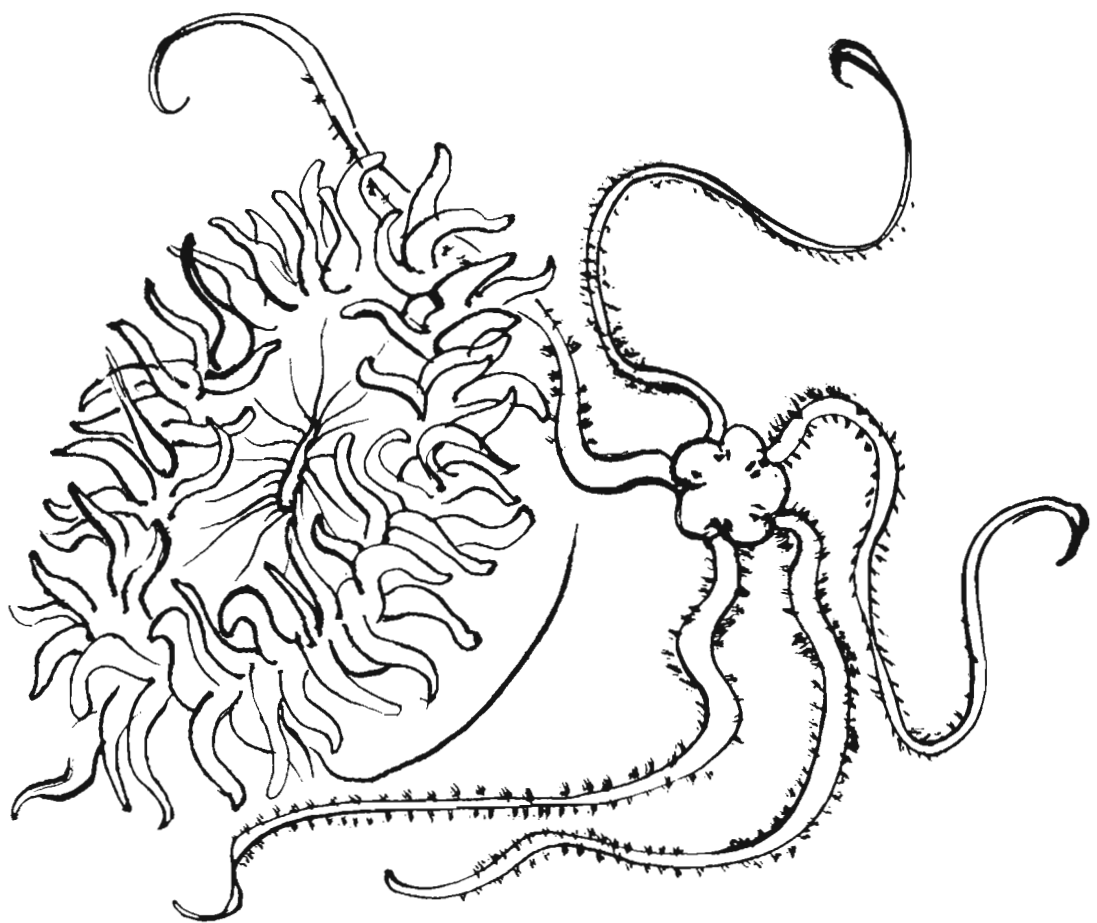




industrial

e₂



Cover Art
The Art Class of Gordon Parker at Carmelo Summer School

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If the results are not surprising,
then one of us goofed.....signed "GOOOOFY."

Pairs of Single-Digit Whole Number Factors

Rule: if not alike, please write the larger factor above the smaller factor.

$\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$	$\begin{array}{r} \\ \times 2 \\ \hline 8 \end{array}$ A.	$\begin{array}{r} \\ \times 3 \\ \hline 9 \end{array}$ B.	$\begin{array}{r} \\ \times \\ \hline 10 \end{array}$ C.	$\begin{array}{r} \\ \times 2 \\ \hline 12 \end{array}$ D.	$\begin{array}{r} \\ \times 3 \\ \hline 12 \end{array}$ E.	$\begin{array}{r} \\ \times \\ \hline 14 \end{array}$ F.	$\begin{array}{r} \\ \times \\ \hline 15 \end{array}$ A.	$\begin{array}{r} \\ \times 2 \\ \hline 16 \end{array}$ B.	$\begin{array}{r} \\ \times 4 \\ \hline 16 \end{array}$ C.
$\begin{array}{r} \\ \times 2 \\ \hline 18 \end{array}$ D.	$\begin{array}{r} \\ \times 3 \\ \hline 18 \end{array}$ E.	$\begin{array}{r} \\ \times \\ \hline 20 \end{array}$ F.	$\begin{array}{r} \\ \times \\ \hline 21 \end{array}$	$\begin{array}{r} \\ \times 3 \\ \hline 24 \end{array}$	$\begin{array}{r} \\ \times 4 \\ \hline 24 \end{array}$ C.	$\begin{array}{r} \\ \times \\ \hline 25 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 27 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 28 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 30 \end{array}$ E.
$\begin{array}{r} \\ \times \\ \hline 32 \end{array}$	$\begin{array}{r} \\ \times 4 \\ \hline 36 \end{array}$	$\begin{array}{r} \\ \times 6 \\ \hline 36 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 40 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 42 \end{array}$ E.	$\begin{array}{r} \\ \times \\ \hline 45 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 48 \end{array}$ C.	$\begin{array}{r} \\ \times \\ \hline 49 \end{array}$ D.	$\begin{array}{r} \\ \times \\ \hline 54 \end{array}$	$\begin{array}{r} \\ \times \\ \hline 56 \end{array}$ F.

Taming frightfully big numbers . . .

$1 \times 1 = 1$	$3 \times 5 = 15$	$6 \times 5 = 30$
$10 \times 1 = 10$	$30 \times 5 =$ A.	$60 \times 5 =$ E.
$1 \times 10 = 10$	$3 \times 50 =$ K.	$6 \times 50 =$ K.
$10 \times 10 =$ B.	$3 \times 500 =$ D.	$6 \times 500 =$ F.
$100 \times 10 =$ C.	$300 \times 5 =$ I.	$600 \times 5 =$ G.
$10 \times 100 =$ J.	$30 \times 50 =$ D.	$60 \times 50 =$ F.

Factor Trees (excluding 1 as a factor)

2 × 3 × 2

6

12

and

3 × 2 × 2

4

12

× × ×

A.

36

× × × ×

B.

32

20

A.

× ×

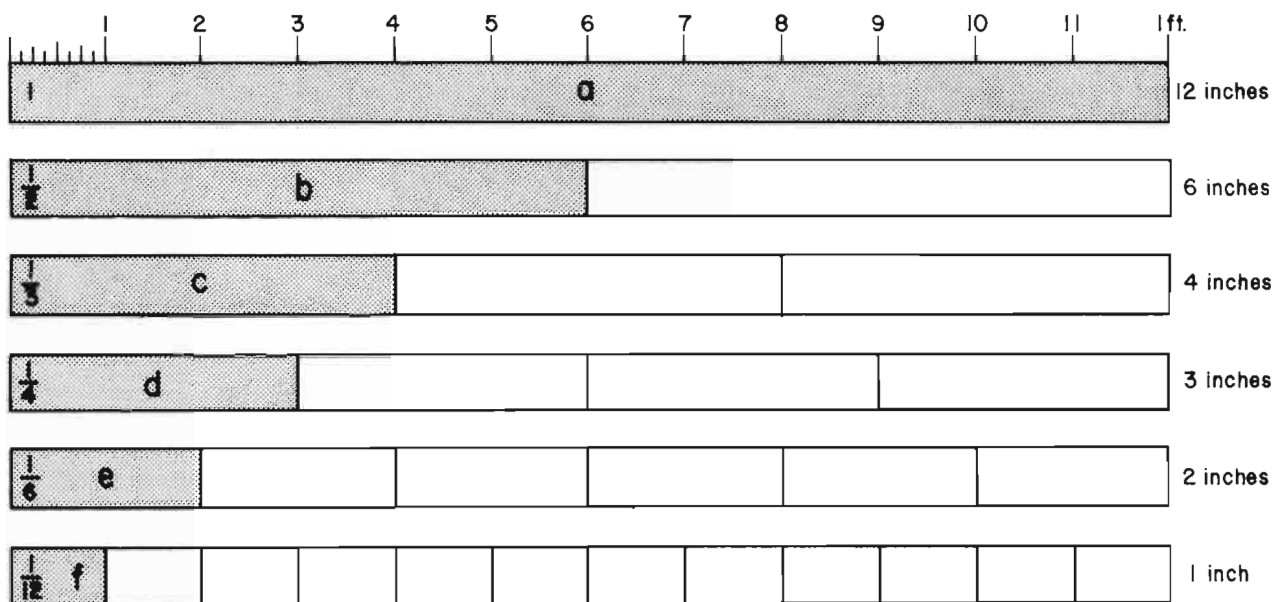
24

B.

× × ×

	A.	B.	C.	D.	E.	F.
G.	2,2,3,3	2,8	6,8	2,7	3,4	3,000
H.	3,5	2,2,2,2,2	2,5	2,9	5,6	4,5
I.	2,4	2,2,2,3	4,4	1500	3,6	2,7
J.	2,2,5	3,3	1000	2,6	6,7	7,8
K.	150	100	4,6	7,7	300	5,6

What Can You See? . . . (suggested by a 1 foot ruler)



$$\frac{b}{\frac{1}{2}} + \frac{b}{\frac{1}{2}} = \frac{a}{1}$$

$$\frac{f}{\frac{1}{12}} + \frac{f}{\frac{1}{12}} = \frac{b}{\frac{1}{2}}$$

A. B.

$$\frac{d}{\frac{1}{3}} - \frac{e}{\frac{1}{6}} = \frac{c}{\frac{1}{3}}$$

C. G. F.

$$\frac{b}{\frac{1}{2}} - \frac{c}{\frac{1}{3}} = \frac{a}{1}$$

D. A. B.

$$\frac{2e}{\frac{2}{6}} + \frac{2f}{\frac{2}{12}} = \frac{b}{\frac{1}{2}}$$

$$\frac{3f}{\frac{3}{12}} - \frac{e}{\frac{1}{6}} = \frac{a}{1}$$

B. A.

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

$$\frac{a}{1} - \frac{d}{\frac{1}{3}} = \frac{c}{\frac{1}{3}}$$

B. C. D.

$$\frac{2c}{\frac{2}{3}} - \frac{3f}{\frac{3}{12}} = \frac{b}{\frac{1}{2}}$$

C. A. B.

$$\frac{d}{\frac{1}{3}} \times \frac{2}{2} = \frac{c}{\frac{1}{3}}$$

C. D.

$$\frac{f}{\frac{1}{12}} \times \frac{3}{3} = \frac{b}{\frac{1}{2}}$$

A. E.

$$\frac{b}{\frac{1}{2}} \div \frac{2}{2} = \frac{a}{1}$$

D. E.

$$\frac{b}{\frac{1}{2}} \div \frac{3}{3} = \frac{c}{\frac{1}{3}}$$

F. G.

	A.	B.	C.	D.
E.	$\frac{1}{3}$	$\frac{5}{12}$	$\frac{1}{4}$	$\frac{1}{5}$
F.	$\frac{1}{12}$	1	$\frac{2}{3}$	$\frac{1}{2}$
G.	$\frac{3}{12}$	$\frac{1}{6}$	$\frac{3}{8}$	$\frac{3}{4}$

From Easier $\xrightarrow{\text{to}}$ more Difficult

From Easier
↓ to
more Difficult

100 %	50 %	25 %	10 %	5 %	3 %	$1\frac{1}{2} \%$
300	A.I	B.I	C.I	D.I	E.I	A.
100	B.I		C.I	A.I	E.I	A.
400	C.I					E.
200	D.I			C.I	E.I	E.

100 %	50 %	25 %	75 %	150 %	15 %	$7\frac{1}{2} \%$
600	D.I	A.I	C.I			B.
200	D.I	B.I	A.I	D.I	C.I	D.
800		C.I		D.I		E.
1000			B.I		A.I	B.

2 (x4) (x3)

26 (+9) (-7)

24 (÷4) (÷3)

26 (-) 19 (+) 28

8 (÷2) (x5)

8 (x) 40 (÷) 20

	A.	B.	C.	D.	E.
F.	5	50	450	15	3
G.	150	750	200	1200	60
H.	$4\frac{1}{2}$	45	30	300	9
I.	$1\frac{1}{2}$	75	10	100	6

+, -, ×, ÷ Measurements: 7 days = 1 week
12 eggs = 1 dozen

wk. da.	
<u>1 3</u>	10 da.
+ <u>1 4</u>	11 da.
<u>3 0</u>	21 da.

doz. eggs	
<u>2 3</u>	27 eggs
+ <u>1 10</u>	22 e.
<u>4 1</u>	e.

\$10 \$1	
<u>1 7</u>	\$ 17
+ <u>1 7</u>	\$
<u>2 4</u>	\$
	A.

wk. da.	
<u>3 0</u>	da.
- <u>1 4</u>	da.
<u>1 6</u>	da.
	B.

doz. eggs	
<u>4 1</u>	e.
- <u>1 10</u>	e.
<u>3 11</u>	e.
	C.

10¢ 1¢	
<u>4 0</u>	¢
- <u>1 8</u>	¢
<u>2 12</u>	¢
	D.

wk. da.	
<u>1 4</u>	da.
x 2	x2
<u>2 8</u>	da.
	E.

doz. eggs	
<u>0 8</u>	e.
x 3	x3
<u>2 4</u>	e.
	F.

1 decimeter = 10 centimeters

dm. cm.	
<u>1 5</u>	cm.
x 2	x2
<u>3 0</u>	cm.
	G.

wk. da.	
<u>3 3</u>	24 da.
÷ 4	÷ 4
<u>8 1</u>	da.
	H.

doz. eggs	
<u>1 8</u>	e.
÷ 5	÷ 5
<u>3 6</u>	e.
	A.

10's 1's	
<u>3 0</u>	(1's)
÷ 2	÷ 2
<u>1 5</u>	(1's)
	B.

wk. da.	
<u>2 5</u>	da.
+ <u>1 6</u>	da.
<u>3 1</u>	da.
	C.

doz. eggs	
<u>3 0</u>	e.
- <u>1 7</u>	e.
<u>1 13</u>	e.
	D.

	A.	B.	C.	D.	E.
F.	1,1	2,0	2,3	3,3	4,4
G.	3,4	1,5	3,0	1,5	3,1
H.	0,4	1,3	4,4	2,2	0,6

Estimation
 . . . or "coming close" . . . with easier arithmetic.

9

x

7

=

+1

+0

→

10

x

7

=

70

(+7)

→

8

x

8

=

A. (+1)

→

10

x

=

B. (-3)

How close?

Getting an exact result

9

x7

63

8

x

13

=

+3

-3

→

11

x

10

=

C. (+6)

→

x

10

=

100

()^x

A.

→

10

x

=

110

()

13

x

8

x "closest"

12

x

23

=

+3

-3

→

15

x

=

D. ()

→

x

25

=

()^x

A.

→

x

=

A. ()

D.

23

x

12

7

x

11

=

+1

-2

→

8

x

=

B. ()

→

x

10

=

C. ()

→

x

=

D. ()

→

-2

+3

→

x

=

A. ()

→

-1

+2

→

x

=

()^x

C.

→

-3

+8

→

x

=

()^x

D.

11

x

7

A.

B.

C.

D.

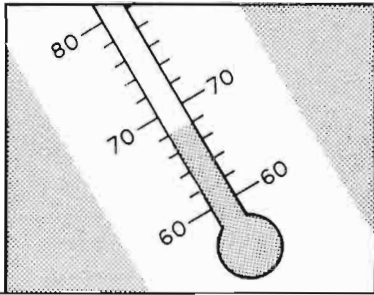
E.

F.

G.

H.

70	72	111	-6
64	-7	80	-1
-4	60	+1	81
270	70	+24	300



temperature shown

_____ °

A.

17° higher

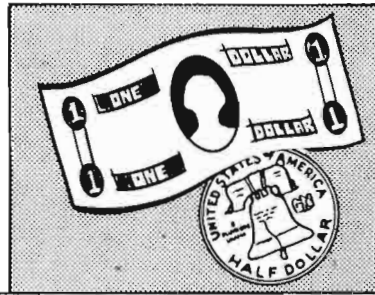
_____ °

B.

39° lower

_____ °

C.



amount shown

\$ _____

D.

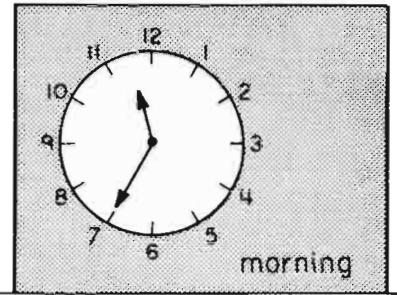
3 times as much

\$ _____

E.

one third as much

\$ _____



time shown

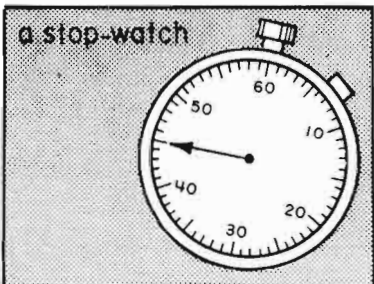
_____ : _____ a.m. G.

1½ hours later

_____ : _____ H.

1¼ hours earlier

_____ : _____ I.



a stop-watch

time shown (less than 1 minute)

_____ min., _____ sec. A.

twice as long

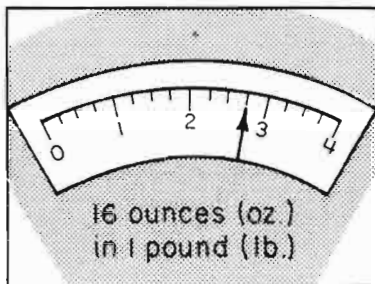
_____ min., _____ sec. B.

one third as long

_____ min., _____ sec. C.

½ minute longer

_____ min., _____ sec.



16 ounces (oz.)
in 1 pound (lb.)

amount shown

_____ lb., _____ oz. E.

half as much

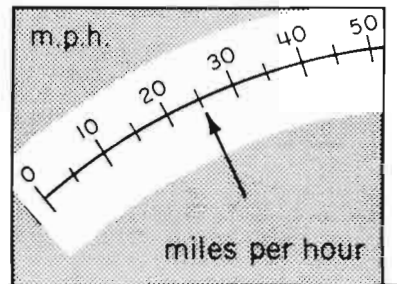
_____ lb., _____ oz. F.

7 ounces more

_____ lb., _____ oz. G.

14 ounces less

_____ lb., _____ oz. H.



m.p.h.

miles per hour

speed shown

_____ m.p.h. A.

17 m.p.h. faster

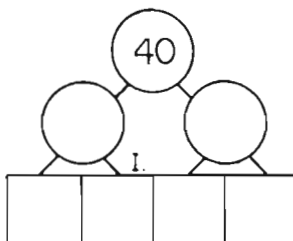
_____ m.p.h. E.

twice as fast

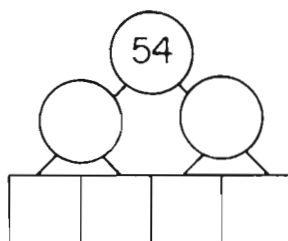
_____ m.p.h.

half as fast

_____ m.p.h. I.



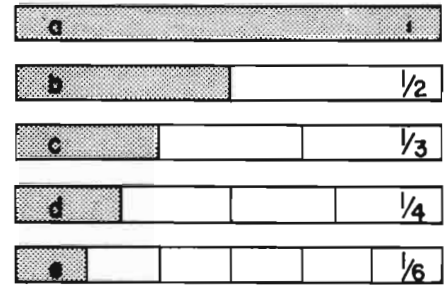
I.



	A.	B.	C.	D.	E.
F.	25	1,30	1,6	1.50	2,12
G.	68	11:35	0,15	3,3	42
H.	0,45	85	1:05	1,14	4.50
I.	2,2 2,5	2,3 3,3	29	10:20	12½

On Your Own (I)

$$\begin{array}{r} 37 \\ 37 \\ 37 \\ + 37 \\ \hline \end{array} \quad \begin{array}{r} 100 \\ - 37 \\ \hline \end{array} \quad \begin{array}{r} 37 \\ \times 12 \\ \hline \end{array} \quad \begin{array}{r} 23 \\ \times 46 \\ \hline \end{array}$$



Please circle the letter after the line you think will be the best "estimate."

12 x 12

- 10 x 10 A.
10 x 15 B.
10 x 20 C.

15 x 15

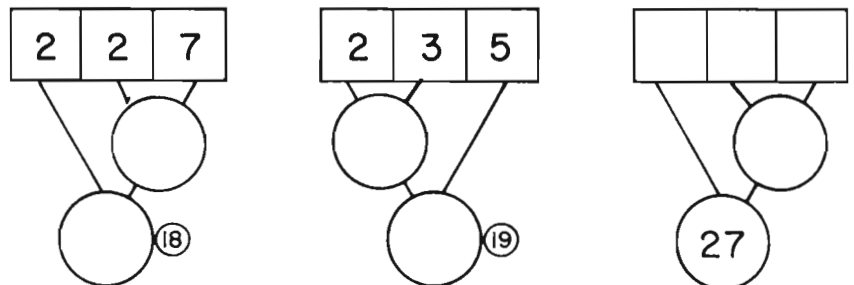
- 10 x 10 D.
10 x 20 E.
20 x 20 F.

$$\begin{array}{r} a - 3d = \\ 1 - \frac{3}{4} = \end{array}$$

$$\begin{array}{r} b + d = \\ + \quad = \end{array}$$

$$\begin{array}{r} 2c - e = \\ - \quad = \end{array}$$

2 x 5 = _____
10 x 5 = _____
5 x 20 = _____
10 x 20 = _____
10 x 50 = _____
20 x 50 = _____
2 x 500 = _____
10 x 500 = _____



100 %	50 %	25 %	10 %	5 %
60	30			
100		25		
50			5	

1 doz. = 12 eggs

doz.	eggs
2	4
1	11

--- e.
--- e.
--- e.

doz.	eggs
3	3
1	10

--- e.
--- e.
--- e.



