07 \\ \times 2 \\ \hline 2.14 \end{array} \quad \begin{array}{r} .34 \\ \times .5 \\ \hline .170 \end{array} \quad \begin{array}{r} 1.5 \\ \times .5 \\ \hline .75 \end{array} \quad \begin{array}{r} 10.7 \\ \times 2 \\ \hline 21.4 \end{array} \quad \begin{array}{r} 1.05 \\ \times 4 \\ \hline 4.20 \end{array} \quad \begin{array}{r} 1.3 \\ \times .3 \\ \hline .39 \end{array} \quad \begin{array}{r} .535 \\ \times 4 \\ \hline 2.140 \end{array}$$

$$3 \overline{) .5} \quad 5 \overline{) .25} \quad 4 \overline{) 2.5} \quad 5 \overline{) 1.30} \quad 4 \overline{) 2.0}$$

Please follow the patterns and extend them.

$$\begin{array}{r} .5 \\ +.4 \\ \hline \end{array} \text{A} \quad \begin{array}{r} .5 \\ +.5 \\ \hline \end{array} \text{B} \quad \begin{array}{r} 1.4 \\ +1.4 \\ \hline \end{array} \text{C} \quad \begin{array}{r} 2.5 \\ +2.5 \\ \hline \end{array} \text{D} \quad \begin{array}{r} .9 \\ -.4 \\ \hline \end{array} \text{E} \quad \begin{array}{r} 1.0 \\ -.4 \\ \hline \end{array} \text{F} \quad \begin{array}{r} .20 \\ -.05 \\ \hline \end{array} \text{G} \quad \begin{array}{r} 2.18 \\ -.09 \\ \hline \end{array} \text{H}$$

$$\begin{array}{r} 1.50 \\ +.75 \\ \hline \end{array} \text{I} \quad \begin{array}{r} .5 \\ -.18 \\ \hline \end{array} \text{J} \quad \begin{array}{r} .07 \\ +.07 \\ \hline \end{array} \text{K} \quad \begin{array}{r} 3.4 \\ -1.56 \\ \hline \end{array} \text{A} \quad \begin{array}{r} 24.3 \\ +1.25 \\ \hline \end{array} \text{B} \quad \begin{array}{r} 24.3 \\ -1.25 \\ \hline \end{array} \text{C} \quad \begin{array}{r} 14.23 \\ +.9 \\ \hline \end{array} \text{D}$$

$$\begin{array}{r} .1 \\ \times 3 \\ \hline \end{array} \text{D} \quad \begin{array}{r} .1 \\ \times .3 \\ \hline \end{array} \text{E} \quad \begin{array}{r} 1.5 \\ \times 3 \\ \hline \end{array} \text{F} \quad \begin{array}{r} 1.5 \\ \times .3 \\ \hline \end{array} \text{G} \quad \begin{array}{r} .15 \\ \times .3 \\ \hline \end{array} \text{H} \quad \begin{array}{r} .7 \\ \times 4 \\ \hline \end{array} \text{C} \quad \begin{array}{r} .7 \\ \times .4 \\ \hline \end{array} \text{J} \quad \begin{array}{r} .07 \\ \times .4 \\ \hline \end{array} \text{K}$$

$$\begin{array}{r} 12 \\ \times 12 \\ \hline 144 \end{array} \quad \begin{array}{r} 1.2 \\ \times 12 \\ \hline \end{array} \text{A} \quad \begin{array}{r} 1.2 \\ \times 1.2 \\ \hline \end{array} \text{B} \quad \begin{array}{r} .12 \\ \times 12 \\ \hline \end{array} \text{C} \quad \begin{array}{r} .12 \\ \times 1.2 \\ \hline \end{array} \text{D}$$

$$5 \overline{) 253} \quad 5 \overline{) 26.5} \text{A} \quad 5 \overline{) 2.65} \text{C} \quad 5 \overline{) 1.265} \text{E}$$