How do you feel?

If the results aren't interesting,
then one of us goofed! . . . signed "GOOOOOFY"

$$4 \overline{)1284}$$

A.

$$7 \overline{)1554}$$

B.

$$6 \overline{)342}$$

C.

$$4 \overline{)1776}$$

A.

$$15 \overline{)360}$$

B.

$$13 \overline{)169}$$

C.

$$12 \overline{)408}$$

A.

$$23 \overline{)2553}$$

B.

$$\begin{array}{r} 2599 \\ 2589 \\ + 2589 \\ \hline \end{array}$$

C.

$$12 \overline{)1476}$$

A.

$$\begin{array}{r} 874 \\ 874 \\ 474 \\ 474 \\ 874 \\ + 874 \\ \hline \end{array}$$

B.

$$12 \overline{)4140}$$

C.

$$\begin{array}{r} 789 \\ 889 \\ 889 \\ + 889 \\ \hline \end{array}$$

A.

$$43 \overline{)903}$$

B.

$$52 \overline{)1768}$$

C.

A.	B.	C.
444	21	57
34	222	345
3456	111	13
123	24	34
321	4444	7777

Pairs of Single-Digit Whole Number Factors.

Rule: if not alike, please write the larger factor above the smaller factor.

A.
 $\begin{array}{r} \times \\ 10 \end{array}$

B.
 $\begin{array}{r} \times 2 \\ 12 \end{array}$

C.
 $\begin{array}{r} \times \\ 14 \end{array}$

D.
 $\begin{array}{r} \times 2 \\ 16 \end{array}$

E.
 $\begin{array}{r} \times 2 \\ 18 \end{array}$

F.
 $\begin{array}{r} \times \\ 15 \end{array}$

G.
 $\begin{array}{r} \times 3 \\ 18 \end{array}$

H.
 $\begin{array}{r} \times \\ 21 \end{array}$

I.
 $\begin{array}{r} \times 3 \\ 24 \end{array}$

J.
 $\begin{array}{r} \times \\ 27 \end{array}$

K.
 $\begin{array}{r} \times \\ 20 \end{array}$

$\begin{array}{r} \times 4 \\ 24 \end{array}$

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

$\begin{array}{r} \times \\ 32 \end{array}$

$\begin{array}{r} \times \\ 36 \end{array}$

$\begin{array}{r} \times \\ 25 \end{array}$

$\begin{array}{r} \times \\ 30 \end{array}$

$\begin{array}{r} \times \\ 35 \end{array}$

$\begin{array}{r} \times \\ 40 \end{array}$

$\begin{array}{r} \times \\ 45 \end{array}$

$\begin{array}{r} \times 6 \\ 36 \end{array}$

$\begin{array}{r} \times \\ 42 \end{array}$

A.
 $\begin{array}{r} \times \\ 48 \end{array}$

D.
 $\begin{array}{r} \times \\ 54 \end{array}$

F.
 $\begin{array}{r} \times \\ 49 \end{array}$

G.
 $\begin{array}{r} \times \\ 56 \end{array}$

H.
 $\begin{array}{r} \times \\ 63 \end{array}$

I.
 $\begin{array}{r} \times \\ 64 \end{array}$

J.
 $\begin{array}{r} \times \\ 72 \end{array}$

K.
 $\begin{array}{r} \times \\ 81 \end{array}$

Taming frightfully big numbers . . .

$2 \times 5 = 10$

$8 \times 9 = 72$

$2 \times 12 = 24$

$2 \times 50 =$

$8 \times 90 =$ K

$20 \times 12 =$ F

$20 \times 5 =$

$80 \times 9 =$ D

$2 \times 120 =$ I

$2 \times 500 =$

$80 \times 90 =$ E

$20 \times 120 =$ A

$20 \times 500 =$

$8 \times 900 =$ J

$2 \times 1200 =$ G

$200 \times 500 =$ F

$800 \times 9 =$ E

$200 \times 12 =$ A

Factor Trees (excluding 1 as a factor)

27

A.

42

B.

56

C.

72

A.

63

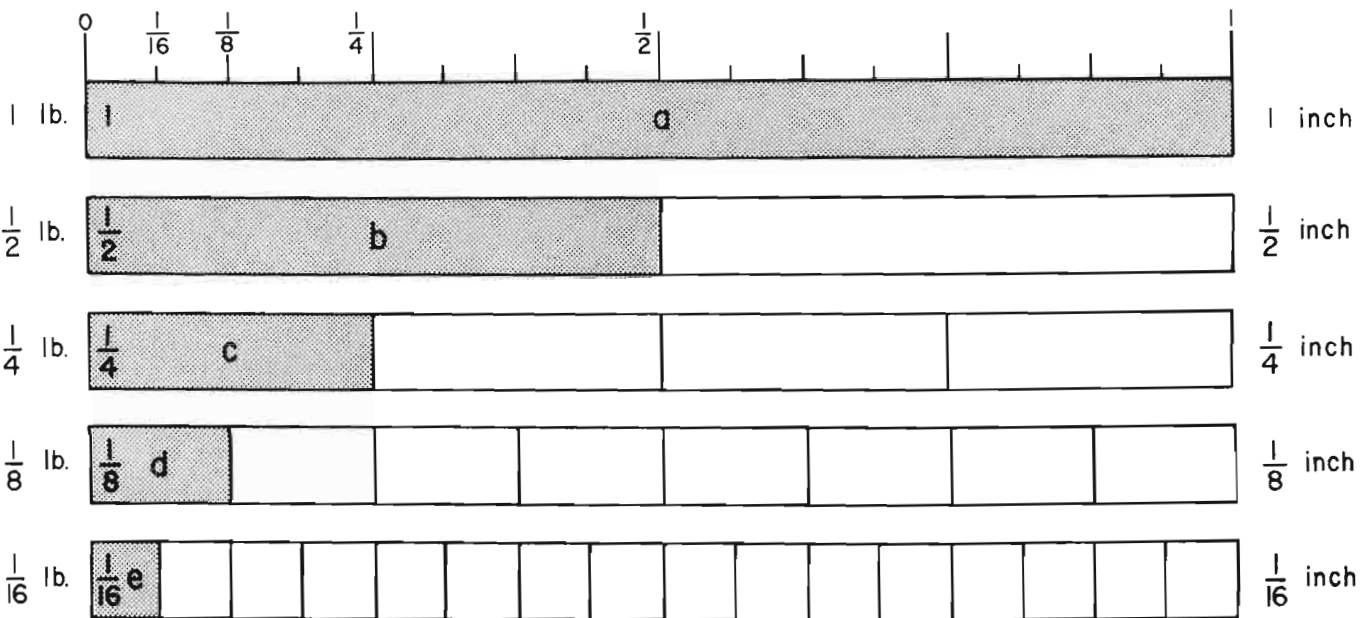
B.

81

C.

	A.	B.	C.	D.	E.	F.
G.	2400	3,3,7	2,7	3,6	7,8	100,000
H.	3,3,3	2,6	7,9	3,7	2,9	7,7
I.	2,5	8,8	2,2,2,7	6,9	3,8	240
J.	6,8	2,3,7	3,9	2,8	7200	8,9
K.	2,2,2,3,3	9,9	3,3,3,3	720	4,5	3,5

What Can You See? . . . (suggested by a pound of butter or 1 inch)



$$\frac{c}{\frac{1}{4}} + \frac{c}{\frac{1}{4}} = \frac{b}{\frac{1}{2}}$$

$$\frac{b}{\frac{1}{2}} + \frac{b}{\frac{1}{2}} = \frac{a}{1}$$

$$\frac{a}{1} - \frac{3c}{\frac{3}{4}} = \frac{c}{\frac{1}{4}}$$

$$\frac{3d}{\frac{3}{8}} + \frac{2e}{\frac{2}{16}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{b}{\frac{1}{2}} - \frac{c}{\frac{1}{4}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{2d}{\frac{2}{8}} - \frac{e}{\frac{1}{16}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{b}{\frac{1}{2}} - \frac{d}{\frac{1}{8}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{d}{\frac{1}{8}} - \frac{e}{\frac{1}{16}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{c}{\frac{1}{4}} + \frac{3e}{\frac{3}{8}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{3c}{\frac{3}{8}} - \frac{b}{\frac{1}{2}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{7d}{\frac{7}{8}} - \frac{c}{\frac{1}{4}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{5d}{\frac{5}{8}} + \frac{c}{\frac{1}{4}} = \frac{3e}{\frac{3}{8}}$$

$$\frac{c}{\frac{1}{4}} \times \frac{2}{2} = \frac{3e}{\frac{3}{8}}$$

$$\frac{3e}{\frac{3}{8}} \times \frac{3}{3} = \frac{3e}{\frac{3}{8}}$$

	A.	B.	C.	D.
E.	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{1}{16}$	$\frac{1}{2}$
F.	$\frac{3}{16}$	$\frac{9}{16}$	$\frac{1}{4}$	$\frac{3}{8}$
G.	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{7}{8}$	$\frac{3}{4}$

$$\frac{3c}{\frac{3}{8}} \div \frac{3}{3} = \frac{3e}{\frac{3}{8}}$$

$$\frac{2c}{\frac{2}{4}} \div \frac{4}{4} = \frac{3e}{\frac{3}{8}}$$

From Easier $\xrightarrow{\text{to}}$ more Difficult

From Easier
 $\downarrow$ to
more Difficult

100 %	50 %	25 %	75 %	10 %	5 %	2½ %
\$ 10.00	\$ 5.00	\$ 2.50	\$ 7.50	\$ 1.00	\$.50	\$.25
\$ 50.00	\$ 25.00	\$ 12.50	\$ A.I	\$ B.I	\$ C.I	\$ 1.25
\$ 100.00	\$ D.I	\$ A.I	\$ E.I	\$ C.I	\$ B.I	\$ C.
\$ 150.00	\$ E.I	\$ 37.50	\$ B.I	\$	\$	\$ 3.75

100 %	50%	150%	25%	125%	200%	250%
\$ 100.00	\$ 50.00	\$ 150.00	\$ A.I	\$ H.I	\$ C.I	\$ D.
\$ 25.00	\$ 12.50	\$ A.I	\$ B.I	\$ C.I	\$ D.I	\$
\$ 75.00	\$ A.I	\$ B.I	\$	\$	\$	\$ A.
\$ 175.00	\$	\$	\$ E.I	\$	\$	\$ A.

Short CHAIN REACTIONS

$$\frac{7 \quad (+8) \quad (+5)}{F \quad G.}$$

$$\frac{2 \quad (\times 3) \quad (\times 4)}{}$$

$$\frac{20 \quad (-8) \quad (-5)}{I. \quad H.}$$

$$\frac{24 \quad (\div 3) \quad (\div 4)}{}$$

$$\frac{7 \quad (+5) \quad (+8)}{E. \quad G.}$$

$$\frac{20 \quad (-5) \quad (-8)}{F. \quad H.}$$

	A.	B.	C.	D.	E.
F.	187.50	6.25	2.50	15	43.75
G.	37.50	20	31.25	250.00	75.00
H.	25.00	5.00	10.00	7	125.00
I.	437.50	112.50	200.00	50.00	12

+, −, ×, ÷ Measurements

ft.	in.	
1	11	23 in.
+	0 9	in.
		in.

5¢	1¢	
2	2	12 ¢
+	1 3	¢
		¢
		¢

1 foot = 12 inches

1 nickel = 5 pennies

\$10	\$1	
6	8	\$ ---
+	2 9	\$ ---
		\$ ---
		\$ ---

ft.	in.	
3	0	in.
−	1 8	in.
		in.

5¢	1¢	
4	0	¢
−	0 4	¢
		¢
		¢

10¢	1¢	
7	1	¢
−	3 8	¢
		¢
		¢

1 decimeter = 10 centimeters

ft.	in.	
1	6	in.
	× 2	× 2
		in.

5¢	1¢	
1	3	¢
	× 4	× 4
		¢
		¢

dm.	cm.	
1	9	cm.
	× 5	× 5
		cm.

ft.	in.	
3	0	in.
	÷ 4	÷ 4
		in.

5¢	1¢	
4	1	¢
	÷ 3	÷ 3
		¢
		¢

10's	1's	
5	1	(1's)
	÷ 3	÷ 3
		(1's)

ft.	in.	
2	11	in.
+	2 11	in.
		in.

5¢	1¢	
3	1	¢
−	1 2	¢
		¢
		¢

	A.	B.	C.	D.	E.
F.	6,0	0,9	9,7	3,3	5,10
G.	2,10	1,4	3,0	1,4	1,7
H.	9,5	4,0	1,2	6,2	3,1

Estimation . . . or "coming close" . . . with easier arithmetic.

$$384 \div 16 =$$

$$\begin{array}{|c|c|} \hline -84 & +4 \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad) \text{A.}$$

$$\begin{array}{|c|c|} \hline +16 & +4 \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad) \text{B.}$$

$$\begin{array}{|c|c|} \hline +66 & -1 \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad) \text{C.}$$

(How close?)

Getting an exact result

$$16 \overline{)384} \text{D.}$$

$$676 \div 13 =$$

$$\begin{array}{|c|c|} \hline -76 & -3 \\ \hline \end{array} \longrightarrow$$

$$600 \div 10 = \underline{\hspace{2cm}} \quad (\quad) \text{A.}$$

$$13 \overline{)676}$$

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \longrightarrow$$

$$600 \div 15 = \underline{\hspace{2cm}} \quad (\quad) \text{B.}$$

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \longrightarrow$$

$$600 \div 12 = \underline{\hspace{2cm}} \quad (\quad) \text{C.}$$

$$342 \div 19 =$$

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad)$$

$$19 \overline{)342}$$

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad)$$

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \longrightarrow$$

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \quad (\quad)$$

Taming frightfully big numbers . . .

$$1 \times 7 = 7$$

$$2 \times 5 = 10$$

$$10 \times 80 = \underline{\hspace{2cm}} \text{E.}$$

$$10 \times 7 = \underline{\hspace{2cm}} \text{A.}$$

$$20 \times 5 = \underline{\hspace{2cm}} \text{D.}$$

$$40 \times 50 = \underline{\hspace{2cm}} \text{B.}$$

$$7 \times 10 = \underline{\hspace{2cm}} \text{E.}$$

$$5 \times 20 = \underline{\hspace{2cm}} \text{E.}$$

$$10 \times 70 = \underline{\hspace{2cm}} \text{C.}$$

$$20 \times 50 = \underline{\hspace{2cm}} \text{C.}$$

$$70 \times 10 = \underline{\hspace{2cm}} \text{E.}$$

$$50 \times 20 = \underline{\hspace{2cm}} \text{H.}$$

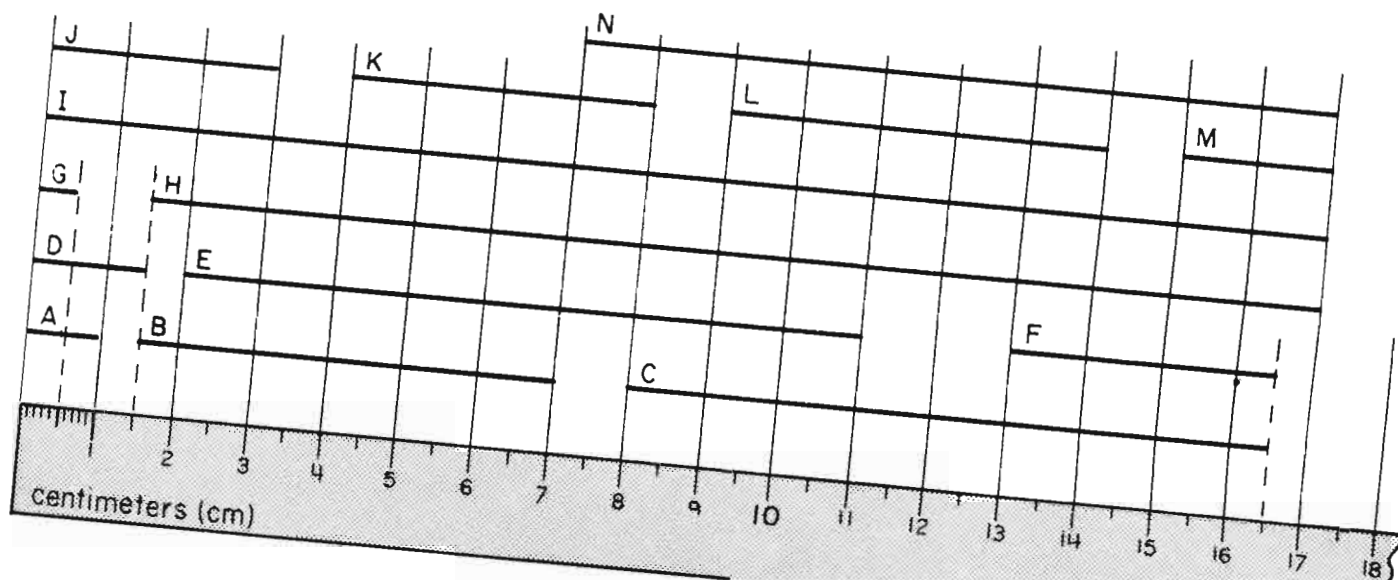
$$700 \times 1 = \underline{\hspace{2cm}} \text{C.}$$

$$500 \times 2 = \underline{\hspace{2cm}} \text{C.}$$

$$1 \times 700 = \underline{\hspace{2cm}} \text{E.}$$

$$2 \times 500 = \underline{\hspace{2cm}} \text{H.}$$

	A.	B.	C.	D.
E.	70	-12	700	100
F.	-9	800	-2	24
G.	+7	2,000	+6	18
H.	+8	-4	1000	52



Lengths of lines shown

A: 1 cm.

H: 1 cm.

B: 1 cm.

I: 1 cm.

C: 8.5 cm.

J: 1 cm.

D: 1 cm.

K: 5 cm.

E: 2 cm.

L: 10 cm.

F: 13 cm.

M: 16 cm.

G: 1 cm.

N: 1 cm.

Sums of lengths

A and B: 2 cm.

C and D: 9 cm.

E and F: 15 cm.

G and H: 2 cm.

I and B: 2 cm.

C and H: 9.5 cm.

G and N: 2 cm.

Differences of lengths

A and B: 4.5 cm.

C and D: 7 cm.

E and F: 11 cm.

G and N: 1 cm.

H and I: 1 cm.

I and C: 7.5 cm.

D and N: 1 cm.

Taming frightfully big numbers . . .

$10 \times 10 =$ 100 H. $1000 \div 2 =$ 500 A.

$20 \times 10 =$ 200 $1000 \div 4 =$ 250

$20 \times 50 =$ 1000 $1000 \div 8 =$ 125 D.

$200 \times 20 =$ 4000 C. $1000 \div 20 =$ 50 B.

$200 \times 50 =$ 10000 $1000 \div 40 =$ 25

$200 \times 500 =$ 100000 A. $1000 \div 80 =$ 12.5 F.

	A.	B.	C.	D.	E.	F.
G.	500	24	17	7	16	15.5
H.	100	5	5.5	3	10.5	11
I.	1	10	4000	9	9.5	4
J.	100,000	50	1.5	125	8	22.5
K.	2	8.5	6.5	12.5	3.5	12 1/2

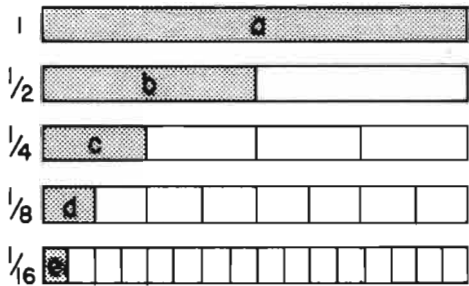
On Your Own (II)

$$\begin{array}{r} 185 \\ 185 \\ + 185 \\ \hline \end{array}$$

$$5 \overline{)215}$$

$$23 \overline{)1035}$$

$$3 \times \$1.50 = \$$$



Please circle the letter after the line you think will be the best "estimate."

$$96 \div 23$$

$$\frac{90 \div 30}{100 \div 20} \begin{matrix} \text{A.} \\ \text{B.} \end{matrix}$$

$$100 \div 25 \text{ C.}$$

$$234 \div 18$$

$$\frac{240 \div 20}{300 \div 15} \begin{matrix} \text{D.} \\ \text{E.} \end{matrix}$$

$$200 \div 20 \text{ F.}$$

$$\frac{c + 2d}{+} =$$

$$\frac{3e + 3e}{+} =$$

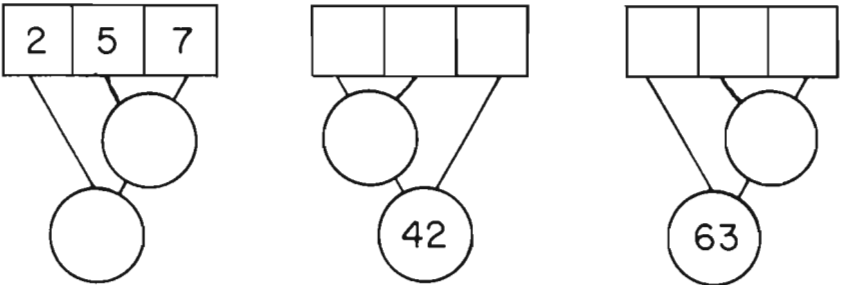
$$\frac{a - 3d}{-} =$$

$$\frac{8 \times 10}{80 \times 10} =$$

$$\frac{8 \times 100}{8 \times 50} =$$

$$\frac{80 \times 50}{5 \times 800} =$$

$$\frac{50 \times 800}{80 \times 500} =$$



100 %	50 %	150 %	25 %	200 %
\$ 400	\$	\$	\$	\$
\$ 300	\$	\$	\$	\$
\$ 50	\$	\$	\$	\$

1 week = 7 days

$$\begin{array}{r|l} \text{wk.} & \text{da.} \\ \hline 1 & 6 \\ + 2 & 4 \\ \hline \end{array}$$

$$\begin{array}{r|l} \text{wk.} & \text{da.} \\ \hline 3 & 0 \\ - 1 & 5 \\ \hline \end{array}$$

$$\begin{array}{r|l} \text{wk.} & \text{da.} \\ \hline 1 & 6 \\ + 2 & 4 \\ \hline \end{array}$$

$$\begin{array}{r|l} \text{wk.} & \text{da.} \\ \hline 3 & 0 \\ - 1 & 5 \\ \hline \end{array}$$



How do you feel?

If the results aren't interesting
then one of us goofed! signed "GOOOOOOOFY."

$$\begin{array}{r} 37 \\ \times 6 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 148 \\ \times 3 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 37 \\ \times 9 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 148 \\ \times 6 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 74 \\ \times 3 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 185 \\ \times 3 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 74 \\ \times 9 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 185 \\ \times 6 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 259 \\ \times 3 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 74 \\ \times 6 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 555 \\ \times 2 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 37 \\ \times 3 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 12 \\ \times 37 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 37 \\ \times 15 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 18 \\ \times 37 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 296 \\ \times 3 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 555 \\ \times 8 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 37 \\ \times 27 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 37 \\ \times 48 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 12 \\ \times 74 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 24 \\ \times 37 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 185 \\ \times 24 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 74 \\ \times 24 \\ \hline \end{array}$$

H.

$$\begin{array}{r} 148 \\ \times 12 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 370 \\ \times 12 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 37 \\ \times 24 \\ \hline \end{array}$$

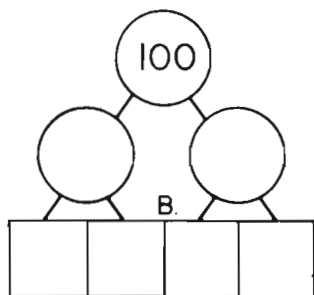
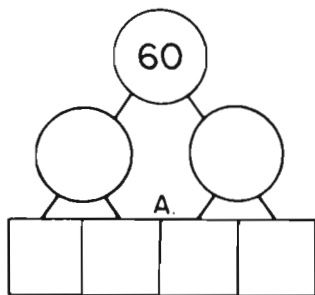
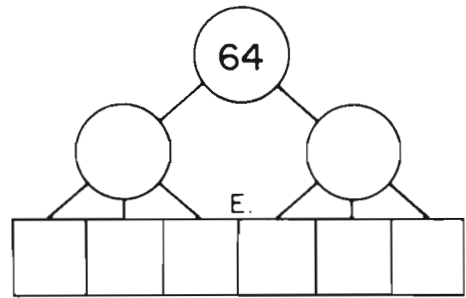
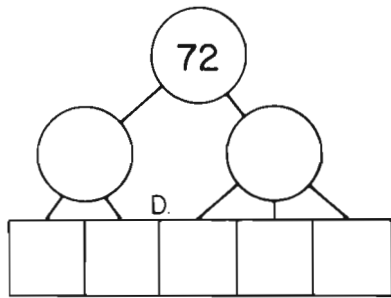
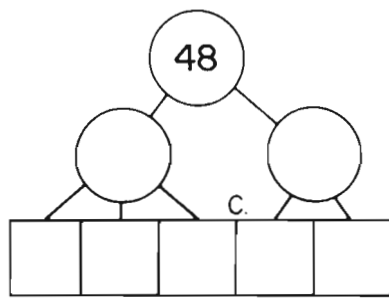
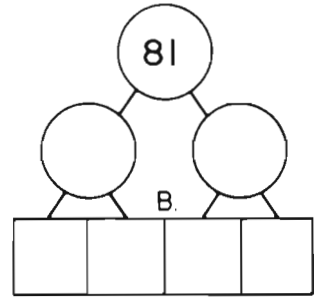
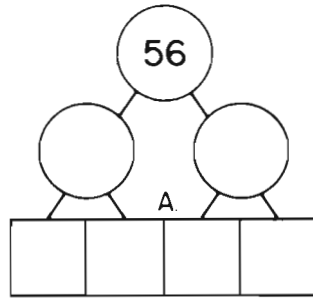
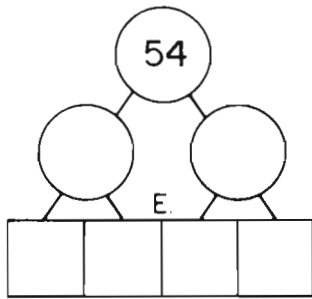
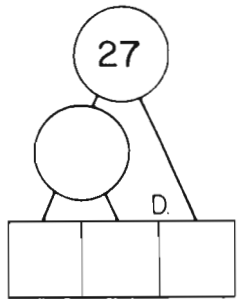
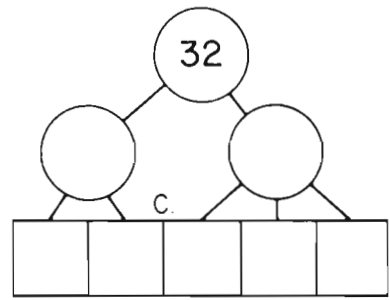
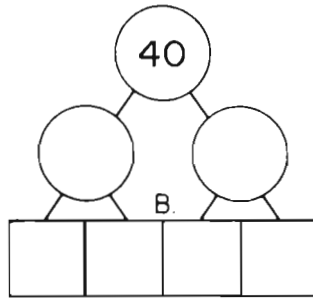
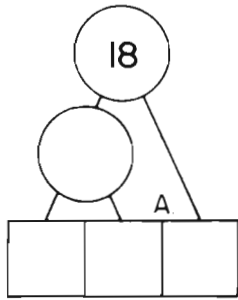
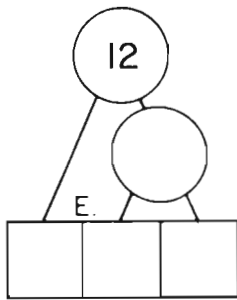
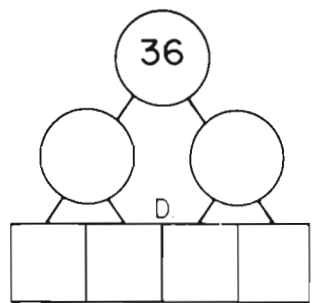
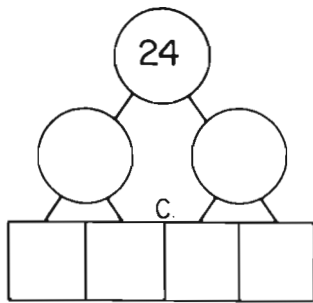
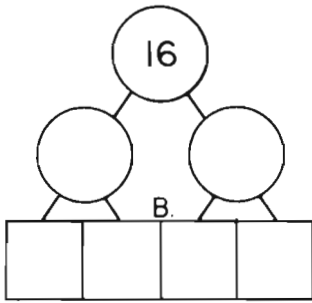
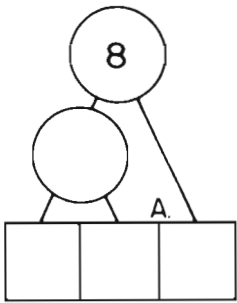
D.

$$\begin{array}{r} 74 \\ \times 60 \\ \hline \end{array}$$

C.

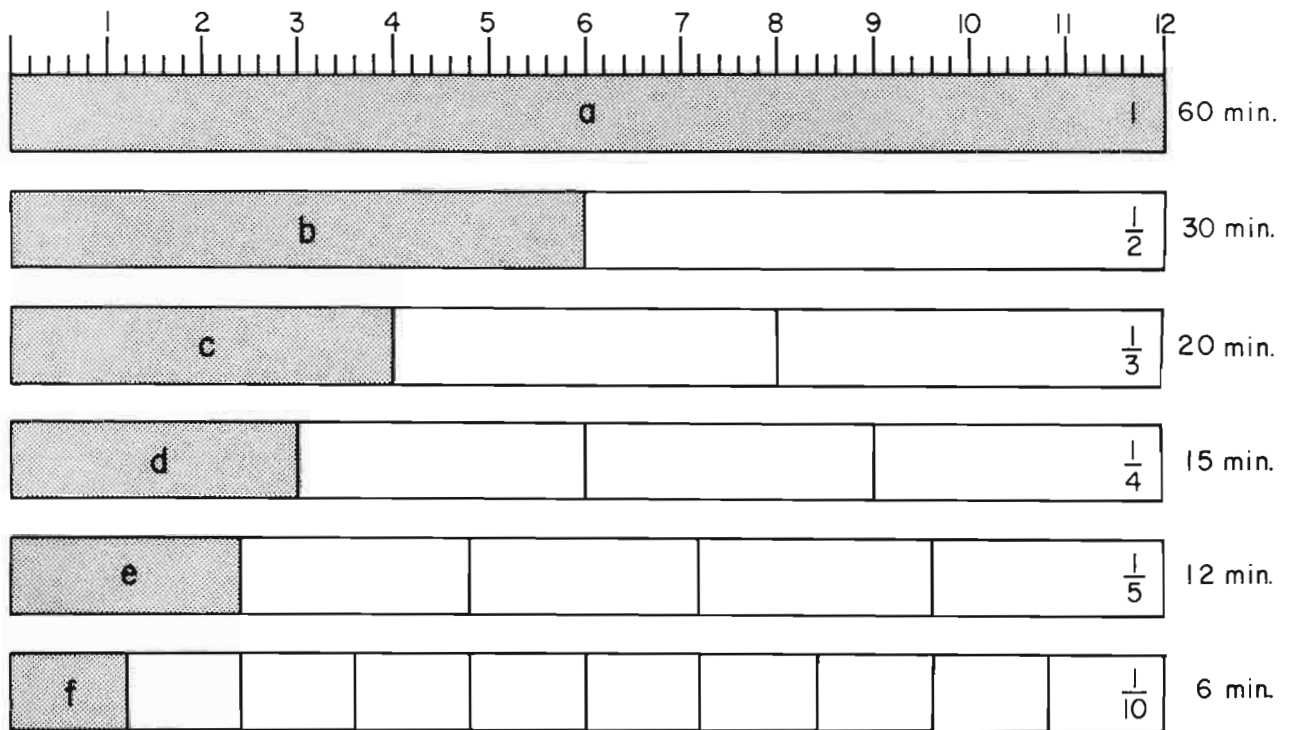
	A.	B.	C.	D.
E.	2220	666	333	111
F.	222	1110	4440	888
G.	555	444	777	444
H.	999	3330	1776	5550

Factor Trees (excluding 1 as a factor)



A.	B.	C.	D.	E.
2,2,2,7	2,2,2,5	5,5,5,5	2,2,3,3	7,7,7
2,2,2	3,3,3,3	2,2 2,2,2	3,7,5	2,2,2 2,2,2
2,2,3,5	2,2,5,5	2,2,2,3	2,2,2 3,3	2,2,3
2,3,3	2,2,2,2	2,2 2,2,3	3,3,3	2,3,3,3

What Can You See? . . . (suggested by a clock)



$$\frac{e}{\frac{1}{5}} - \frac{f}{\frac{1}{10}} = \frac{f}{\frac{1}{10}}$$

$$\frac{a}{1} - \frac{2c}{\frac{2}{3}} = \frac{\quad}{\quad} \quad \text{A.}$$

$$\frac{b}{\quad} + \frac{d}{\quad} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{C.} \quad \text{D.}$$

$$\frac{2e}{\quad} + \frac{f}{\quad} = \frac{\quad}{\quad} \quad \text{E.} \quad \text{A.} \quad \text{B.}$$

$$\frac{3e}{\quad} - \frac{f}{\quad} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{F.} \quad \text{G.}$$

$$\frac{b}{\quad} + \frac{e}{\quad} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{D.} \quad \text{E.}$$

$$\frac{b}{\quad} - \frac{d}{\quad} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{F.} \quad \text{C.}$$

$$\frac{3d}{\quad} - \frac{b}{\quad} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{B.} \quad \text{F.}$$

$$\frac{3e}{\quad} + \frac{3f}{\quad} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{G.} \quad \text{F.}$$

$$\frac{3f}{\quad} \times \frac{2}{\quad} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{H.}$$

$$\frac{c}{\quad} \times \frac{3}{\quad} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{E.}$$

$$\frac{3e}{\quad} \div \frac{2}{\quad} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{G.}$$

$$\frac{a}{\quad} \div \frac{10}{\quad} = \frac{\quad}{\quad} \quad \text{F.}$$

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

From Easier $\xrightarrow{\text{to}}$ more Difficult

From Easier
 $\downarrow$ to
more Difficult

100 %	1 %	2 %	3 %	4 %	5 %	6 %
\$ 1.00	\$.01	\$.02	\$.03	\$ A.	\$ B.	\$ C.
\$.50	\$.00 $\frac{1}{2}$		\$.01 $\frac{1}{2}$		\$.02 $\frac{1}{2}$	\$ D.
\$ 1.50	\$.01 $\frac{1}{2}$			\$ A.	\$ C.	\$ E.
\$ 3.00		\$ D.	\$ C.	\$ E.		\$ E.

100 %	101 %	102 %	103 %	104 %	105 %	106 %
\$ 1.00	\$ 1.01	\$ 1.02		\$ E.	\$ A.	\$ B.
\$.50	\$.50 $\frac{1}{2}$	\$.51	\$.51 $\frac{1}{2}$		\$ C.	\$ C.
\$ 1.50	\$ 1.51 $\frac{1}{2}$			\$ C.	\$ D.	\$ 1.57 $\frac{1}{2}$ D.
\$ 3.00	\$ 3.03		\$ A.		\$ B.	\$ E.

(x3) 27 (x2)

(-8) 34 (-14)

(x2) 18 (x3)

(-14) 28 (-8)

(÷ 2) 27 (÷ 3)

(-75) (+25) 50

	A.	B.	C.	D.	E.
F.	1.04	1.52 $\frac{1}{2}$	.06	1.56	1.03
G.	.04	3.12	.53	.03	3.18
H.	3.06	.05	1.54 $\frac{1}{2}$	1.59	.09
I.	.04 $\frac{1}{2}$	1.06	.52	1.53	.18

+, −, × and ÷ Measurements

1 hour = 60 minutes

1 gallon = 8 pints

$$\begin{array}{r|l}
 \text{hr.} & \text{min.} \\
 \hline
 & 30 \\
 + & 45 \\
 \hline
 & \text{min.} \\
 & \text{min.} \\
 \hline
 & \text{A.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{gal.} & \text{pt.} \\
 \hline
 & 1 \quad 6 \\
 + & 3 \quad 5 \\
 \hline
 & \text{pt.} \\
 & \text{pt.} \\
 \hline
 & \text{B.}
 \end{array}$$

$$\begin{array}{r|l}
 \$10 & \$1 \\
 \hline
 & 1 \quad 6 \\
 + & 3 \quad 5 \\
 \hline
 & \$ \\
 & \$ \\
 \hline
 & \$
 \end{array}$$

$$\begin{array}{r|l}
 \text{hr.} & \text{min.} \\
 \hline
 2 & 10 \\
 - & 30 \\
 \hline
 & \text{min.} \\
 & \text{min.} \\
 \hline
 & \text{D.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{gal.} & \text{pt.} \\
 \hline
 4 & 0 \\
 - & 1 \quad 7 \\
 \hline
 & \text{pt.} \\
 & \text{pt.} \\
 \hline
 & \text{E.}
 \end{array}$$

$$\begin{array}{r|l}
 \textcircled{10\text{¢}} & \textcircled{1\text{¢}} \\
 \hline
 4 & 0 \\
 - & 1 \quad 7 \\
 \hline
 & \text{¢} \\
 & \text{¢} \\
 \hline
 & \text{¢}
 \end{array}$$

$$\begin{array}{r|l}
 \text{hr.} & \text{min.} \\
 \hline
 1 & 15 \\
 \times & 4 \\
 \hline
 & \times 4 \\
 & \text{min.} \\
 \hline
 & \text{G.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{gal.} & \text{pt.} \\
 \hline
 1 & 3 \\
 \times & 3 \\
 \hline
 & \times 3 \\
 & \text{pt.} \\
 \hline
 & \text{H.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{dm.} & \text{cm.} \\
 \hline
 1 & 3 \\
 \times & 3 \\
 \hline
 & \times 3 \\
 & \text{cm.} \\
 \hline
 & \text{A.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{hr.} & \text{min.} \\
 \hline
 2 & 0 \\
 \div & 8 \\
 \hline
 & \div 8 \\
 & \text{min.} \\
 \hline
 & \text{B.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{gal.} & \text{pt.} \\
 \hline
 4 & 4 \\
 \div & 3 \\
 \hline
 & \div 3 \\
 & \text{pt.} \\
 \hline
 & \text{pt.}
 \end{array}$$

$$\begin{array}{r|l}
 10\text{'s} & 1\text{'s} \\
 \hline
 5 & 4 \\
 \div & 3 \\
 \hline
 & \div 3 \\
 & (1\text{'s}) \\
 & (1\text{'s}) \\
 \hline
 & \text{E.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{hr.} & \text{min.} \\
 \hline
 4 & 37 \\
 - & 1 \quad 52 \\
 \hline
 & \text{min.} \\
 & \text{min.} \\
 \hline
 & \text{F.}
 \end{array}$$

$$\begin{array}{r|l}
 \text{gal.} & \text{pt.} \\
 \hline
 1 & 3 \\
 + & 5 \quad 5 \\
 \hline
 & \text{pt.} \\
 & \text{pt.} \\
 \hline
 & \text{H.}
 \end{array}$$

	A.	B.	C.	D.	E.
F.	2,45	3,3	5,1	2,3	1,8
G.	3,9	5,3	5,0	1,6	2,1
H.	1,15	0,15	4,1	1,40	7,0

Estimation . . . or "coming close" . . . with easier arithmetic.

12 x 18 =

-2

-2

→

10 x 16

=

A. (-56)

+2

+2

→

14 x 20

=

B. (+64)

-2

+2

→

10 x 20

=

C. (-16)

(How close?)

Getting an exact result

18

x 12

x "closest"

9 x 14 =

+4

-4

→

13 x

=

D. (+4)

+1

+1

→

10 x

=

E. (+24)

+1

-1

→

10 x

=

G. (+4)

14

x 9

18 x 23 =

+2

+2

→

x 25

=

A.

+2

-2

→

x 21

=

B.

+2

-3

→

x 20

=

C.

23

x 18

17 x 32 =

+3

-1

→

20 x

=

A.

+3

-3

→

x

=

B.

+3

-5

→

x

=

C.

+4

-2

→

x 30

=

+2

-2

→

x

=

+1

-2

→

x

=

F.

A.

B.

C.

D.

E.

F.

G.

H.

+86

-4

200

150

160

+6

540

+26

620

580

-14

130

+36

280

+66

+70

22

Please indicate the largest amount with an A in the tinted block; the next largest with a B, the next with a C, and the smallest with a D.

18 days

Month of January

Three weeks

Two weeks and 5 days

Please find the difference in days between:

A and B: _____ da.
A

A and C: _____ da.
D

A and D: _____ da.
B

B and C: _____ da.
E

B and D: _____ da.
C

C and D: _____ da.
F

100 nickels

Three dollars and 20 cents

14 quarters

280 pennies

Please find the difference in dimes between:

A and B: _____ dimes
A

A and C: _____ dimes
D

A and D: _____ dimes
B

B and C: _____ dimes
E

B and D: _____ dimes
C

C and D: _____ dimes
F

There are 3 feet in 1 yard

One yard

Four feet

A half a yard

Three fourth of a yard

Please find the difference in inches between:

A and B: _____ in.
D

A and C: _____ in.
C

A and D: _____ in.

B and C: _____ in.

B and D: _____ in.
A

C and D: _____ in.
J

Half a day

Forty-eight hours

1 1/4 days

One day and 17 hours

Please find the difference in hours between:

A and B: _____ hr.
A

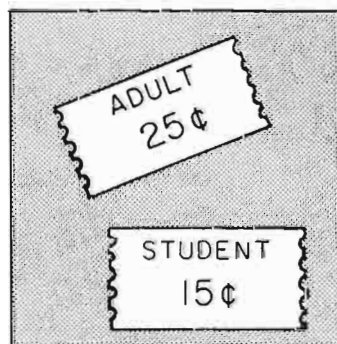
A and C: _____ hr.
A

A and D: _____ hr.
B

B and C: _____ hr.
C

B and D: _____ hr.
C

C and D: _____ hr.
I



one of each	¢	D.
2 student, 1 adult	¢	E.
4 student, 2 adult	\$.	D.
6 student, 3 adult	\$.	E.
13 student	\$.	F.

	A.	B.	C.	D.	E.
F.	1.95	22	11	1	4
G.	10	30	7	40	2
H.	15	13	21	18	55
I.	18	36	3	1.10	3
J.	7	9	29	12	1.65

On Your Own (III)

$$\begin{array}{r} 175 \\ + 392 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ \times 12 \\ \hline \end{array}$$

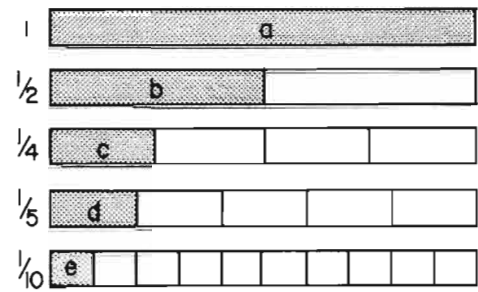
$$\begin{array}{r} 101 \\ \times 63 \\ \hline \end{array}$$

$$\begin{array}{r} 750 \\ - 195 \\ \hline \end{array}$$

$$\begin{array}{r} 148 \\ \times 6 \\ \hline \end{array}$$

$$\rule{1cm}{0.4pt}$$

$$\rule{1cm}{0.4pt}$$



Please circle the letter after the line you think will be the best "estimate."

$$18 \times 21$$

$$25 \times 25$$

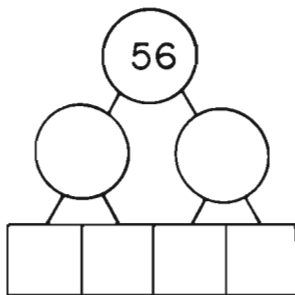
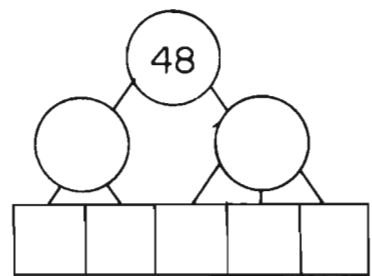
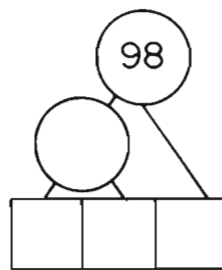
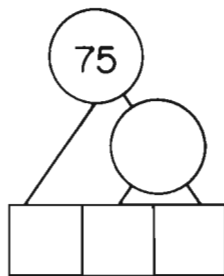
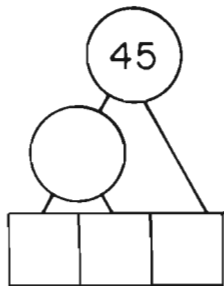
- $$\begin{array}{r} 20 \times 23 \\ \hline \end{array}$$
 A.
- $$\begin{array}{r} 20 \times 20 \\ \hline \end{array}$$
 B.
- $$\begin{array}{r} 15 \times 20 \\ \hline \end{array}$$
 C.