	A	B	C	D	E
F	.45	1.44	23.05	.6	4.8
G	1.84	.15	2.8	.3	4.5
H	.9	.045	1.44	2.09	.03
I	14.4	2.25	2.53	5.0	.253
J	25.3	1.0	.32	.144	.28
K	.14	25.55	.028	15.13	.5

Change to
"simplest form" or
"lowest terms"

Change to a
"decimal fraction"

Change to a
"common fraction"
in "lowest terms"

$$\frac{50}{8} = \frac{\quad}{4} =$$

$$\frac{27}{6} = \quad =$$

$$\frac{54}{4} = \quad =$$

$$\frac{57}{9} = \quad =$$

$$50\% = \frac{\quad}{100} =$$

$$7\frac{1}{2} = \frac{\quad}{10} =$$

$$114\% = \quad =$$

$$\frac{18}{45} = \quad =$$

$$7\% = \quad =$$

$$75\% = \quad =$$

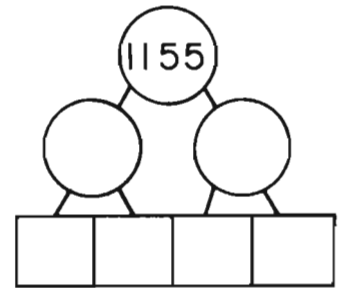
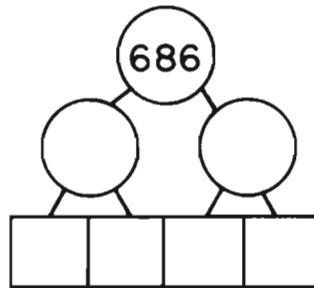
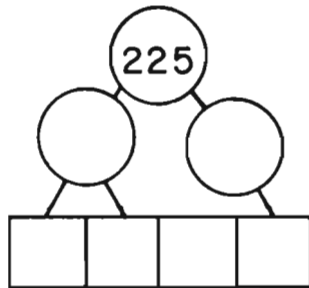
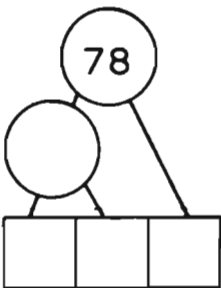
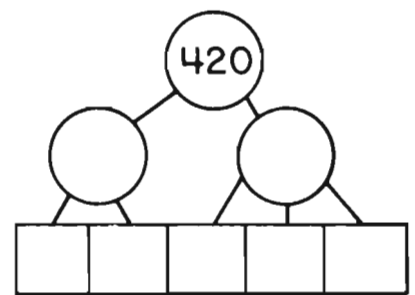
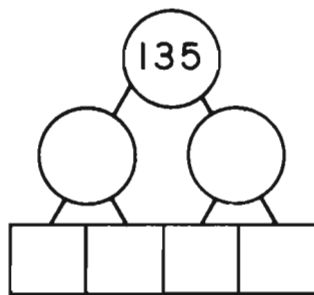
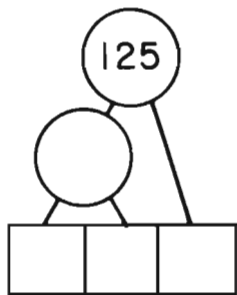
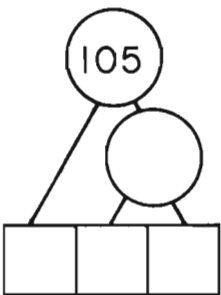
$$.16 = \quad =$$

$$150\% = \quad =$$

$$.008 = \quad =$$

$$1.45 = \quad =$$

... all factors greater than 1



$$\begin{array}{r} .3 \\ + .4 \\ \hline \end{array}$$

$$\begin{array}{r} .7 \\ + .7 \\ \hline \end{array}$$

$$\begin{array}{r} .9 \\ - .5 \\ \hline \end{array}$$

$$\begin{array}{r} 1.2 \\ - .4 \\ \hline \end{array}$$

$$\frac{1}{2} \times \frac{1}{3} = \text{---}$$

$$\frac{1}{4} \times \frac{1}{2} = \text{---}$$

$$\frac{2}{3} \times \frac{2}{3} = \text{---}$$

$$\frac{1}{4} \times \frac{2}{3} = \text{---}$$

$$\begin{array}{r} .5 \\ \times .5 \\ \hline \end{array}$$

$$\begin{array}{r} 6.3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} .63 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .07 \\ \times .3 \\ \hline \end{array}$$

$$\frac{3}{4} \times \frac{1}{2} = \text{---}$$



How do you feel ?

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$\frac{215}{10} = 21\frac{5}{10} = 21\frac{1}{2}$$

$$\frac{30}{14} = \quad = \quad \text{A}$$

$$\frac{36}{24} = \quad = \quad \text{B}$$

$$\frac{64}{56} = \quad = \quad \text{C}$$

$$\frac{63}{54} = \quad = \quad \text{D}$$

Change to
"per cent"

$$\frac{7}{20} = \frac{\quad}{100} = 35\%$$

$$2 = \quad = \quad \% \text{E}$$

$$\frac{9}{60} = \quad = \quad \% \text{F}$$

$$\frac{37}{25} = \quad = \quad \% \text{A}$$

$$\frac{5}{250} = \quad = \quad \% \text{B}$$

Change to
"equivalent fractions"
with the "least
common denominator"

$$\frac{5}{6}, \frac{5}{7} = \frac{35}{42}, \frac{30}{42}$$

$$\frac{5}{9}, \frac{5}{8} = \quad, \quad \text{C}$$

$$\frac{5}{4}, \frac{5}{11} = \quad, \quad \text{D}$$

$$\frac{5}{8}, \frac{5}{7} = \quad, \quad \text{E}$$

$$\frac{5}{3}, \frac{5}{8} = \quad, \quad \text{F}$$

Change to
decimal fraction

$$18\% = \frac{\quad}{100} = .18$$

$$\frac{27}{45} = \quad = \quad \text{A}$$

$$\frac{34}{8} = \quad = \quad \text{B}$$

$$\frac{18}{60} = \quad = \quad \text{C}$$

$$\frac{49}{35} = \quad = \quad \text{D}$$

Change to
"equivalent fractions"
with "convenient
denominators"

$$\frac{3}{5} = \frac{12}{20} = \frac{\quad}{45} \text{E}$$

$$\frac{9}{7} = \frac{\quad}{35} = \frac{\quad}{63} \text{F}$$

$$\frac{3}{13} = \frac{\quad}{39} = \frac{\quad}{91} \text{A}$$

$$\frac{7}{8} = \frac{\quad}{48} = \frac{\quad}{72} \text{B}$$

$$\frac{4}{9} = \frac{\quad}{54} = \frac{\quad}{81} \text{C}$$

Change to
a "common fraction"
in "lowest terms"

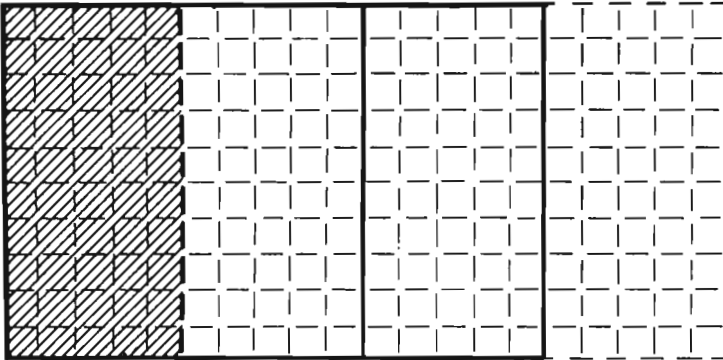
$$166\frac{2}{3}\% = \quad \text{D}$$

$$112\frac{1}{2}\% = \quad \text{E}$$

$$6\frac{1}{4}\% = \quad \text{F}$$

A	B	C	D	E	F
.6	2	24,36	$1\frac{1}{6}$	27	$\frac{40}{24}, \frac{15}{24}$
$2\frac{1}{7}$	42,63	$\frac{40}{72}, \frac{45}{72}$	1.4	200	45,81
9,21	$1\frac{1}{2}$	.3	$1\frac{2}{3}$	$\frac{35}{56}, \frac{40}{56}$	15
148	4.25	$1\frac{1}{7}$	$\frac{55}{44}, \frac{20}{44}$	$1\frac{1}{8}$	$\frac{1}{16}$