- $$\begin{array}{r} 20 \times 30 \\ \hline \end{array}$$
 D.
- $$\begin{array}{r} 20 \times 25 \\ \hline \end{array}$$
 E.
- $$\begin{array}{r} 30 \times 30 \\ \hline \end{array}$$
 F.

$$\begin{array}{r} b - e = \\ - = \end{array}$$

$$\begin{array}{r} 2d + e = \\ + = \end{array}$$

$$\begin{array}{r} 3e + e = \\ + = \end{array}$$



100 %	2 %	5 %	102 %	105 %
\$ 1.00	\$	\$	\$	\$
\$ 100	\$	\$	\$	\$
\$ 50	\$	\$	\$	\$



How do you feel?

1 pound (lb.) = 16 ounces (oz.)

$$\begin{array}{r} \text{lb.} \mid \text{oz.} \\ \hline 3 \mid 0 \\ - 1 \mid 13 \\ \hline \end{array}$$

$$\begin{array}{r} \text{oz.} \\ \hline \end{array}$$

$$\begin{array}{r} \text{lb.} \mid \text{oz.} \\ \hline 2 \mid 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{oz.} \\ \hline \end{array}$$

If the results aren't interesting, then one of us goofed! signed "GOOOOOFY"

$$\begin{array}{r} 26 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 36 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 47 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 57 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 38 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 117 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 108 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 171 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 162 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 114 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 144 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 141 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 216 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 108 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 39 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 13 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \\ \times 18 \\ \hline \end{array}$$

$$\begin{array}{r} 27 \\ \times 12 \\ \hline \end{array}$$

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

$$\begin{array}{r} 36 \\ \times 12 \\ \hline \end{array}$$

Pairs of Single-Digit Whole Number Factors.

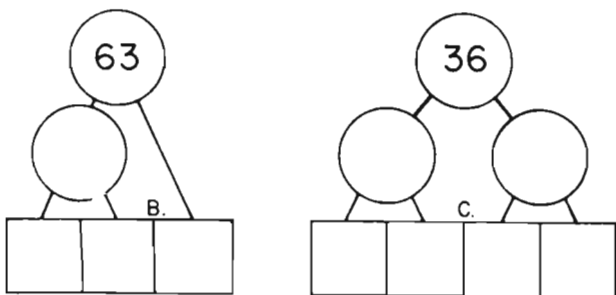
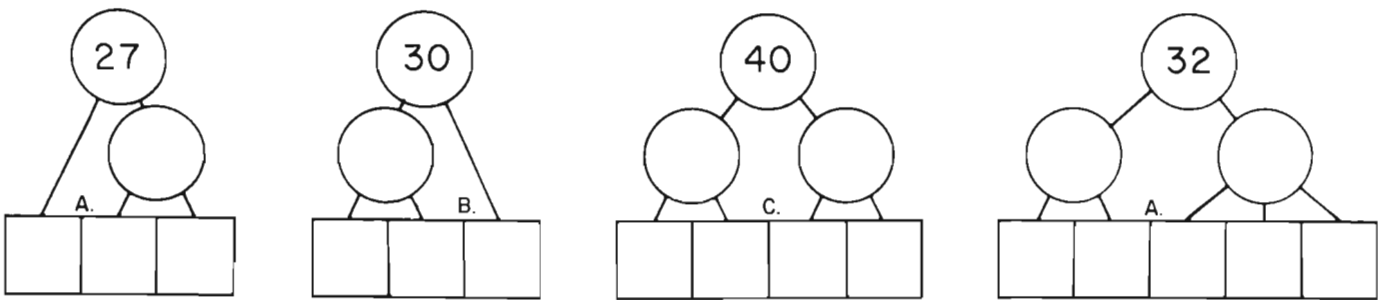
Rule: if not alike, please write the larger factor above the smaller factor.

$\overset{\text{A.}}{\underset{\times}{25}}$	$\overset{\text{B.}}{\underset{\times}{14}}$	$\overset{\text{C.}}{\underset{\times}{28}}$	$\overset{\text{D.}}{\underset{\times}{56}}$	$\overset{\text{E.}}{\underset{\times}{18}}$	$\overset{\text{F.}}{\underset{\times}{36}}$	$\underset{\times}{36}$	$\overset{\text{H.}}{\underset{\times}{72}}$	$\overset{\text{I.}}{\underset{\times}{32}}$	$\overset{\text{J.}}{\underset{\times}{64}}$
$\underset{\times}{30}$	$\overset{\text{F.}}{\underset{\times}{49}}$	$\underset{\times}{21}$	$\overset{\text{E.}}{\underset{\times}{42}}$	$\overset{\text{A.}}{\underset{\times}{63}}$	$\underset{\times}{24}$	$\underset{\times}{24}$	$\overset{\text{D.}}{\underset{\times}{48}}$	$\overset{\text{F.}}{\underset{\times}{81}}$	$\overset{\text{H.}}{\underset{\times}{72}}$
$\overset{\text{F.}}{\underset{\times}{35}}$	$\overset{\text{D.}}{\underset{\times}{45}}$	$\underset{\times}{27}$	$\overset{\text{C.}}{\underset{\times}{54}}$	$\overset{\text{F.}}{\underset{\times}{81}}$	$\underset{\times}{40}$	$\overset{\text{4}}{\underset{\times}{16}}$	$\overset{\text{2}}{\underset{\times}{16}}$	$\overset{\text{H.}}{\underset{\times}{48}}$	$\overset{\text{J.}}{\underset{\times}{64}}$

Taming frightfully big numbers . . .

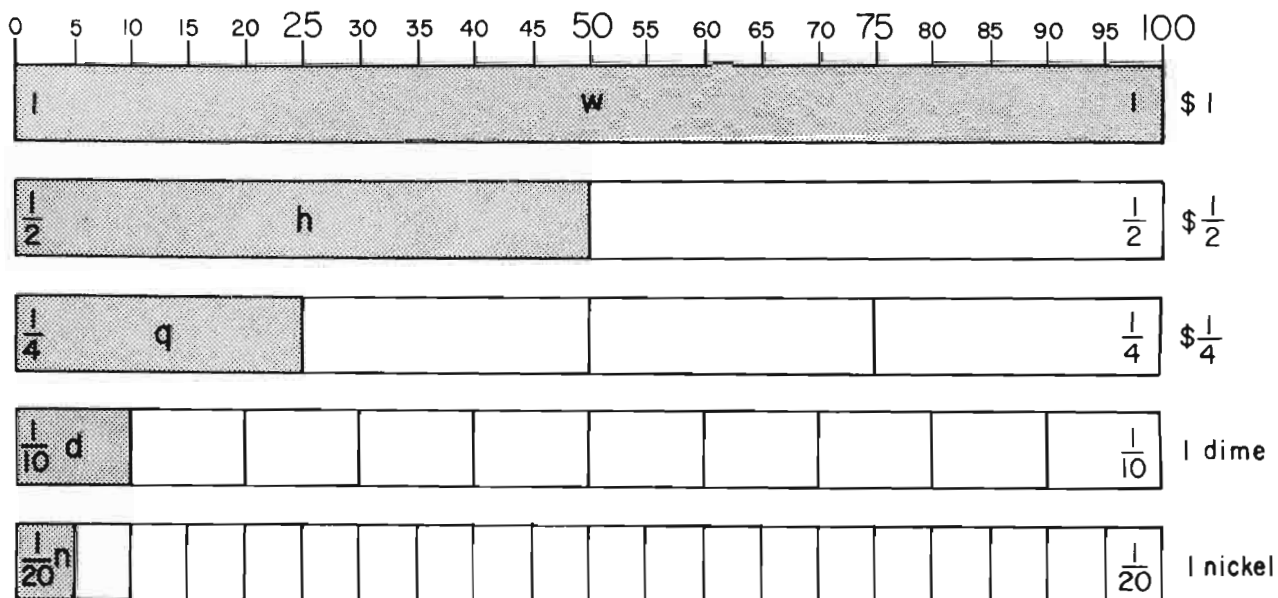
$9 \times 9 = 81$	$5 \times 6 = 30$	$4 \times 25 = 100$
$90 \times 9 = \text{A}$	$5 \times 60 = \text{E}$	$8 \times 25 = \text{C}$
$9 \times 90 = \text{G}$	$5 \times 600 = \text{F}$	$4 \times 250 = \text{D}$
$9 \times 900 = \text{B}$	$500 \times 6 = \text{H}$	$8 \times 250 = \text{E}$
$90 \times 90 = \text{K}$	$50 \times 60 = \text{F}$	$40 \times 25 = \text{K}$
$900 \times 9 = \text{B}$	$60 \times 50 = \text{H}$	$80 \times 25 = \text{I}$

Factor Trees (excluding 1 as a factor)



	A.	B.	C.	D.	E.	F.
G.	810	2,3,5	9,6	8,7	7,6	7,7
H.	2,2,2,2,2	7,2	200	8,6	9,8	3,000
I.	5,5	3,3,7	2,2,3,3	8,4	2,000	6,6
J.	9,7	8,8	7,4	9,5	300	7,5
K.	3,3,3	8,100	2,2,2,5	1000	9,2	9,9

What Can You See? . . . (suggested by U. S. coins)



$$\frac{2d + n}{+} = \frac{\quad}{F}$$

$$\frac{h - q}{-} = \frac{\quad}{C.}$$

$$\frac{q + 5n}{+} = \frac{\quad}{E.}$$

$$\frac{w - 2d}{-} = \frac{\quad}{A.}$$

$$\frac{q + n}{+} = \frac{\quad}{D.}$$

$$\frac{3n + 7n}{+} = \frac{\quad}{F.}$$

$$\frac{h - 3d}{-} = \frac{\quad}{B.}$$

$$\frac{7d - q}{-} = \frac{\quad}{A.}$$

$$\frac{3q - 4d}{-} = \frac{\quad}{C.}$$

$$\frac{4d + 7n}{+} = \frac{\quad}{B.}$$

$$\frac{9n - 4n}{-} = \frac{\quad}{F.}$$

$$\frac{19n - 2q}{-} = \frac{\quad}{H.}$$

$$\frac{3n \times 6}{\times 6} = \frac{\quad}{F.}$$

$$\frac{2d \times 5}{\times 5} = \frac{\quad}{H.}$$

	A.	B.	C.	D.	E.
F.	$\frac{1}{20}$	$\frac{2}{10}$	$\frac{1}{4}$	$\frac{9}{10}$	$\frac{1}{2}$
G.	$\frac{8}{10}$	$\frac{4}{10}$	$\frac{7}{20}$	$\frac{7}{10}$	$\frac{1}{10}$
H.	$\frac{9}{20}$	$\frac{3}{4}$	$\frac{7}{10}$	$\frac{3}{10}$	1

$$\frac{h \div 5}{\div 5} = \frac{\quad}{E.}$$

$$\frac{h \div 10}{\div 10} = \frac{\quad}{F.}$$

From Easier $\xrightarrow{\text{to}}$ more Difficult

From Easier
 $\downarrow$ to
more Difficult

100 %	50%	25%	75%	10%	85%	95 %
\$ 1000.00	\$ 500	\$ 250	\$	\$	\$ 850	\$ B.
\$ 500.00	\$ 250	\$	\$	\$	\$	\$
\$ 250.00	\$ 125	\$	\$ 187.50	\$	\$	\$ A. B.
\$ 125.00	\$	\$	\$	\$	\$	\$ D.

100 %	10%	20%	30%	110%	120%	130 %
\$ 575.00	\$ 57.50	\$	\$ 172.50	\$	\$	\$ A.
\$ 17.40	\$ 1.74	\$	\$	\$	\$	\$ D.
\$ 64.00	\$ 6.40	\$	\$	\$	\$	\$
\$ 850.00	\$	\$	\$	\$	\$	\$ E.

$$(-11) 19 (+) 28$$

$$(\div 3) 7 (x) 14$$

$$30 (+) 39 (-11)$$

$$21 (x) 42 (\div 3)$$

$$(+17) 32 (+8)$$

$$(+8) 23 (+17)$$

	A.	B.	C.	D.	E.
F.	212.50	19.20	3.48	93.75	62.50
G.	5.22	950.00	106.25	22.62	690.00
H.	85.00	237.50	20.88	632.50	1105
I.	747.50	19.14	115.00	118.75	935

+, −, × and ÷ Measurements

1 yard = 3 feet, 1 foot = 12 in.

1 gallon = 4 quarts, 1 quart = 4 half-pints

yd. ft. in.	
<u>1 1 9</u>	in.
<u>+ 1 3</u>	in.
<u>2 2 12</u>	in.
<u>3 0 0</u>	
A.	

G. Q. $\frac{1}{2}$ P.	
<u>0 2 3</u>	$\frac{1}{2}$ P.
<u>+ 0 2 1</u>	$\frac{1}{2}$ P.
<u>0 4 4</u>	$\frac{1}{2}$ P.
B.	

\$ 100 \$10 \$1	
<u>2 4 9</u>	\$
<u>+ 1 3 7</u>	\$
<u>3 8 6</u>	\$
C.	

yd. ft. in.	
<u>2 0 0</u>	in.
<u>- 2 10</u>	in.
<u>0 10 0</u>	in.
D.	

G. Q. $\frac{1}{2}$ P.	
<u>3 0 3</u>	$\frac{1}{2}$ P.
<u>- 1 1 1</u>	$\frac{1}{2}$ P.
<u>2 11 2</u>	$\frac{1}{2}$ P.
F.	

\$1 10¢ 1¢	
<u>3 0 0</u>	¢
<u>- 1 2 8</u>	¢
<u>1 72</u>	¢

yd. ft. in.	
<u>1 2 5</u>	in.
<u>x 2</u>	x 2
<u>2 4 10</u>	in.
G.	

G. Q. $\frac{1}{2}$ P.	
<u>1 2 3</u>	$\frac{1}{2}$ P.
<u>x 3</u>	x 3
<u>3 6 9</u>	$\frac{1}{2}$ P.
H.	

M dm cm	
<u>1 2 3</u>	cm
<u>x 4</u>	x 4
<u>4 8 12</u>	cm
A.	

yd. ft. in.	
<u>1 1 3</u>	in.
<u>÷ 3</u>	÷ 3
<u>0 3 9</u>	in.
B.	

G. Q. $\frac{1}{2}$ P.	
<u>4 0 1</u>	$\frac{1}{2}$ P.
<u>÷ 5</u>	÷ 5
<u>0 8 1</u>	$\frac{1}{2}$ P.
C.	

100's 10's 1's	
<u>7 2 8</u>	(1's)
<u>÷ 4</u>	÷ 4
<u>1 8 2</u>	(1's)
D.	

yd. ft. in.	
<u>1 2 11</u>	in.
<u>+ 1 1 11</u>	in.
<u>2 3 22</u>	in.
A.	

G. Q. $\frac{1}{2}$ P.	
<u>3 0 0</u>	$\frac{1}{2}$ P.
<u>- 1 1 1</u>	$\frac{1}{2}$ P.
<u>1 11 11</u>	$\frac{1}{2}$ P.
D.	

	A.	B.	C.	D.
E.	4,9,2	4,3,2	3,8,6	3,2,1
F.	2,3,4	1,1,0	1,3,2	1,0,2
G.	2,0,0	0,1,5	3,1,10	1,8,2
H.	3,1,10	5,0,1	0,3,1	1,2,3

Estimation

... or "coming close" ... with easier arithmetic.

$$\begin{array}{r|l} 423 \div 9 = \\ +27 & +1 \\ \hline -23 & +1 \\ \hline & \end{array}$$

$$\begin{array}{l} \longrightarrow \quad \div = \quad (\quad) \text{A.} \\ \longrightarrow \quad \div = \quad (\quad) \text{B.} \\ \longrightarrow \quad 440 \div 11 = \quad (\quad) \text{F.} \end{array}$$

(How close?)

Getting an exact result

$$9 \overline{)423} \text{C.}$$

$$\begin{array}{r|l} 684 \div 18 = \\ +16 & +2 \\ \hline & \\ \hline -84 & -3 \\ \hline \end{array}$$

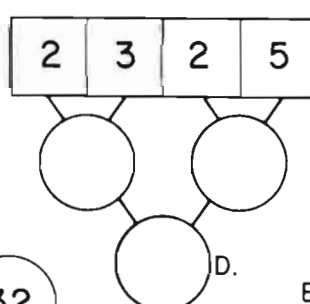
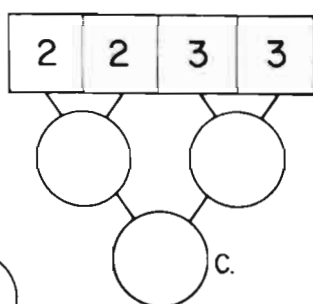
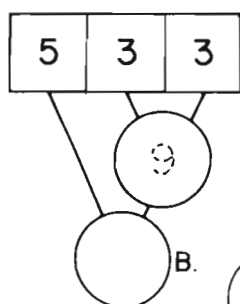
$$\begin{array}{l} \longrightarrow \quad \div = \quad (\quad) \text{D.} \\ \longrightarrow \quad 650 \div 20 = \quad (\quad) \text{A.} \\ \longrightarrow \quad \div = \quad (\quad) \text{B.} \end{array}$$

$$18 \overline{)684}$$

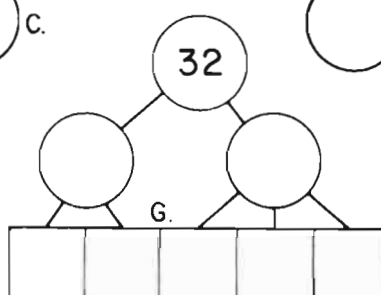
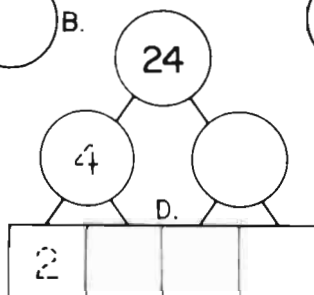
$$\begin{array}{r|l} 1265 \div 55 = \\ -65 & -5 \\ \hline -65 & +5 \\ \hline -5 & -5 \\ \hline \end{array}$$

$$\begin{array}{l} \longrightarrow \quad \div = \quad (\quad) \text{C.} \\ \longrightarrow \quad \div = \quad (\quad) \text{D.} \\ \longrightarrow \quad \div = \quad (\quad) \end{array}$$

$$55 \overline{)1265} \text{B.}$$



Factor Trees
(excluding 1
as a factor)

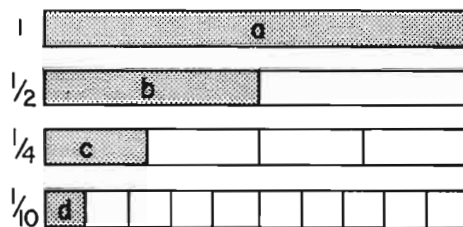


	A.	B.	C.	D.
E.	$-5\frac{1}{2}$	45	+1	2,2,2,3
F.	+1	-7	36	-3
G.	-1	+2	47	2,2 2,2,2
H.	-2	23	38	60

On Your Own (IV)

$$\begin{array}{r} 2468 \\ 2468 \\ 2468 \\ + 2468 \\ \hline \end{array} \quad \begin{array}{r} 123 \\ \times 4 \\ \hline \end{array}$$

$$4 \overline{)728} \quad 18 \overline{)666}$$



Please circle the letter after the line you think will be the best "estimate."

$$\boxed{329 \div 17}$$

- $300 \div 15$ A.
 $300 \div 20$ B.
 $350 \div 15$ c.

$$\boxed{275 \div 28}$$

- $300 \div 25$ D.
 $240 \div 30$ E.
 $250 \div 25$ F.

$$\frac{a - 3c}{-} = \underline{\hspace{2cm}}$$

$$\frac{3d + 2d}{+} = \underline{\hspace{2cm}}$$

$$\frac{7d + 3d}{+} = \underline{\hspace{2cm}}$$

$$4 \times 5 = \underline{\hspace{2cm}}$$

$$4 \times 50 = \underline{\hspace{2cm}}$$

$$40 \times 50 = \underline{\hspace{2cm}}$$

$$4 \times 25 = \underline{\hspace{2cm}}$$

$$40 \times 25 = \underline{\hspace{2cm}}$$

$$4 \times 250 = \underline{\hspace{2cm}}$$

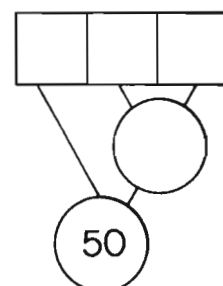
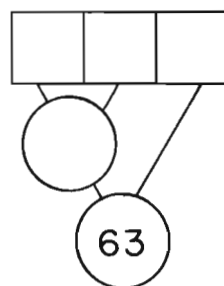
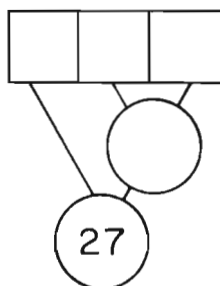
$$40 \times 500 = \underline{\hspace{2cm}}$$

$$40 \times 250 = \underline{\hspace{2cm}}$$

1 yard = 3 feet

1 foot = 12 inches

yd.	ft.	in.	
1	1	10	in.
+	1	11	in.
			in.



100 %	50 %	125 %	10 %	150 %
\$ 500	\$	\$	\$	\$
\$ 10	\$	\$	\$	\$
\$ 400	\$	\$	\$	\$



How do you feel?

yd.	ft.	in.	
1	1	7	in.
			x 2
			in.

If the results aren't interesting
then one of us goofed!. . . . signed "GOOOOOFY"

$$\begin{array}{r} 168 \\ \times 2 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 378 \\ \times 2 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 693 \\ \times 2 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 728 \\ \times 2 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 48 \\ \times 7 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 108 \\ \times 7 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 112 \\ \times 3 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 252 \\ \times 3 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 462 \\ \times 3 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 364 \\ \times 4 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 198 \\ \times 7 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 208 \\ \times 7 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 84 \\ \times 4 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 126 \\ \times 6 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 154 \\ \times 9 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 182 \\ \times 8 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 42 \\ \times 8 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 84 \\ \times 9 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 231 \\ \times 6 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 56 \\ \times 6 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 364 \\ \times 4 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 21 \\ \times 16 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 42 \\ \times 18 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 63 \\ \times 12 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 12 \\ \times 28 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 54 \\ \times 14 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 28 \\ \times 27 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 112 \\ \times 13 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 14 \\ \times 24 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 36 \\ \times 21 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 104 \\ \times 14 \\ \hline \end{array}$$

C.

	A.	B.	C.	D.
E.	336	756	1386	1456
F.	1386	1456	336	756
G.	1456	336	756	1386
H.	756	1386	1456	336

Factor Trees (excluding 1 as a factor) . . . you may need scratch paper

28

A.

90

B.

150

C.

250

D.

45

E.

63

A.

88

B.

32

C.

50

D.

104

E.

140

A.

126

B.

80

C.

120

D.

96

E.

220

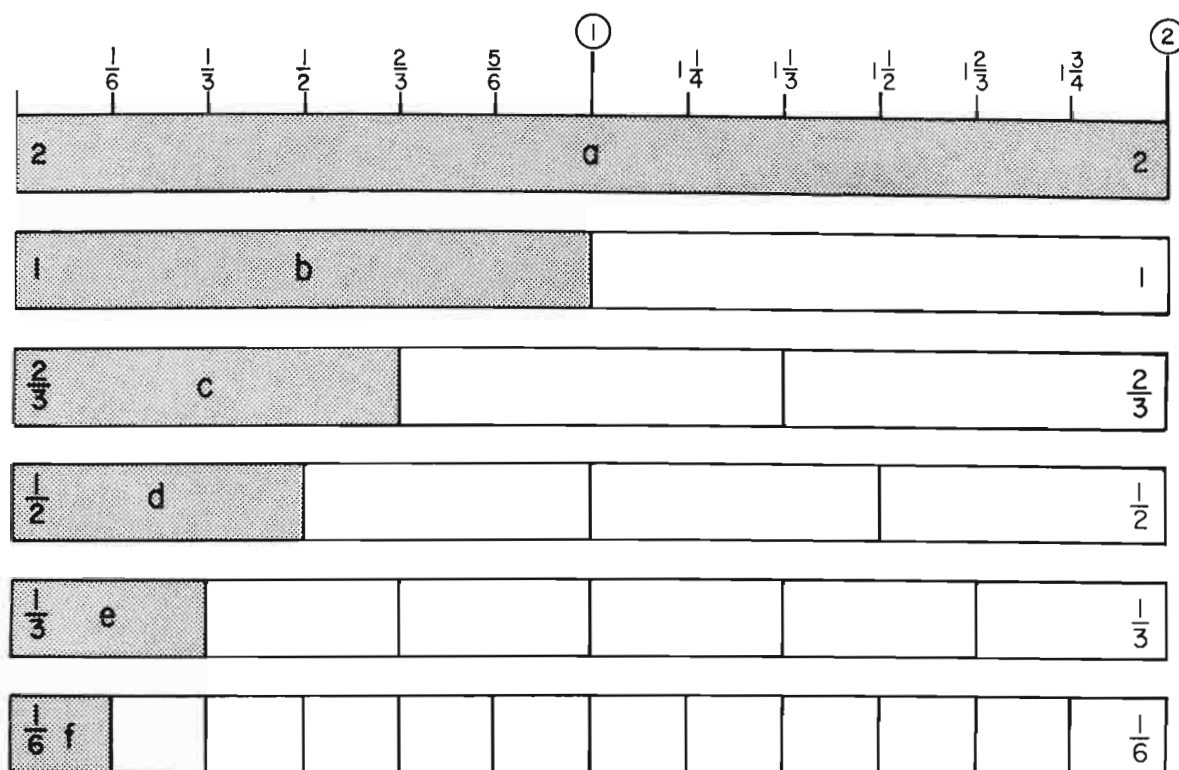
A.

225

B.

A.	B.	C.	D.	E.
2,2,7	3,3,5,5	2,3,5,11	2,2 2,3,5	3,3,5
2,2,5,7	2,2,2,11	2,3,5,5	2,3,11	5,5,5,5
2,2,5,11	2,3,3,5	2,2 2,2,5	2,5,5	2,2,2,13
3,3,7	2,3,3,7	2,2 2,2,2	2,5,5,5	2,2,2 2,2,3

What Can You See?



$$\frac{b}{1} + \frac{d}{\frac{1}{2}} = \frac{3d}{1\frac{1}{2}}$$

$$\frac{c}{+} + \frac{c}{+} = \frac{2c}{+}$$

$$\frac{a}{-} - \frac{e}{+} = \frac{-}{+}$$

$$\frac{3d}{-} - \frac{f}{+} = \frac{-}{+}$$

$$\frac{d}{-} - \frac{e}{+} = \frac{-}{+}$$

$$\frac{2c}{+} + \frac{f}{+} = \frac{+}{+}$$

$$\frac{3d}{-} - \frac{3f}{+} = \frac{-}{+}$$

$$\frac{a}{-} - \frac{3d}{+} = \frac{-}{+}$$

$$\frac{4e}{-} - \frac{3f}{+} = \frac{-}{+}$$

$$\frac{c}{x} \times \frac{3}{3} = \frac{-}{+}$$

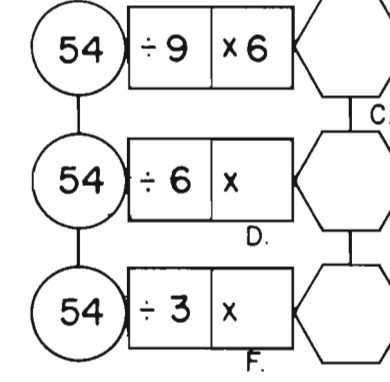
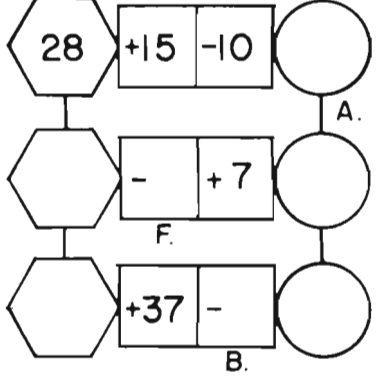
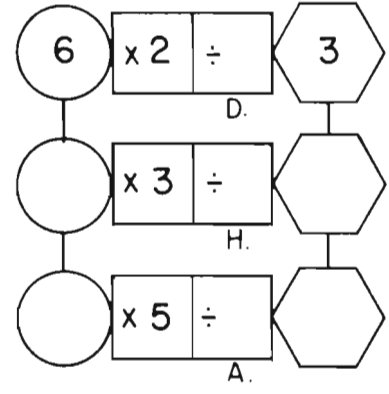
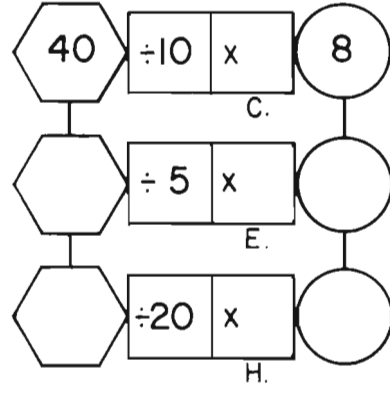
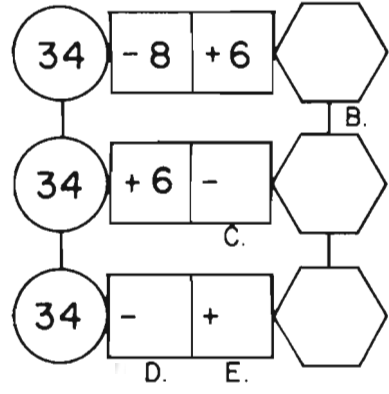
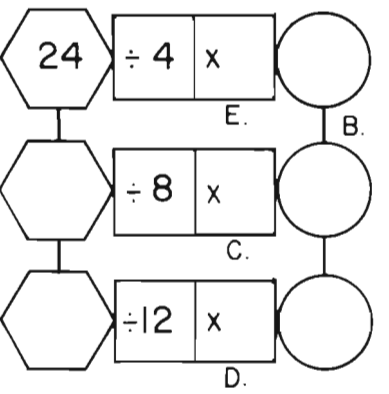
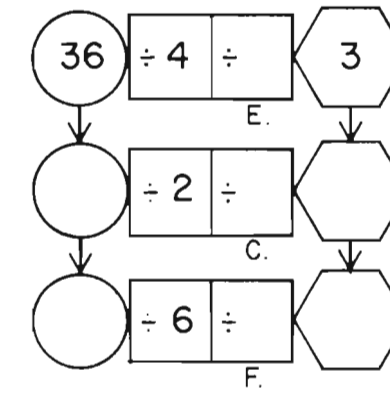
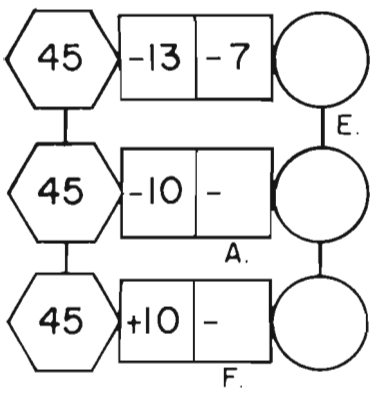
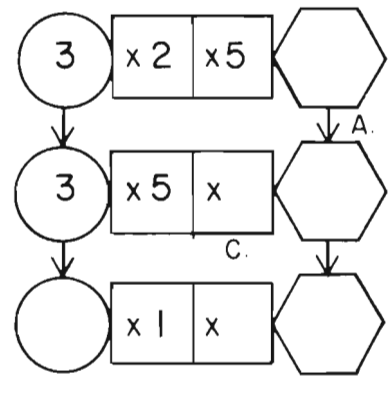
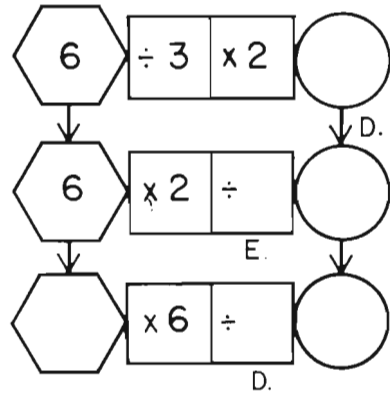
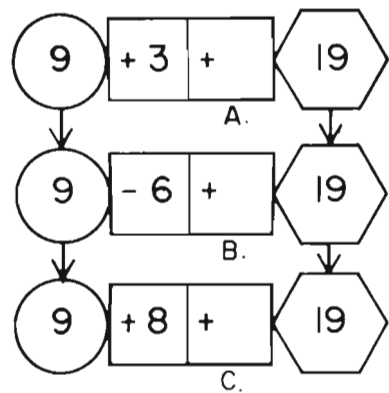
$$\frac{5e}{\div} \div \frac{2}{2} = \frac{-}{+}$$

	A.	B.	C.	D.	E.	F.
G.	$1\frac{2}{3}$	$\frac{1}{6}$	$\frac{4}{3}$	$\frac{5}{3}$	$\frac{1}{2}$	1
H.	$\frac{2}{3}$	$\frac{1}{4}$	$1\frac{1}{3}$	$\frac{5}{2}$	$\frac{3}{6}$	$1\frac{1}{2}$
I.	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{5}{6}$	$2\frac{1}{2}$	2	$\frac{3}{2}$

$$\frac{3d}{\div} \div \frac{3}{3} = \frac{-}{+}$$

$$\frac{d}{x} \times \frac{5}{5} = \frac{-}{+}$$

Equal Chain Reactions



	A.	B.	C.	D.	E.
F.	30	13	2	5	25
G.	7	18	36	9	3
H.	33	32	6	4	9
I.	10	16	8	11	1

Estimation

. . . or "coming close" . . . with easier arithmetic.

<u>23 x 27 =</u>		(How close?)	Getting an exact result
<u>-3 -7</u> →	x =	() A.	<u>27</u>
<u>-3 +3</u> →	x =	() B.	<u>x 23</u>
<u>+2 +3</u> →	x =	() C.	_____ D.

<u>48 x 94 =</u>			<u>94</u>
<u>+2 +6</u> →	x =	() A.	<u>x 48</u>
<u>+2 -4</u> →	x =	() B.	_____ D.
<u>-8 -4</u> →	x =	() C.	

On Your Own

<u>35 x 44 =</u>			<u>44</u>
_____ →	x =	()	<u>x 35</u>
_____ →	x =	()	_____ D.
_____ →	x =	()	

Taming frightfully big numbers . . .

<u>10 x 17</u> = _____ A.	<u>8 x 9</u> = _____ B.	<u>100 x 10</u> = _____ C.
<u>17 x 10</u> = _____ H.	<u>80 x 9</u> = _____	<u>100 x 100</u> = _____ C.
<u>100 x 17</u> = _____ B.	<u>8 x 90</u> = _____	
<u>10 x 170</u> = _____ G.	<u>80 x 90</u> = _____	
<u>100 x 34</u> = _____	<u>80 x 900</u> = _____	
<u>34 x 100</u> = _____	<u>90 x 800</u> = _____	
<u>100 x 49</u> = _____ A.	<u>90 x 400</u> = _____ D.	

	A.	B.	C.	D.
E.	4900	72	+129	36,000
F.	-221	-12	1,000	621
G.	+488	1700	-912	1540
H.	170	-21	10,000	4,512

On Your Own (V)

$$\begin{array}{r} 357 \\ + 246 \\ \hline \end{array}$$

$$\begin{array}{r} 753 \\ - 468 \\ \hline \end{array}$$

$$\begin{array}{r} 182 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 112 \\ \times 13 \\ \hline \end{array}$$

Please circle the letter after the line you think will be the best "estimate."

$$35 \times 75$$

$$30 \times 80$$

$$40 \times 80$$

$$30 \times 70$$

A.

B.

C.

$$27 \times 54$$

$$25 \times 55$$

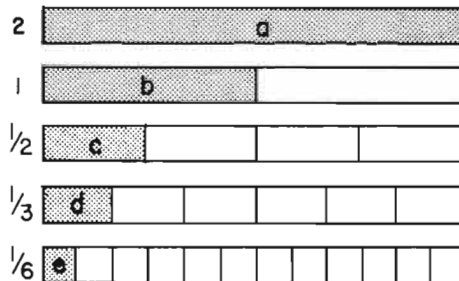
$$25 \times 50$$

$$30 \times 50$$

D.

E.

F.

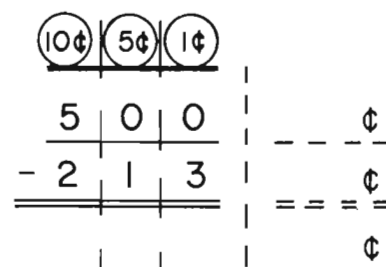
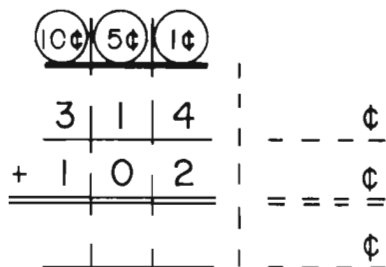
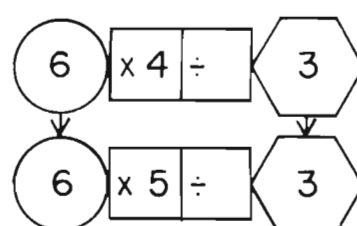
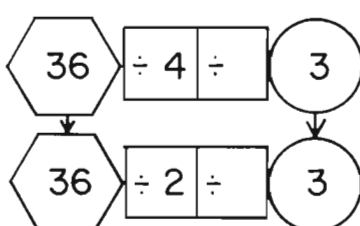
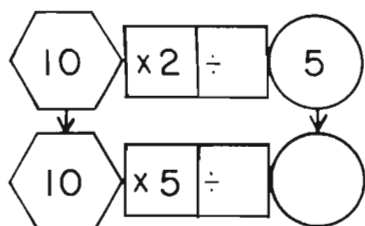
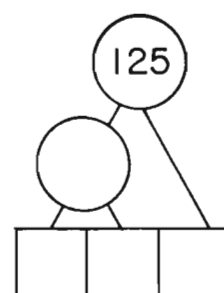
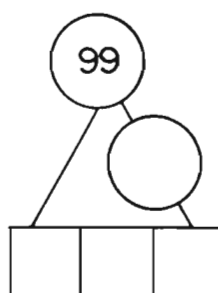
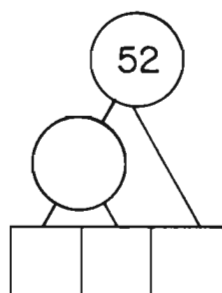
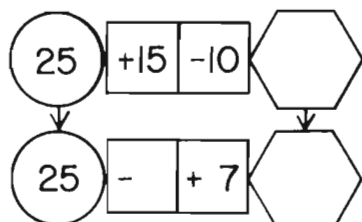


$$\frac{b + d}{=} =$$

$$\frac{4e - d}{=} =$$

$$\frac{b \div 3}{=} =$$

Equal Chain Reactions



How do you feel?

If the results aren't interesting
then one of us goofed! . . . signed "GOOOOOOOFY"

$$\begin{array}{r} 432 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 648 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 727 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 1059 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 288 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 96 \\ \times 36 \\ \hline \end{array}$$

$$\begin{array}{r} 192 \\ \times 18 \\ \hline \end{array}$$

$$\begin{array}{r} 297 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 165 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 64 \\ \times 54 \\ \hline \end{array}$$

$$\begin{array}{r} 143 \\ \times 45 \\ \hline \end{array}$$

$$\begin{array}{r} 149 \\ \times 36 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \times 63 \\ \hline \end{array}$$

$$\begin{array}{r} 99 \\ \times 65 \\ \hline \end{array}$$

Can you find other examples that belong to this family?

$$\begin{array}{r} 144 \\ \times \underline{\quad} \\ \hline \end{array}$$

$$\begin{array}{r} \times 35 \\ \hline \end{array}$$

$$\begin{array}{r} \times \underline{\quad} \\ \hline \end{array}$$

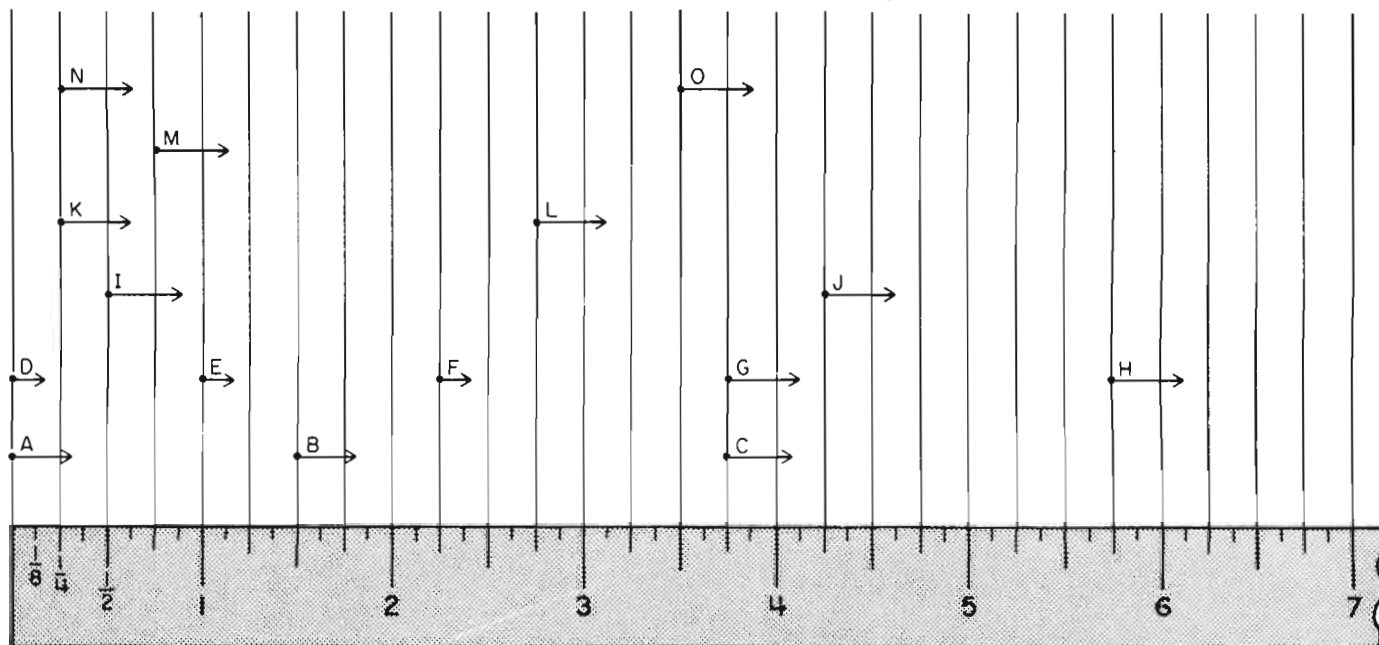
$$\begin{array}{r} \times \underline{\quad} \\ \hline \end{array}$$

$$\begin{array}{r} \times \underline{\quad} \\ \hline \end{array}$$

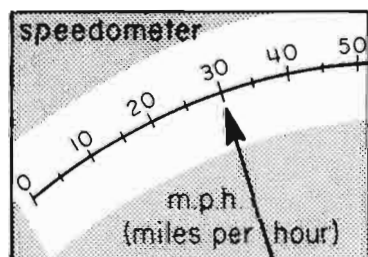
$$\begin{array}{r} \hline 3456 \end{array}$$

$$\begin{array}{r} \hline 3465 \end{array}$$

Please extend the lines to the right so they are as long as the chart below indicates.