What Can You See? . . . Large Square = 1 = $\frac{10}{10}$ = $\frac{100}{100}$ = 1.0 = 1.00



$$\begin{array}{r|l} 1 & \frac{5}{10} \\ \hline & 1.5 \end{array}$$

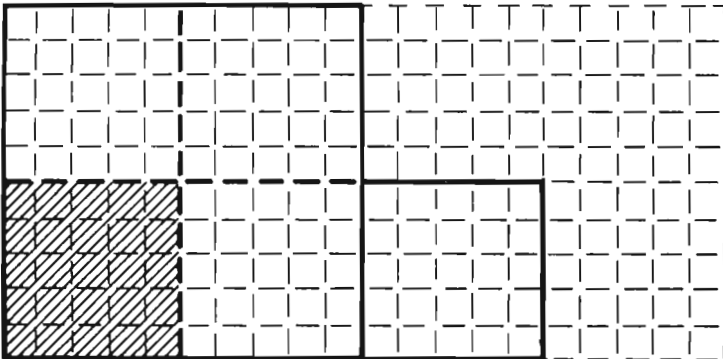
$$\div 3 \quad \div 3$$

$$\begin{array}{r|l} & \\ \hline \text{A.} & \frac{10}{10} \end{array} \quad \text{B.}$$

$$\begin{array}{r|l} & \frac{5}{10} \\ \hline & .5 \end{array}$$

$$\div 5 \quad \div 5$$

$$\begin{array}{r|l} & \\ \hline \text{C.} & \frac{10}{10} \end{array} \quad \text{D.}$$



$$\begin{array}{r|l} 1 & \frac{25}{100} \\ \hline & 1.25 \end{array}$$

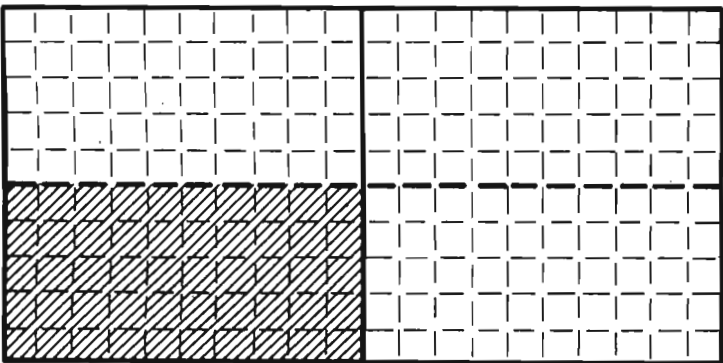
$$\div 5 \quad \div 5$$

$$\begin{array}{r|l} & \\ \hline \text{E.} & \frac{100}{100} \end{array} \quad \text{F.}$$

$$\begin{array}{r|l} 1 & \frac{5}{10} \\ \hline & 1.5 \end{array}$$

$$\div 5 \quad \div 5$$

$$\begin{array}{r|l} & \\ \hline \text{G.} & \frac{10}{10} \end{array} \quad \text{H.}$$



$$\begin{array}{r|l} & 2 \\ \hline & 2.0 \end{array}$$

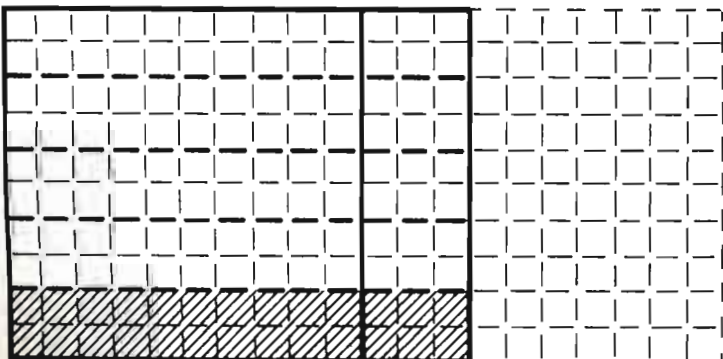
$$\div 4 \quad \div 4$$

$$\begin{array}{r|l} & \\ \hline \text{A.} & \frac{10}{10} \end{array} \quad \text{B.}$$

$$\begin{array}{r|l} \frac{30}{10} & 3.0 \end{array}$$

$$\div 5 \quad \div 5$$

$$\begin{array}{r|l} & \\ \hline \text{C.} & \frac{10}{10} \end{array} \quad \text{D.}$$



$$\begin{array}{r|l} 1 & \frac{30}{100} \\ \hline & 1.30 \end{array}$$

$$\div 5 \quad \div 5$$

$$\begin{array}{r|l} & \\ \hline \text{A.} & \frac{100}{100} \end{array}$$

	A.	B.	C.
D.	.8	.6	.1
E.	26	.5	25
F.	5	.25	.4
G.	28	3	1
H.	.3	.26	6

Different ways to talk about 50c.

$\frac{1}{2}$ of a dollar . . . "2 quarters" or $\frac{2}{4}$ of a dollar . . . 1 dime is $\frac{1}{10}$ of a dollar, so $\frac{1}{2}$ of a dollar is $\frac{5}{10}$ of a dollar . . . there are 20 nickels in a dollar and a nickel is $\frac{1}{20}$ of a dollar; there are 10 nickels in $\frac{1}{2}$ dollar, so 50c is $\frac{10}{20}$ of a dollar. A penny is $\frac{1}{100}$ of a dollar, so 50c is $\frac{50}{100}$ of a dollar. So, we say

$$\frac{1}{2} = \frac{2}{4} = \frac{5}{10} = \frac{10}{20} = \frac{50}{100}$$

There are many ways to talk about $\frac{1}{2}$. Please fill in the following series of names for $\frac{1}{2}$

$$\frac{1}{2} = \frac{A}{4} = \frac{B}{6} = \frac{C}{8} = \frac{5}{10} = \frac{6}{D} = \frac{7}{E} = \frac{8}{F} = \frac{9}{G} = \frac{H}{20} \text{ --- } \frac{I}{100}$$

Different ways to talk about 75c

Three quarters . . . $\frac{3}{4}$ of a dollar . . . 15 nickels or $\frac{15}{20}$ of a dollar . . . 75c or $\frac{75}{100}$ of a dollar. So we say: $\frac{3}{4} = \frac{15}{20} = \frac{75}{100}$

Please fill in the following series of names for $\frac{3}{4}$

$$\frac{3}{4} = \frac{6}{8} = \frac{A}{12} = \frac{D}{16} = \frac{15}{20} = \frac{18}{B} = \frac{21}{H} = \frac{24}{A} = \frac{27}{D} = \frac{30}{D} \text{ --- } \frac{75}{100}$$

Please fill in the following series of names for $\frac{1}{4}$, $\frac{1}{10}$ and $\frac{7}{10}$.

$$\frac{1}{4} = \frac{2}{8} = \frac{3}{H} = \frac{4}{F} = \frac{5}{B} = \frac{6}{C} = \frac{7}{I} = \frac{8}{D} \text{ --- } \frac{10}{D}$$

$$\frac{1}{10} = \frac{2}{20} = \frac{3}{F} = \frac{4}{G} = \frac{5}{I} = \frac{6}{D} = \frac{7}{D} = \frac{8}{E} \text{ --- } \frac{10}{E}$$

$$\frac{7}{10} = \frac{14}{20} = \frac{C}{30} = \frac{H}{40} = \frac{D}{50} = \frac{H}{60} = \frac{A}{70} = \frac{G}{80} \text{ --- } \frac{100}{G}$$

	A	B	C	D
E	2	14	21	100
F	56	3	16	40
G	9	18	4	70
H	49	10	28	12
I	32	24	50	42

Tactics and language you may find useful.