A: $\frac{1}{8}$ in. B: $1\frac{1}{2}$ in. C: $3\frac{1}{4}$ in. D: $\frac{1}{2}$ in. E: $\frac{1}{4}$ in.
 F: $\frac{3}{4}$ in. G: $1\frac{3}{4}$ in. H: $1\frac{1}{4}$ in. I: $3\frac{1}{4}$ in. J: $2\frac{1}{2}$ in.
 K: 2 in. L: $3\frac{1}{4}$ in. M: $5\frac{1}{2}$ in. N: $2\frac{1}{4}$ in. O: $3\frac{1}{2}$ in.



twice the speed shown.

_____ m.p.h.

$\frac{1}{2}$ the speed shown

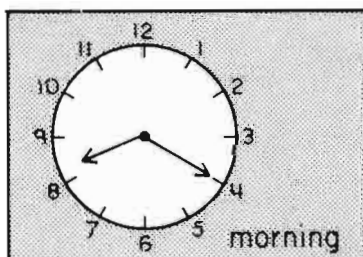
_____ m.p.h.

$\frac{1}{3}$ the speed shown

_____ m.p.h.

$\frac{1}{4}$ the speed shown

_____ m.p.h.



time shown

_____ : _____ a.m.

90 minutes later

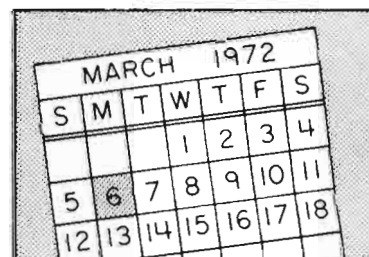
_____ : _____

5 hr. and 10 min. later

_____ : _____

10 hours earlier

_____ : _____



2 weeks after March 6, 1972

_____, 19____

1 week before March 6, 1972

_____, 19____

30 days after March 6, 1972

_____, 19____

4 weeks after March 6, 19____

_____, 19____

Pairs of Single-Digit Whole Number Factors.

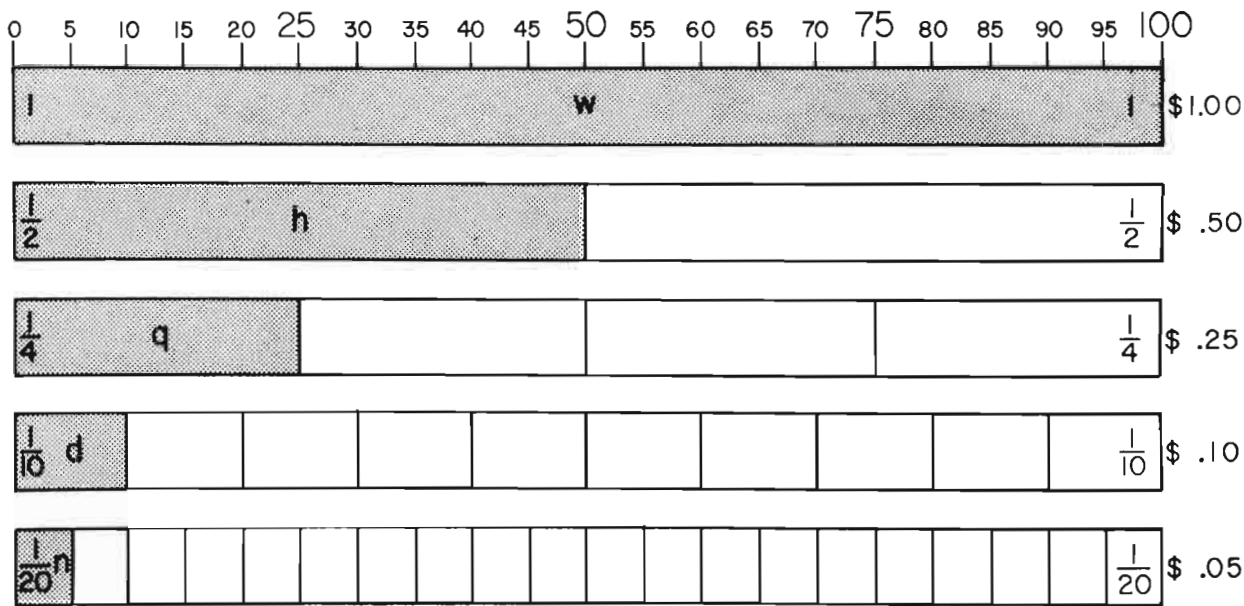
Rule: if not alike, please write the larger factor above the smaller factor.

$\overset{\text{A.}}{\underset{\times}{5}} \overline{)30}$	$\overset{\text{B.}}{\underset{\times}{}} \overline{)49}$	$\overset{\text{C.}}{\underset{\times}{}} \overline{)35}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)63}$	$\overset{\text{E.}}{\underset{\times}{}} \overline{)48}$	$\overset{\text{F.}}{\underset{\times}{}} \overline{)32}$	$\overset{\text{A.}}{\underset{\times}{}} \overline{)72}$	$\overset{\text{C.}}{\underset{\times}{}} \overline{)40}$	$\overset{\text{B.}}{\underset{\times}{}} \overline{)35}$	$\overset{\text{B.}}{\underset{\times}{}} \overline{)81}$
$\underset{\times}{54}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)64}$	$\underset{\times}{40}$	$\overset{\text{E.}}{\underset{\times}{4}} \overline{)36}$	$\overset{\text{F.}}{\underset{\times}{6}} \overline{)36}$	$\overset{\text{B.}}{\underset{\times}{}} \overline{)49}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)42}$	$\underset{\times}{56}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)63}$	$\overset{\text{E.}}{\underset{\times}{}} \overline{)48}$
$\overset{\text{A.}}{\underset{\times}{}} \overline{)72}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)42}$	$\overset{\text{F.}}{\underset{\times}{}} \overline{)45}$	$\underset{\times}{56}$	$\overset{\text{B.}}{\underset{\times}{}} \overline{)81}$	$\overset{\text{A.}}{\underset{\times}{}} \overline{)30}$	$\overset{\text{I.}}{\underset{\times}{}} \overline{)45}$	$\underset{\times}{54}$	$\overset{\text{F.}}{\underset{\times}{}} \overline{)32}$	$\overset{\text{D.}}{\underset{\times}{}} \overline{)64}$

$10 \times 1 = 10$	$8 \times 7 =$ <u> </u> <u>G.</u>	$5 \times 8 =$ <u> </u>
$10 \times 10 =$ <u> </u> <u>A.</u>	$80 \times 7 =$ <u> </u> <u>A.</u>	$5 \times 80 =$ <u> </u> <u>I.</u>
$10 \times 100 =$ <u> </u> <u>B.</u>	$80 \times 70 =$ <u> </u> <u>H.</u>	$50 \times 8 =$ <u> </u> <u>C.</u>
$100 \times 100 =$ <u> </u> <u>K.</u>	$8 \times 700 =$ <u> </u> <u>E.</u>	$50 \times 80 =$ <u> </u>
$100 \times 1000 =$ <u> </u> <u>H.</u>	$80 \times 700 =$ <u> </u> <u>A.</u>	$50 \times 800 =$ <u> </u>
$1000 \times 100 =$ <u> </u> <u>D.</u>	$800 \times 700 =$ <u> </u> <u>G.</u>	$500 \times 800 =$ <u> </u> <u>B.</u>

</

What Can You See?



$$\frac{3h}{\frac{3}{2}} - \frac{3q}{\frac{3}{4}} = \frac{3q}{\frac{3}{4}} \quad \text{A.}$$

$$\frac{2ln}{\frac{1}{2}} - \frac{h}{\frac{1}{2}} = \frac{h}{\frac{1}{2}} \quad \text{B.}$$

$$\frac{5q}{-} - \frac{7n}{-} = \frac{5q}{-} \quad \text{C.}$$

$$\frac{3d}{\frac{3}{10}} + \frac{8d}{\frac{3}{10}} = \frac{11d}{\frac{3}{10}} \quad \text{D.}$$

$$\frac{3h}{+} + \frac{3h}{+} = \frac{6h}{+} \quad \text{I.}$$

$$\frac{1ld}{+} + \frac{2ln}{+} = \frac{3ln}{+} \quad \text{F.}$$

$$\frac{3q}{-} - \frac{ld}{-} = \frac{2q}{-} \quad \text{A.}$$

$$\frac{13n}{+} + \frac{3h}{+} = \frac{16n}{+} \quad \text{F.}$$

$$\frac{2w}{-} - \frac{9d}{-} = \frac{2w}{-} \quad \text{H.}$$

$$\frac{7d}{\times} \times \frac{3}{3} = \frac{7d}{\times} \quad \text{G.}$$

$$\frac{3q}{\times} \times \frac{4}{4} = \frac{3q}{\times} \quad \text{G.}$$

$$\frac{3h}{\times} \times \frac{4}{4} = \frac{3h}{\times} \quad \text{C.}$$

$$\frac{2w}{\div} \div \frac{8}{8} = \frac{2w}{\div} \quad \text{D.}$$

$$\frac{9d}{\div} \div \frac{6}{6} = \frac{9d}{\div} \quad \text{E.}$$

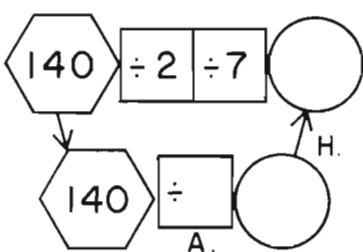
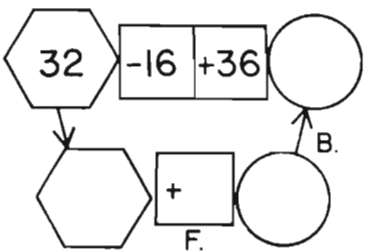
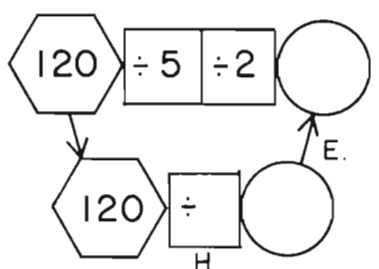
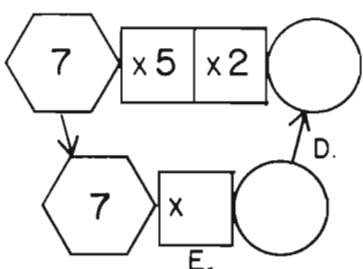
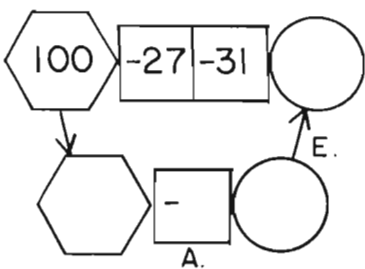
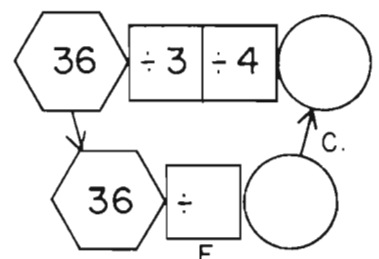
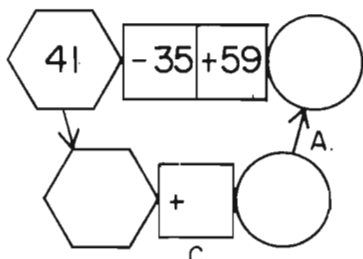
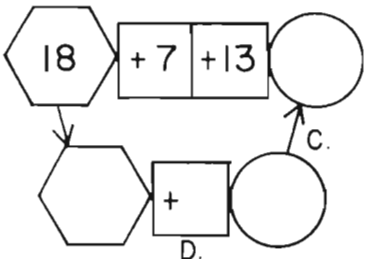
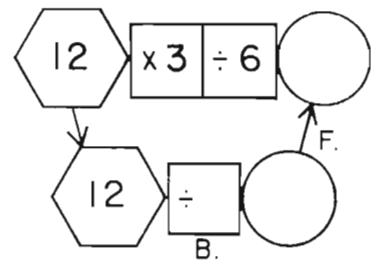
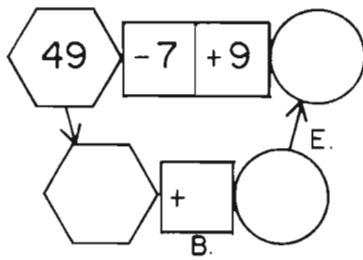
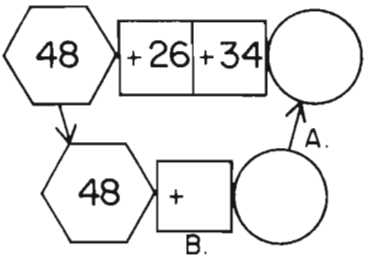
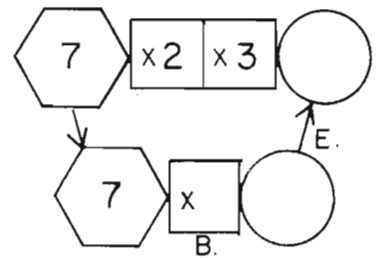
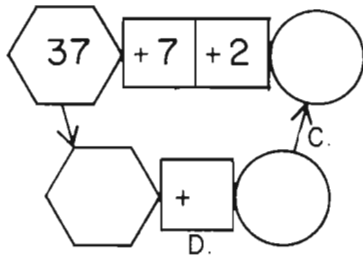
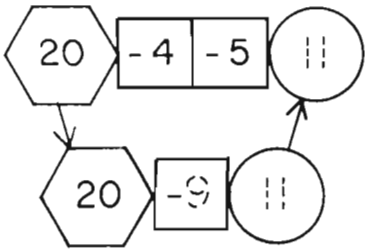
$$\frac{3h}{\div} \div \frac{4}{4} = \frac{3h}{\div} \quad \text{C.}$$

$$\frac{3h}{\div} \div \frac{15}{15} = \frac{3h}{\div} \quad \text{F.}$$

$$\frac{3q}{\div} \div \frac{5}{5} = \frac{3q}{\div} \quad \text{I.}$$

	A.	B.	C.	D.	E.	F.
G.	$\frac{1}{20}$	$\frac{11}{20}$	$\frac{21}{20}$	$\frac{1}{4}$	3	$\frac{7}{10}$
H.	$\frac{3}{4}$	$2\frac{1}{10}$	6	$1\frac{1}{10}$	2	$2\frac{3}{20}$
I.	$\frac{13}{20}$	$\frac{3}{2}$	$\frac{9}{10}$	$1\frac{1}{2}$	$\frac{3}{20}$	$\frac{1}{10}$

Chain Reactions . . . and Shortcuts



	A.	B.	C.	D.	E.
F.	65	6	46	20	12
G.	-58	60	3	70	51
H.	14	52	38	7	10
I.	108	2	24	9	42

+, −, × and ÷ Measurements

1 yard = 3 feet

1 foot = 12 inches

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ \hline 1 \quad 2 \quad 3 \\ \hline + 1 \quad 2 \quad 3 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

A.

$$\begin{array}{r} \text{yd. ft. in.} \\ \hline 1 \quad 2 \quad 8 \\ \hline + 2 \quad 1 \quad 3 \\ \hline \hline \end{array}$$

_____ in.

_____ in.

_____ in.

B.

$$\begin{array}{r} \$100 \quad \$10 \quad \$1 \\ \hline 5 \quad 6 \quad 7 \\ \hline + 3 \quad 4 \quad 5 \\ \hline \hline \end{array}$$

_____ \$

_____ \$

_____ \$

C.

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{5\text{¢}} \textcircled{1\text{¢}} \\ \hline 4 \quad 0 \quad 0 \\ \hline - 1 \quad 2 \quad 3 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

D.

$$\begin{array}{r} \text{yd. ft. in.} \\ \hline 2 \quad 2 \quad 2 \\ \hline - 1 \quad 0 \quad 10 \\ \hline \hline \end{array}$$

_____ in.

_____ in.

_____ in.

E.

$$\begin{array}{r} \textcircled{\$1} \textcircled{10\text{¢}} \textcircled{1\text{¢}} \\ \hline 5 \quad 4 \quad 3 \\ \hline - 3 \quad 4 \quad 5 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

F.

$$\begin{array}{r} \text{Q. N. P.} \\ \hline 1 \quad 2 \quad 3 \\ \hline \times 3 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

G.

$$\begin{array}{r} \text{yd. ft. in.} \\ \hline 1 \quad 1 \quad 7 \\ \hline \times 4 \\ \hline \hline \end{array}$$

_____ in.

_____ in.

_____ in.

H.

$$\begin{array}{r} \text{M. dm. cm.} \\ \hline 2 \quad 3 \quad 4 \\ \hline \times 4 \\ \hline \hline \end{array}$$

_____ cm.

_____ cm.

_____ cm.

A.

$$\begin{array}{r} \text{Q. N. P.} \\ \hline 2 \quad 2 \quad 0 \\ \hline \div 6 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

$$\begin{array}{r} \text{yd. ft. in.} \\ \hline 3 \quad 0 \quad 0 \\ \hline \div 4 \\ \hline \hline \end{array}$$

_____ in.

_____ in.

_____ in.

C.

$$\begin{array}{r} 100\text{'s} \quad 10\text{'s} \quad 1\text{'s} \\ \hline 2 \quad 2 \quad 2 \\ \hline \div 3 \\ \hline \hline \end{array}$$

_____ (1's)

_____ (1's)

_____ (1's)

D.

$$\begin{array}{r} \text{Q. N. P.} \\ \hline 2 \quad 2 \quad 2 \\ \hline + 1 \quad 2 \quad 3 \\ \hline \hline \end{array}$$

_____ ¢

_____ ¢

_____ ¢

D.

$$\begin{array}{r} \text{yd. ft. in.} \\ \hline 4 \quad 0 \quad 0 \\ \hline - 1 \quad 2 \quad 11 \\ \hline \hline \end{array}$$

_____ in.

_____ in.

_____ in.

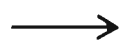
E.

	A.	B.	C.	D.
E.	4,5,6	1,1,4	2,0,1	4,0,0
F.	3,0,1	0,2,2	1,9,8	2,2,2
G.	9,3,6	4,0,11	0,2,3	4,2,4
H.	6,0,4	1,2,3	9,1,2	0,7,4

Estimation

. . . or "coming close" . . . with easier arithmetic.

$$\begin{array}{r|l} 585 \div 13 = \\ \hline +15 \quad -3 \\ \hline +15 \quad +2 \\ \hline -85 \quad -3 \\ \hline \end{array}$$

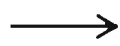


$$600 \div 10 = \underline{\hspace{2cm}}$$

=

(How close?)

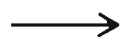
()A.



$$600 \div 15 = \underline{\hspace{2cm}}$$

=

()B.



$$500 \div 10 = \underline{\hspace{2cm}}$$

=

()C.

Getting an exact result

$$13 \overline{)585} \text{D.}$$

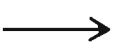
$$\begin{array}{r|l} 459 \div 27 = \\ \hline -9 \quad +3 \\ \hline +41 \quad +3 \\ \hline \end{array}$$



$\div$

=

()A.



$\div$

=

()B.



$$450 \div 25 = \underline{\hspace{2cm}}$$

=

()C.

$$27 \overline{)459} \text{D.}$$

$$\begin{array}{r|l} 2025 \div 45 = \\ \hline -25 \quad -5 \\ \hline -25 \quad +5 \\ \hline \div 5 \quad \div 5 \\ \hline \end{array}$$



$\div$

=

()C.



$\div$

=

()B.

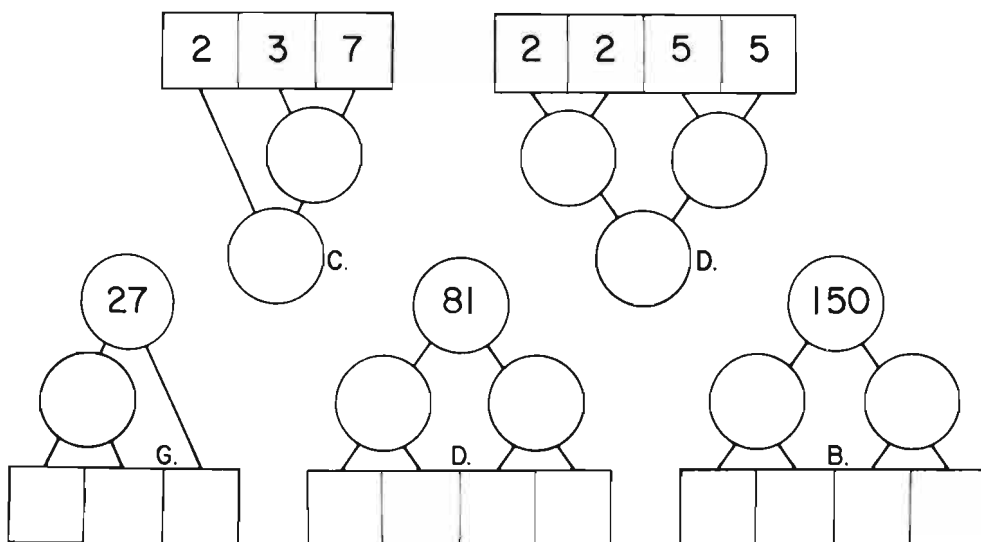


$\div$

=

()A.

$$45 \overline{)2025} \text{D.}$$



Factor Trees
(excluding 1 as a factor)

	A.	B.	C.	D.
E.	6	$-\frac{1}{3}$	+5	100
F.	+15	9	+1	17
G.	0	-5	3,3,3	3,3,3,3
H.	-2	$\frac{2,5}{5,3}$	42	45

Please indicate the largest amount with an A in the tinted block;
the next largest amount with a B, the next with a C, and the smallest with a D.

An hour and a half

Three quarters of an hour

Seventy minutes

An hour and a quarter

Please find the difference in minutes between:

A and B: _____ min.
 a.