Change to
"simplest form" or
"lowest terms"

$$2\frac{1}{10} = \frac{5}{20} = \frac{1}{4}$$

$$2\frac{1}{15} = \frac{\quad}{30} = \text{---}^A$$

$$5\frac{1}{22} = \text{---} = \text{---}^B$$

$$7\frac{1}{25} = \text{---} = \text{---}^C$$

$$3\frac{1}{7} = \text{---} = \text{---}^D$$

Change to a
"decimal fraction"

$$\frac{5}{4} = 1\frac{1}{4} = 1.25$$

$$135\% = \quad = \quad^E$$

$$\frac{14}{4} = \quad = \quad^F$$

$$2\frac{5}{4} = \quad = \quad^A$$

$$\frac{17}{25} = \quad = \quad^B$$

Change to "equivalent
mixed numbers" with
the "least common
denominator"

$$1\frac{3}{7}, 2\frac{4}{5} = 1\frac{15}{35}, 2\frac{28}{35}$$

$$2\frac{5}{6}, 4\frac{5}{8} = 2\text{---}, 4\text{---}^C$$

$$5\frac{4}{9}, 2\frac{1}{4} = 5\text{---}, 2\text{---}^D$$

$$7\frac{3}{4}, 4\frac{1}{6} = 7\text{---}, 4\text{---}^E$$

$$2\frac{1}{12}, 1\frac{1}{9} = 2\text{---}, 1\text{---}^F$$

Round off
to the nearest
whole number

$$4\frac{5}{8} \longrightarrow \underline{5}$$

$$1.39 \longrightarrow \underline{1}$$

$$225\% \longrightarrow \text{---}^A$$

$$\frac{47}{4} \longrightarrow \text{---}^B$$

$$135.7 \longrightarrow \text{---}^C$$

$$7\frac{9}{16} \longrightarrow \text{---}^D$$

$$297\frac{3}{8} \longrightarrow \text{---}^E$$

$$12.725 \longrightarrow \text{---}^F$$

Change to
"per cent"

$$\frac{5}{2} = 2\frac{1}{2} = 250\%$$

$$1.3 = \quad = \quad\%^A$$

$$\frac{17}{20} = \quad = \quad\%^B$$

$$.09 = \quad = \quad\%^C$$

$$\frac{13}{65} = \quad = \quad\%^D$$

Change to a
"common fraction"
in "lowest terms"

$$33\frac{1}{3}\% = \frac{1}{3}$$

$$66\frac{2}{3}\% = \text{---}^E$$

$$12\frac{1}{2}\% = \text{---}^F$$

A	B	C	D	E	F
$\frac{1}{6}$	12	9	8	$\frac{2}{3}$	3.5
2	.68	$\frac{3}{5}$	$\frac{16}{36}, \frac{9}{36}$	297	13
3.25	85	136	$\frac{1}{2}$	$\frac{9}{12}, \frac{2}{12}$	$\frac{1}{8}$
130	$\frac{1}{4}$	$\frac{15}{24}, \frac{20}{24}$	20	1.35	$\frac{3}{36}, \frac{4}{36}$

Pairs of Whole Number Factors

Rule: write the smaller factor below the larger factor.

A			B			C			
$\frac{x}{18}$	$\frac{x}{18}$	$\frac{x}{18}$	$\frac{x}{20}$	$\frac{x}{20}$	$\frac{x}{20}$	$\frac{x}{24}$	$\frac{x}{24}$	$\frac{x}{24}$	$\frac{x}{24}$
D		E		G			B		
$\frac{x}{25}$	$\frac{x}{25}$	$\frac{x}{27}$	$\frac{x}{27}$	$\frac{x}{28}$	$\frac{x}{28}$	$\frac{x}{28}$	$\frac{x}{32}$	$\frac{x}{32}$	$\frac{x}{32}$
A				F		G			
$\frac{x}{30}$	$\frac{x}{30}$	$\frac{x}{30}$	$\frac{x}{30}$	$\frac{x}{35}$	$\frac{x}{35}$	$\frac{x}{40}$	$\frac{x}{40}$	$\frac{x}{40}$	$\frac{x}{40}$
B					D		C		
$\frac{x}{36}$	$\frac{x}{36}$	$\frac{x}{36}$	$\frac{x}{36}$	$\frac{x}{36}$	$\frac{x}{45}$	$\frac{x}{45}$	$\frac{x}{63}$	$\frac{x}{63}$	$\frac{x}{63}$

Please find the "Missing Prime Factors" from the list.

The list

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73,79,83

$\frac{x}{14}$ $\frac{x}{9}$ A B C D E A								89
B C D E A B C D								97
$\frac{x}{55}$ $\frac{x}{46}$ $\frac{x}{51}$ $\frac{x}{65}$ $\frac{x}{57}$ $\frac{x}{69}$ $\frac{x}{94}$ $\frac{x}{106}$								101
$3 \overline{)33}$ A B D								103
E C D E								107
$\frac{x}{35}$ $\frac{x}{39}$ $\frac{x}{85}$ $\frac{x}{91}$								109
F A B C D E					F A B C D E			113
G H I J K					G H I J K			127
2,11 2,13 2,47 1,5 5,13					2,5 1,2,4 3,5 3,17 1,2,4,5			131
5,7					7,7 1,2,3,4,6 3,13 5,17 1,3			137
5,5					1,2,3,5 3,23 1,2,3,4 2,19 5,5			139
7,13					3,19 3,1 2,23 2,3 7,13			149
151								
157								

“Prime Factor Puzzles”

Rule: fill all the blanks from this list: 2, 3, 5, 7

$A \underline{\quad} \times \underline{\quad} = 14$	$C \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 8$	$E \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 16$
$B \underline{\quad} \times \underline{\quad} = 15$	$D \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 12$	$F \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 24$
$C \underline{\quad} \times \underline{\quad} = 21$	$G \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 18$	$G \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 36$
$D \underline{\quad} \times \underline{\quad} = 25$	$F \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 20$	$A \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 40$
$E \underline{\quad} \times \underline{\quad} = 35$	$G \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 27$	$B \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 54$
$F \underline{\quad} \times \underline{\quad} = 49$	$A \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 28$	$C \underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 56$
$G \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 30$	$B \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 50$	$D \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 75$
$A \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 42$	$C \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 63$	$E \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 98$

Pairs of Whole Number Factors

Rule: write the smaller factor below the larger factor
(Answers show only smaller factors.)

$\frac{x}{4}$	$\frac{x}{4}$	$\frac{x}{6}$	$\frac{x}{6}$	$\frac{x}{8}$	$\frac{x}{8}$	$\frac{x}{9}$	$\frac{x}{9}$	$\frac{x}{10}$	$\frac{x}{10}$																				
$\frac{x}{12}$			$\frac{x}{12}$			$\frac{x}{12}$			$\frac{x}{14}$			$\frac{x}{14}$			$\frac{x}{15}$			$\frac{x}{15}$			$\frac{x}{16}$			$\frac{x}{16}$			$\frac{x}{16}$		
$\frac{x}{20}$			$\frac{x}{20}$			$\frac{x}{20}$			$\frac{x}{21}$			$\frac{x}{21}$																	
$\frac{x}{48}$					$\frac{x}{48}$					$\frac{x}{48}$					$\frac{x}{48}$					$\frac{x}{48}$									

A	B	C	D	E	F	G
2, 3, 7	1, 2	2, 2, 2	5, 5	2, 7, 7	1, 2, 3, 4, 6	2, 3, 5
2, 2, 2, 5	3, 5	2, 2, 2, 7	2, 5, 7	2, 2, 2, 2	2, 2, 5	3, 3, 2
2, 2, 7	2, 5, 5	1, 3	2, 2, 3	5, 7	2, 2, 2, 3	2, 2, 3, 3
2, 7	2, 3, 3, 3	7, 3, 3	3, 5, 5	2, 3, 3	5, 5, 5	3, 3, 3
1, 2	3, 3, 5	3, 7	1, 2, 3	1, 2, 4	7, 7	4, 5, 1

Change to a "common fraction" in "lowest terms"

Change to "per cent"