A and D: _____ min.
 b.

B and D: _____ min.
 c.

A and C: _____ min.
 d.

B and C: _____ min.
 e.

C and D: _____ min.
 f.

Two pounds, 10 ounces

Two and a half pounds

Two and $\frac{3}{4}$ pounds

Two ounces

Please find the difference
in ounces between:

A and B: _b oz. A and C: _e oz.
A and D: _c oz. B and C: _f oz.
B and D: _d oz. C and D: _i oz.

Twenty inches

Two feet

One foot, 7 inches

Three fourth of a foot

Please find the difference
in inches between:

A and B: ______e. in. A and C: ______e. in.
A and D: ______a. in. B and C: ______k. in.
B and D: ______b. in. C and D: ______c. in.

Seventeen dimes 

Twenty-five nickels

Two and a half dollars

Two hundred pennies

Please find the difference
in cents between:

A and B: $\frac{\quad}{a.} \notin$ A and C: $\frac{\quad}{d.} \notin$
A and D: $\frac{\quad}{b.} \notin$ B and C: $\frac{\quad}{c.} \notin$
B and D: $\frac{\quad}{c.} \notin$ C and D: $\frac{\quad}{b.} \notin$



amount shown	¢	a.
half as much	¢	b.
one third as much	¢	c.
one fourth as much	¢	d.
one sixth as much	¢	e.

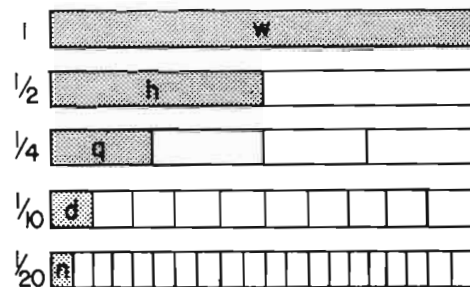
	a.	b.	c.	d.	e.
f.	25	36	75	18	2
g.	15	11	10	20	12
h.	72	125	30	1	4
i.	50	45	24	80	5
j.	38	2	42	40	4
k.	14	1	27	30	17

On Your Own (VI)

$$\begin{array}{r} 727 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 148 \\ 148 \\ 148 \\ 148 \\ 148 \\ + 148 \\ \hline \end{array}$$

$$\begin{array}{r} 185 \\ \times 24 \\ \hline \end{array}$$



Please circle the letter after the line you think will be the best "estimate."

$$575 \div 35$$

$$500 \div 40 \quad \text{A.}$$

$$600 \div 40 \quad \text{B.}$$

$$600 \div 30 \quad \text{C.}$$

$$2511 \div 55$$

$$3000 \div 50 \quad \text{D.}$$

$$2000 \div 50 \quad \text{E.}$$

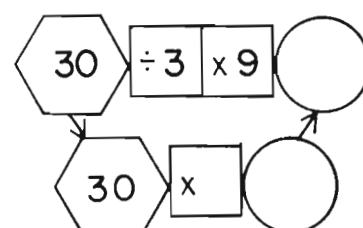
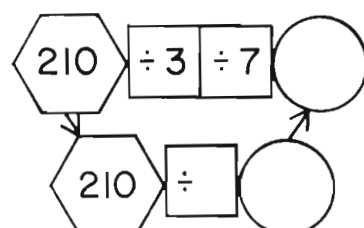
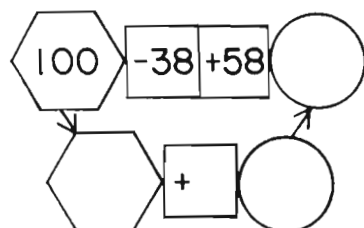
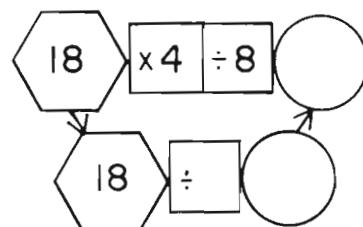
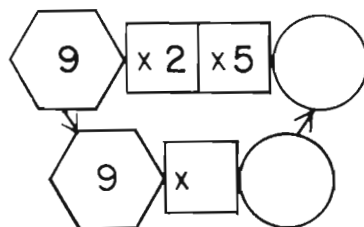
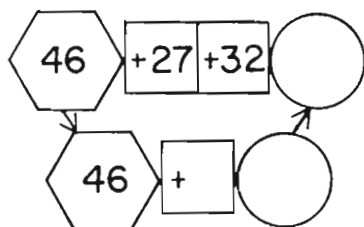
$$2000 \div 60 \quad \text{F.}$$

$$\begin{array}{r} 3h - 3q \\ - \\ \hline \end{array}$$

$$\begin{array}{r} 2w - 7d \\ - \\ \hline \end{array}$$

$$\begin{array}{r} 3h \div 15 \\ \div 15 \\ \hline \end{array}$$

Chain Reactions . . . and Shortcuts



How do you feel?

$$\begin{array}{r} 25\text{¢} \quad 10\text{¢} \quad 5\text{¢} \\ \hline 4 \quad 0 \quad 0 \\ - 1 \quad 4 \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 25\text{¢} \quad 10\text{¢} \quad 5\text{¢} \\ \hline 2 \quad 3 \quad 4 \\ \times 3 \\ \hline \end{array}$$

If the results aren't interesting
then one of us goofed! signed "GOOOOOFY"

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

A.

$$\begin{array}{r} 195 \\ \times 2 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 63 \\ \times 2 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 378 \\ \times 4 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 108 \\ \times 9 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 154 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 105 \\ \times 2 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 130 \\ \times 3 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 42 \\ \times 3 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 243 \\ \times 4 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 308 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 216 \\ \times 7 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 42 \\ \times 5 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 65 \\ \times 6 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 18 \\ \times 7 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 176 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 168 \\ \times 9 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 162 \\ \times 6 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 35 \\ \times 6 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 78 \\ \times 5 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 14 \\ \times 9 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 54 \\ \times 28 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 42 \\ \times 36 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 15 \\ \times 14 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 325 \\ \times 12 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 36 \\ \times 35 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 36 \\ \times 27 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 18 \\ \times 54 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 75 \\ \times 28 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 156 \\ \times 25 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 225 \\ \times 56 \\ \hline \end{array}$$

C.

	A.	B.	C.	D.
E.	390	210	6300	972
F.	21	1260	12600	135
G.	126	3900	2100	1512

Pairs of Single-Digit Whole Number Factors

Rule: if not alike, please write the larger factor above the smaller factor.

$\frac{x \overset{E.}{2}}{12}$

$\frac{x \overset{A.}{8}}{81}$

$\frac{x \overset{F.}{14}}{14}$

$\frac{x \overset{B.}{72}}{72}$

$\frac{x \overset{F.}{2}}{16}$

$\frac{x \overset{C.}{63}}{63}$

$\frac{x \overset{2}{18}}{18}$

$\frac{x \overset{D.}{54}}{54}$

$\frac{x}{20}$

$\frac{x \overset{E.}{48}}{48}$

$\frac{x \overset{3}{24}}{24}$

$\frac{x \overset{F.}{42}}{42}$

$\frac{x}{25}$

$\frac{x \overset{G.}{36}}{36}$

$\frac{x}{27}$

$\frac{x \overset{H.}{32}}{32}$

$\frac{x \overset{I.}{30}}{30}$

$\frac{x}{28}$

$\frac{x \overset{J.}{36}}{36}$

$\frac{x \overset{4}{24}}{24}$

$\frac{x \overset{K.}{40}}{40}$

$\frac{x}{21}$

$\frac{x \overset{A.}{45}}{45}$

$\frac{x \overset{3}{18}}{18}$

$\frac{x \overset{B.}{49}}{49}$

$\frac{x \overset{4}{16}}{16}$

$\frac{x \overset{C.}{56}}{56}$

$\frac{x}{15}$

$\frac{x \overset{D.}{64}}{64}$

$\frac{x \overset{3}{12}}{12}$

Taming frightfully big numbers . . .

$\frac{1}{2} \times 100 =$ **A.**

$2 \times 50 =$

$1 \times 100 =$

$\frac{1}{2} \times 400 =$ **B.**

$2 \times 60 =$

$10 \times 100 =$ **D.**

$\frac{1}{2} \times 4000 =$ **C.**

$2 \times 500 =$ **D.**

$100 \times 100 =$

$\frac{1}{2} \times 2000 =$ **D.**

$2 \times 600 =$

$10 \times 1000 =$

$\frac{1}{2} \times 1000 =$ **E.**

$8 \times 500 =$

$100 \times 1000 =$

$\frac{1}{2} \times 500 =$ **F.**

$8 \times 600 =$

$1000 \times 1000 =$

Factor Trees (excluding 1 as a factor)

44

A.

2

78

B.

2

100

C.

72

A.

125

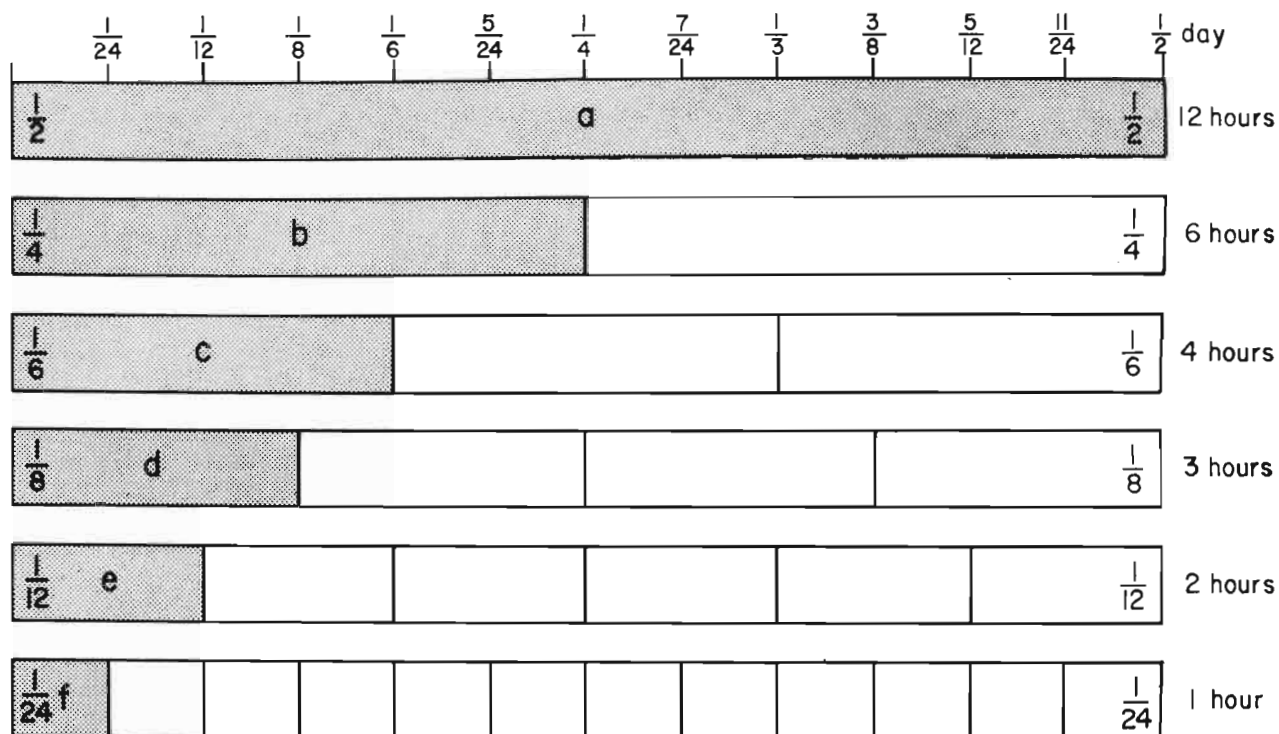
B.

60

C.

	A.	B.	C.	D.	E.	F.
G.	50	8,9	2,2,3,5	6,6	2,6	250
H.	2,2,11	7,7	2,000	6,9	4,8	2,7
I.	9,9	2,3,13	7,9	1,000	5,6	6,7
J.	2,2,2,3,3	200	2,2,5,5	8,8	500	4,9
K.	5,9	5,5,5	7,8	5,8	6,8	2,8

What Can You See?



$$\frac{a - b}{\frac{1}{2} - \frac{1}{4}} = \frac{\quad}{\quad} \quad \text{A.}$$

$$\frac{b - d}{\quad - \quad} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{B.} \quad \text{H.}$$

$$\frac{c - e}{\quad - \quad} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{D.} \quad \text{H.}$$

$$\frac{e - f}{\quad - \quad} = \frac{\quad}{\quad} \quad \text{D.} \quad \text{E.} \quad \text{I.}$$

$$\frac{a - d}{\quad - \quad} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{B.} \quad \text{A.}$$

$$\frac{a - c}{\quad - \quad} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{C.} \quad \text{E.}$$

$$\frac{a \div 2}{\div 2} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{A.}$$

$$\frac{a \times \frac{1}{2}}{\times \frac{1}{2}} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{I.}$$

$$\frac{c \times \frac{1}{2}}{\times \frac{1}{2}} = \frac{\quad}{\quad} \quad \text{G.} \quad \text{D.}$$

$$\frac{a \times \frac{1}{3}}{\times \frac{1}{3}} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{G.}$$

$$\frac{a \times \frac{2}{3}}{\times \frac{2}{3}} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{E.}$$

$$\frac{b \times \frac{1}{6}}{\times \frac{1}{6}} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{I.}$$

$$\frac{b \times \frac{5}{6}}{\times \frac{5}{6}} = \frac{\quad}{\quad} \quad \text{I.} \quad \text{G.}$$

	A.	B.	C.	D.	E.	F.
G.	$\frac{3}{8}$	$\frac{1}{5}$	$\frac{1}{6}$	$\frac{3}{7}$	$\frac{3}{4}$	$\frac{5}{24}$
H.	$\frac{1}{9}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{12}$	$\frac{1}{3}$	$\frac{5}{6}$
I.	$\frac{1}{4}$	$\frac{5}{12}$	$\frac{1}{24}$	$\frac{2}{3}$	$\frac{1}{24}$	$\frac{7}{12}$

Two-Step and Four Step CHAIN REACTIONS

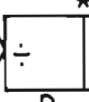
(note: *indicates several solutions)

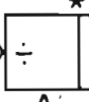
81 $\div 9 \times 4$  A.

15 $\times 3 \div 9$  B.

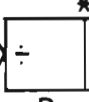
12 $\times 3 \div$  C. 6

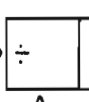
21 $\times 2 \div$  7 C.

6 $\div$  $\times$  9 D. E.

49 $\div$  $\times$  56 A. B.

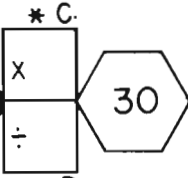
72 $\div 9 \times$  32 C.

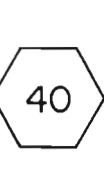
5 $\div$  $\times$  9 B. C.

35 $\div$  $\times$  50 A. D.

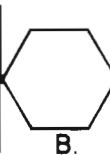
64 $\times 3 \div 8$  E.

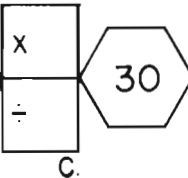
42 $\times 5 \div 7$  A.

25 $\times \div$  30 B. C.

16 $\times \div$  40 D. B.

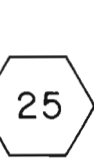
12 $\times 3 \div$  4 C.

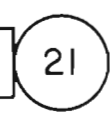
15 $\times 2 \div 6$  B.

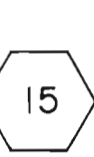
27 $\times \div$  30 C. D.

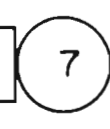
4 $\times \div$  7 A. C.

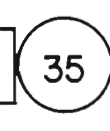
18 $\div 2 \div 3$  E. $\times 7 \times 2$  E.

27 $\times \div 9$ 15 $\times \div$  25 B. E. B.

5 $\times 9 \div$ 15 $\div \times$  21 E. B. A.

6 $\times \div 2$ 9 $\times \div$  15 E. B. E.

3 $\div \times$ 8 $\div \times$  7 E. D. D. A.

6 $\div \times$ 10 $\div \times$  35 E. B. D. A.

(If there is more than one solution, only the simplest is given.)

A.	B.	C.	D.	E.
7	11	4	2	42
30	5	6	8	24
36	8	9	10	3

+, -, × and ÷ Measurements

1 gross = 12 dozen

1 dollar = 2 half dollars

1 dozen = 12 eggs

1 half dollar = 2 quarters

\$1 50¢ 25¢

0 0 1	Q.
+ 0 1 1	Q.
=====	=====
_____	Q.
A.	

gr. doz. eggs

1 7 3	e.
+ 0 6 8	e.
=====	=====
_____	e.
B.	

\$100 \$10 \$1

4 7 9	\$
+ 4 7 9	\$
=====	=====
_____	\$
C.	

\$1 50¢ 25¢

1 0 0	Q.
- 0 0 1	Q.
=====	=====
_____	Q.
D.	

G. D. E.

1 0 0	e.
- 6 2	e.
=====	=====
_____	e.
E.	

\$1 10¢ 1¢

8 0 4	¢
- 2 8 9	¢
=====	=====
_____	¢
F.	

D. H. Q.

0 1 1	Q.
x 2	x2
=====	=====
_____	Q.
G.	

G. D. E.

0 5 5	e.
x 3	x3
=====	=====
_____	e.
H.	

M. dm. cm.

2 3 9	cm.
x 4	x4
=====	=====
_____	cm.
A.	

D. H. Q.

1 1 0	Q.
÷ 3	÷3
=====	=====
_____	Q.
B.	

G. D. E.

3 1 10	e.
÷ 2	÷2
=====	=====
_____	e.
C.	

100's 10's 1's

1 4 4	(1's)
÷ 6	÷6
=====	=====
_____	(1's)
D.	

D. H. Q.

1 1 1	Q.
+ 0 1 1	Q.
=====	=====
_____	Q.
E.	

G. D. E.

1 6 6	e.
+ 1 6 6	e.
=====	=====
_____	e.
F.	

	A.	B.	C.	D.
E.	9,5,6	2,1,0	0,5,10	2,2,2
F.	3,1,0	2,1,11	1,6,11	5,1,5
G.	1,1,0	0,1,0	9,5,8	0,2,4
H.	1,0,0	1,4,3	3,4,5	0,1,1

Estimation

... or "coming close" ... with easier arithmetic.

<u>38 x 74 =</u>			(How close?)	Getting an exact result
<u>+2</u>	<u>-4</u>	→	x = _____ () A.	<u>38</u> x <u>74</u>
<u>+2</u>	<u>+1</u>	→	x = _____ () B.	
<u>+4</u>	<u>-4</u>	→	x = _____ () C.	_____ D.

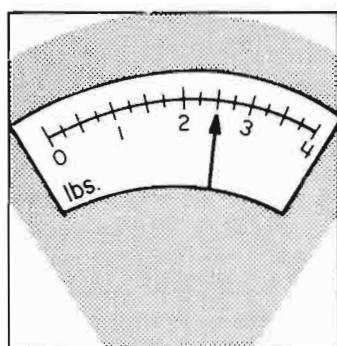
<u>49 x 83 =</u>				
<u>+1</u>	<u>+1</u>	→	x = _____ () A.	<u>49</u> x <u>83</u>
<u>-1</u>	<u>-2</u>	→	x = _____ ()	
<u>+1</u>	<u>-3</u>	→	x = _____ () C.	_____ D.

<u>275 x 45 =</u>				
<u>+25</u>	<u>+5</u>	→	x = _____ () A.	<u>275</u> x <u>45</u>
<u>-25</u>	<u>+5</u>	→	x = _____ () B.	
<u>+25</u>	<u>-5</u>	→	x = _____ () C.	_____ D.

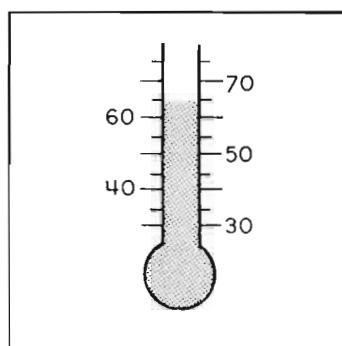
Taming frightfully big numbers . . .

<u>2 x 75</u> = _____ A.	<u>60,000 ÷ 2</u> = _____ B.	<u>100 x 100</u> = _____ C.
<u>4 x 75</u> = _____	<u>60,000 ÷ 3</u> = _____	<u>200 x 500</u> = _____ D.
<u>40 x 75</u> = _____	<u>60,000 ÷ 4</u> = _____	
<u>4 x 750</u> = _____	<u>60,000 ÷ 5</u> = _____	
<u>40 x 750</u> = _____	<u>60,000 ÷ 6</u> = _____	
<u>20 x 750</u> = _____	<u>60,000 ÷ 10</u> = _____	
<u>10 x 750</u> = _____	<u>60,000 ÷ 100</u> = _____	

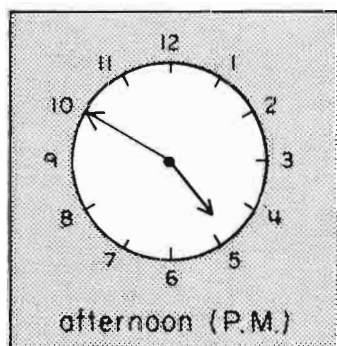
	A.	B.	C.	D.
E.	-12	+125	10,000	12,375
F.	150	+188	-375	2812
G.	+133	30,000	-67	100,000
H.	+2625	-17	+128	4067



weight shown	
----- lb.	A.
twice as much	
----- lb.	B.
half as much	$\frac{3}{4}$ lb. more
----- lb.	----- lb.
C.	E.
$\frac{3}{4}$ lb. less	three times as much
----- lb.	----- lb.
D.	F.