Change to "equivalent fractions" with the "least common denominator"

$$113\% = \frac{\quad}{100} =$$

$$\frac{3}{4} = \frac{\quad}{100} = \%$$

$$\frac{1}{7}, \frac{3}{5} = \text{---}, \text{---}$$

$$\frac{144}{8} = \quad =$$

$$1\frac{3}{5} = \quad = \%$$

$$\frac{3}{8}, \frac{2}{3} = \text{---}, \text{---}$$

$$\frac{72}{54} = \quad =$$

$$\frac{17}{25} = \quad = \%$$

$$\frac{3}{7}, \frac{4}{9} = \text{---}, \text{---}$$

Use only pairs of factors
"From the List"

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,
61,67,71,73,79,83,89,97,101,103,107,109,113

$$\frac{x}{126}$$

$$\frac{x}{177}$$

$$\frac{x}{249}$$

$$\frac{x}{291}$$

$$\frac{x}{321}$$

$$\frac{x}{335}$$

$$\frac{x}{427}$$

$$\frac{x}{763}$$

$$\frac{x}{201}$$

$$\frac{x}{259}$$

$$\frac{x}{319}$$

$$\frac{x}{395}$$

$$\frac{x}{403}$$

$$\frac{x}{581}$$

$$\frac{x}{583}$$

$$\frac{x}{1133}$$

Change to a decimal fraction

Round off to the nearest whole number

Change to "equivalent fractions" with "convenient denominators"

$$2\frac{3}{5} = \quad =$$

$$13\frac{7}{17} \rightarrow \text{---}$$

$$\frac{2}{5} = \frac{\quad}{15} = \frac{\quad}{65}$$

$$7\frac{17}{20} = \quad =$$

$$7.09 \rightarrow \text{---}$$

$$\frac{4}{9} = \frac{\quad}{36} = \frac{\quad}{81}$$

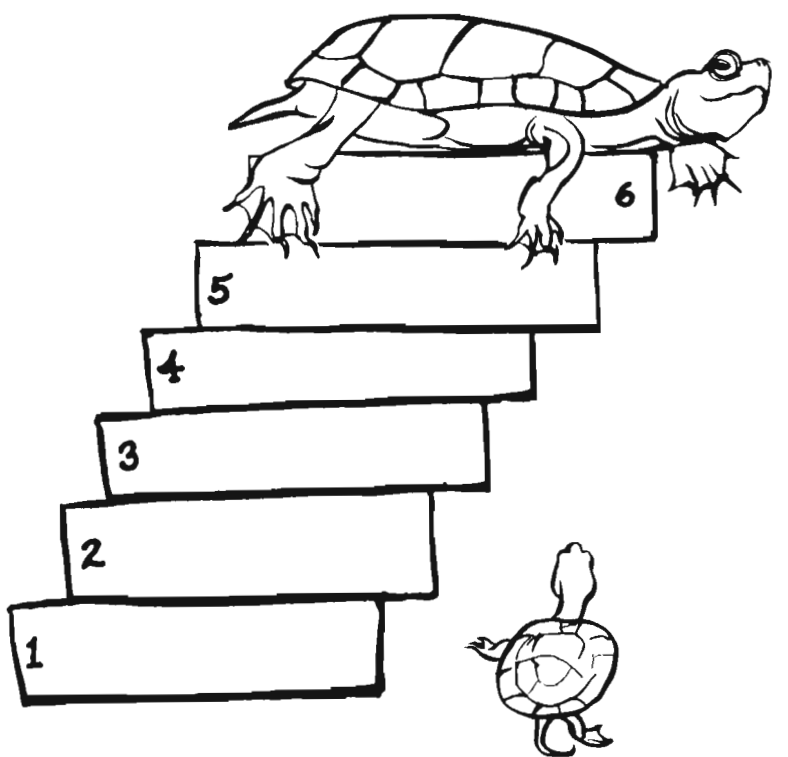
$$173\% = \quad =$$

$$135.7 \rightarrow \text{---}$$

$$317\frac{5}{9} \rightarrow \text{---}$$



How do you feel?





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