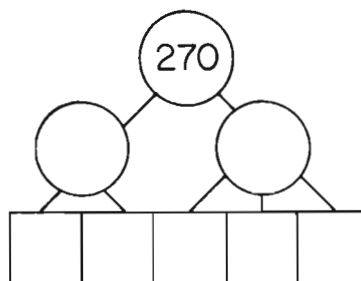
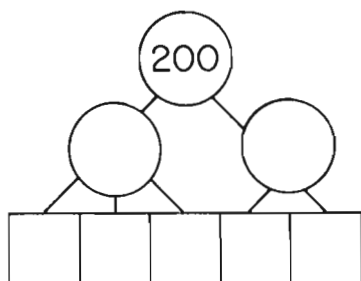
temperature shown	
----- °	A.
up 15°	
----- °	B.
down 25°	down 65°
----- °	----- °
C.	E.
up 17°	down 17°
----- °	----- °
D.	F.



time shown	
----- :----- p.m.	A.
6 hours earlier	
----- :----- a.m.	B.
$1\frac{1}{4}$ hr. later	45 min. earlier
----- :-----	----- :-----
A.	B.
50 min. earlier	$\frac{1}{3}$ hour later
----- :-----	----- :-----
B.	A.
12 hours later	24 hours later
----- :-----	----- :-----
A.	A.



amount shown	
----- ¢	C.
half as much	
----- ¢	D.
twice as much	$\frac{1}{4}$ as much
----- ¢	----- ¢
E.	D.
3 times as much	49¢ more
----- ¢	----- ¢
F.	E.
19¢ less	$\frac{1}{2}$ dollar more
----- ¢	----- ¢
C.	F.



A.	B.	C.	D.	E.	F.
6:05	4:05	$1\frac{1}{4}$	82	19	39
$2\frac{1}{2}$	10:50	28	7	0	$7\frac{1}{2}$
4:50	80	1	$1\frac{3}{4}$	56	84
65	5	9	14	77	48
5:10	4:00	40	7	$3\frac{1}{4}$	78

On Your Own (VII)

1000

- 392

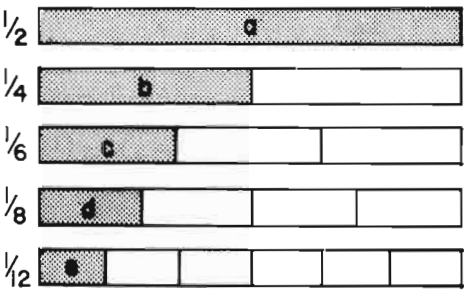
148,296

148,296

+ 148,296

296

x 75



Please circle the letter after the line you think will be the best "estimate".

64 x 66

349 x 25

60 x 60

 A.

350 x 30

 D.

70 x 70

 B.

300 x 20

 E.

70 x 60

 C.

400 x 20

 F.

b - c =

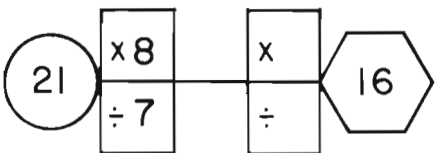
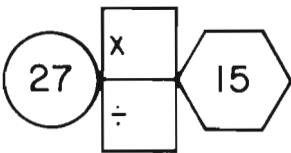
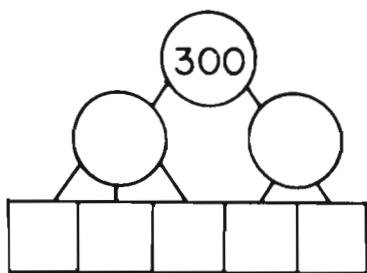
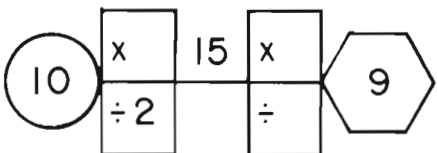
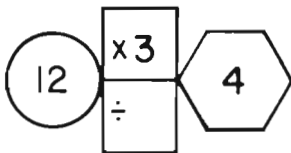
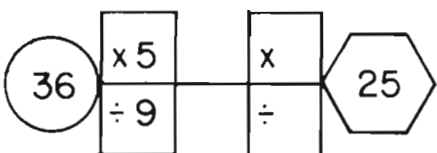
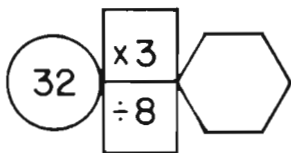
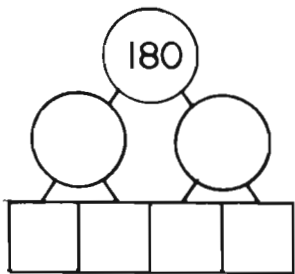
- =

a - 2d =

- =

b x 1/2 =

x 1/2 =



1 gross = 12 doz.

1 dozen = 12 eggs

gr.	doz.	eggs	
1	7	9	e.
+	3	8	2
			e.
			e.



How do you feel?

g.	d.	e.	
7	10	0	e.
		÷ 3	
			e.

If the results aren't interesting
 then one of us goofed! signed "GOOOOOOFY"

$$\begin{array}{r} 79 \\ + 32 \\ \hline \end{array}$$

$$\begin{array}{r} 63 \\ + 42 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 37 \\ \times 3 \\ \hline \end{array}$$

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

$$\begin{array}{r} 401 \\ - 179 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 74 \\ \times 3 \\ \hline \end{array}$$

H.

$$4 \overline{)492}$$

C.

$$\begin{array}{r} 37 \\ \times 9 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 76 \\ + 9 \\ \hline \end{array}$$

B.

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

D.

$$\begin{array}{r} 143 \\ \times 7 \\ \hline \end{array}$$

A.

$$4 \overline{)52}$$

B.

$$\begin{array}{r} 185 \\ \times 6 \\ \hline \end{array}$$

A.

$$\begin{array}{r} 4321 \\ - 3087 \\ \hline \end{array}$$

B.

$$6 \overline{)342}$$

C.

$$\begin{array}{r} 74 \\ \times 9 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 1738 \\ \times 4 \\ \hline \end{array}$$

A.

Peculiar Pairs

$$\begin{array}{r} 42 \\ \times 12 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 24 \\ \times 21 \\ \hline \end{array}$$

G.

$$\begin{array}{r} 39 \\ \times 31 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 93 \\ \times 13 \\ \hline \end{array}$$

F.

$$\begin{array}{r} 42 \\ \times 36 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 24 \\ \times 63 \\ \hline \end{array}$$

E.

$$\begin{array}{r} 918 \\ - 275 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 504 \\ - 178 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 1026 \\ - 437 \\ \hline \end{array}$$

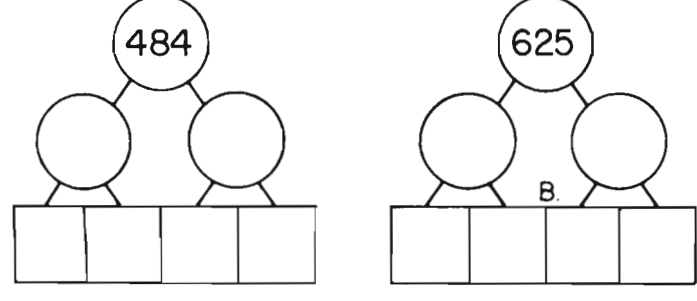
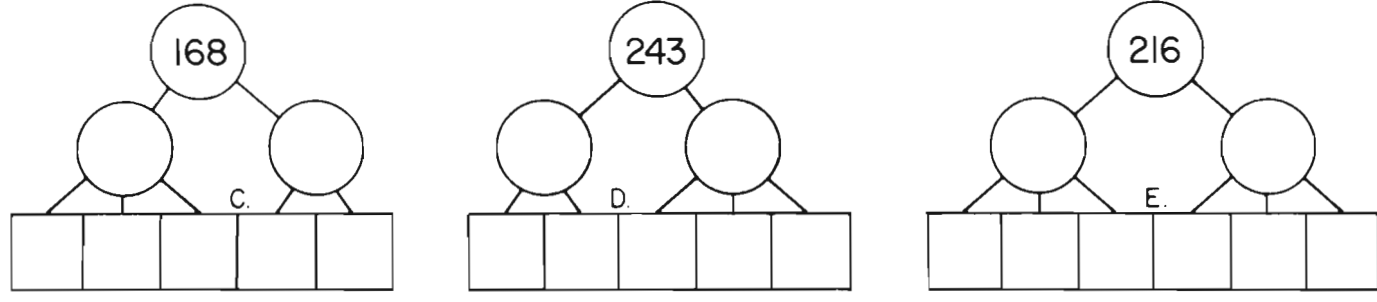
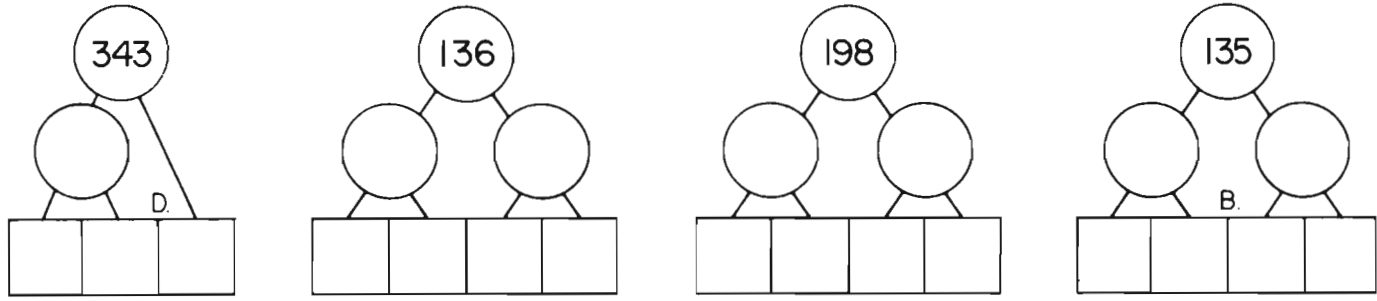
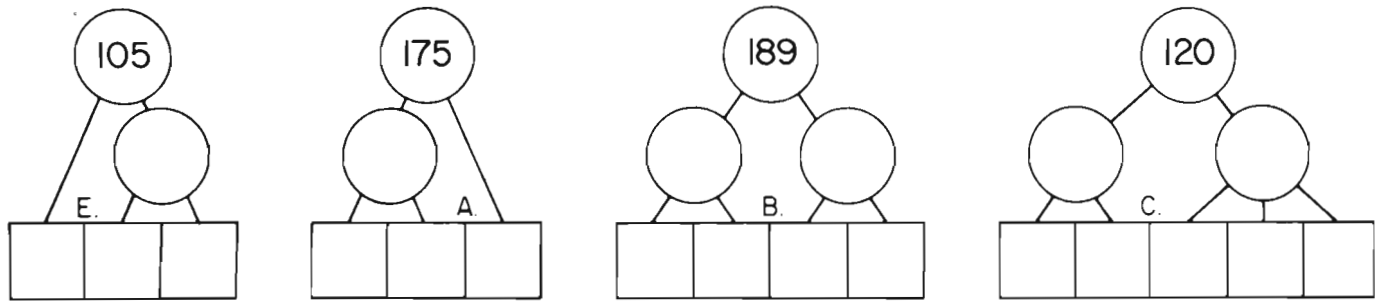
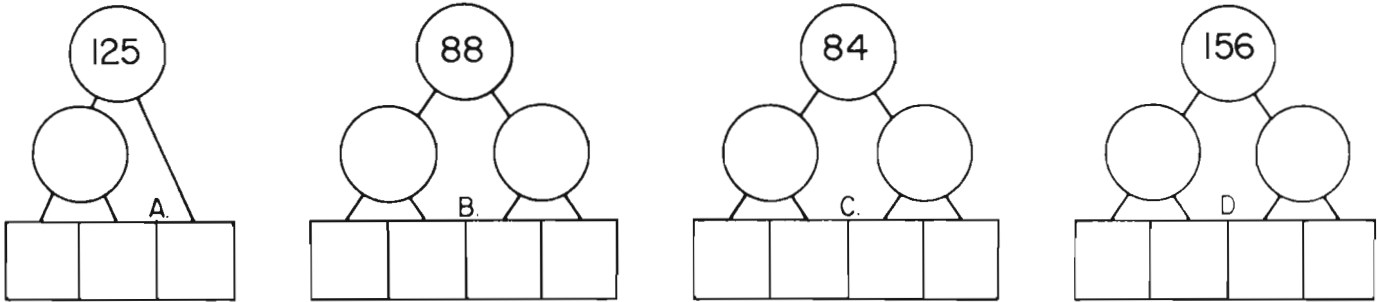
A.

$$\begin{array}{r} 1503 \\ - 624 \\ \hline \end{array}$$

C.

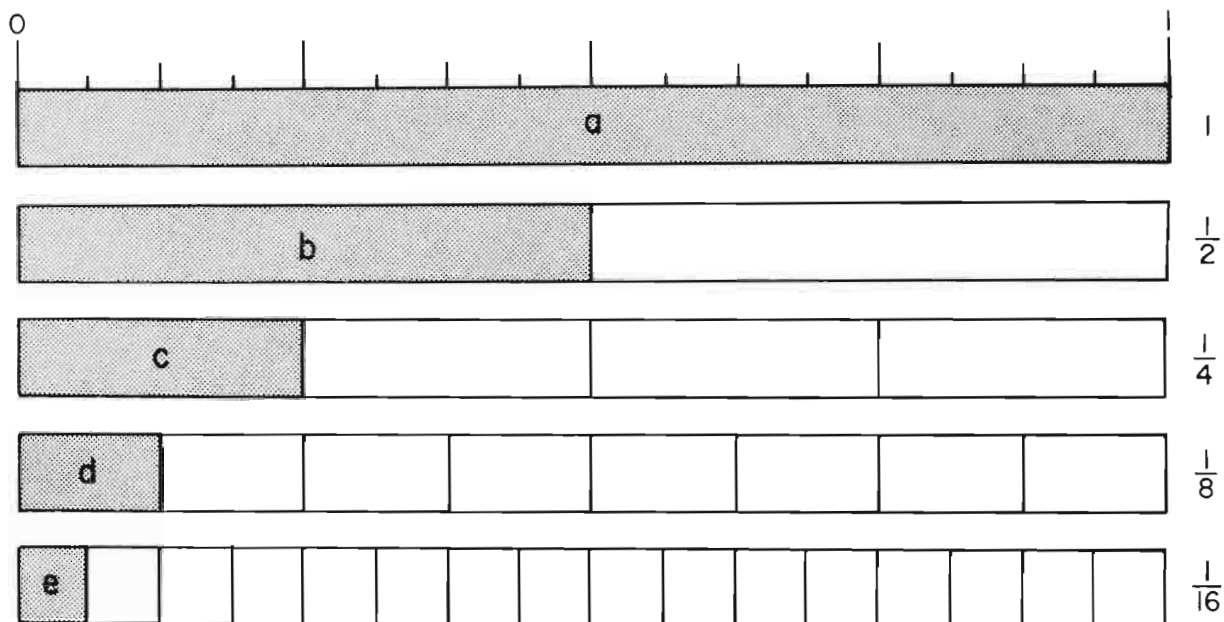
	A.	B.	C.	D.
E.	6952	13	643	1512
F.	589	105	1209	56
G.	333	504	57	326
H.	1001	1234	123	222
I.	1110	85	879	666

Factor Trees (excluding 1 as a factor) . . . You will need scratch paper.



A.	B.	C.	D.	E.
5,5,7	5,5,5,5	2,2 2,3,7	2,2,3,13	7,11,13
2,2 11,11	3,3,3,5	2,2 2,3,5	5,5 5,5,5	3,5,7
5,5,5	3,3,3,7	2,2,3,7	3,3 3,3,3	2,2,5,7
2,3,3,11	2,2,2,11	7,7,7,7	7,7,7	2,2,2 3,3,3

What Can You See?



$$\frac{\frac{1}{2} \times b}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{B.}$$

$$\frac{\frac{1}{2} \times c}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{C.}$$

$$\frac{\frac{1}{2} \times d}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{C.} \quad \text{D.}$$

$$\frac{\frac{1}{4} \times c}{\frac{1}{4} \times} = \frac{\quad}{\quad} \quad \text{I.} \quad \text{H.}$$

$$\frac{\frac{1}{4} \times b}{\frac{1}{4} \times} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{G.}$$

$$\frac{\frac{1}{8} \times b}{\frac{1}{8} \times} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{D.}$$

$$\frac{\frac{1}{2} \times 3c}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{A.}$$

$$\frac{\frac{1}{2} \times 3d}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{C.}$$

$$\frac{\frac{1}{2} \times 5d}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{D.} \quad \text{G.}$$

$$\frac{\frac{3}{4} \times b}{\frac{3}{4} \times} = \frac{\quad}{\quad} \quad \text{A.} \quad \text{I.}$$

$$\frac{\frac{3}{8} \times b}{\frac{3}{8} \times} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{C.}$$

$$\frac{\frac{5}{8} \times b}{\frac{5}{8} \times} = \frac{\quad}{\quad} \quad \text{H.} \quad \text{E.}$$

$$\frac{\frac{3}{4} \times c}{\frac{3}{4} \times} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{C.}$$

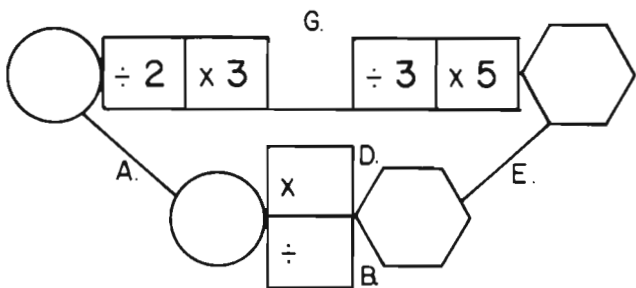
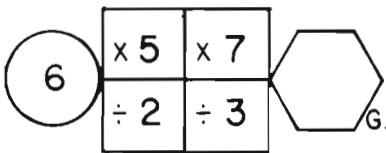
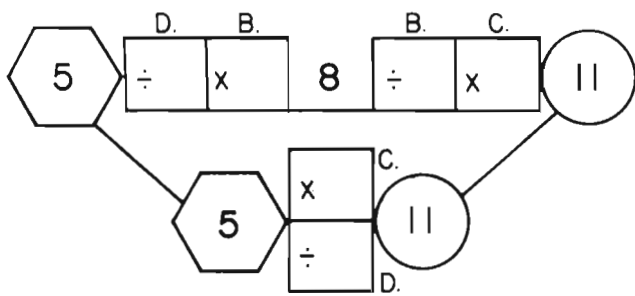
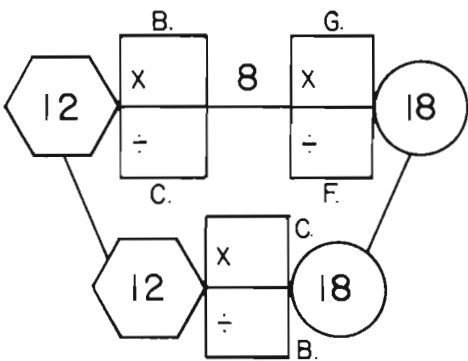
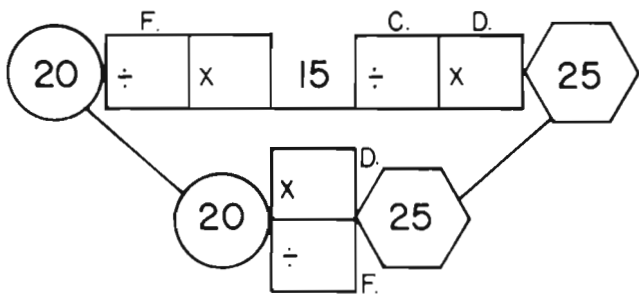
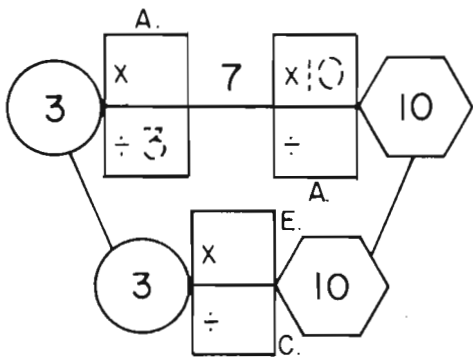
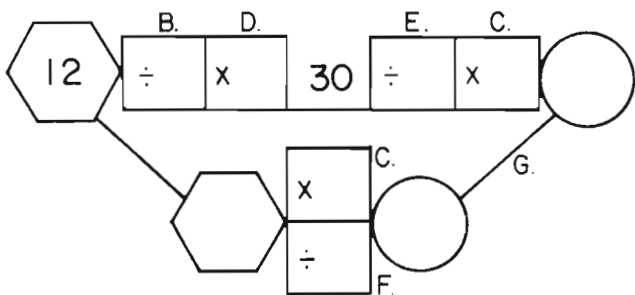
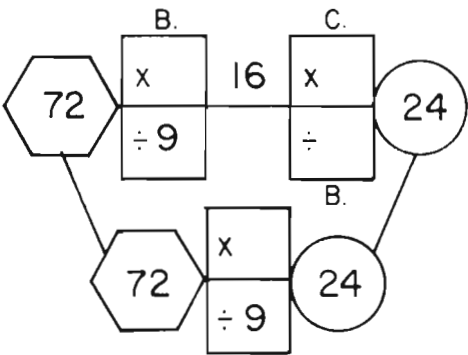
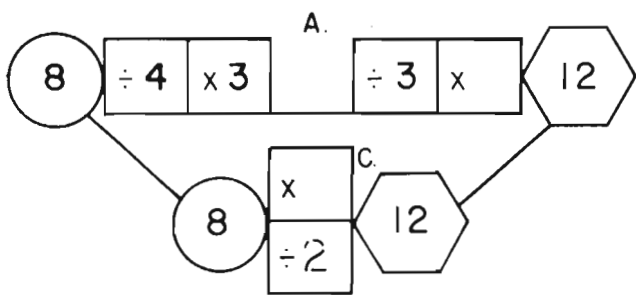
$$\frac{\frac{1}{2} \times 7d}{\frac{1}{2} \times} = \frac{\quad}{\quad} \quad \text{E.} \quad \text{F.}$$

$$\frac{\frac{1}{4} \times 3c}{\frac{1}{4} \times} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{C.}$$

$$\frac{\frac{3}{4} \times 3c}{\frac{3}{4} \times} = \frac{\quad}{\quad} \quad \text{B.} \quad \text{F.}$$

	A.	B.	C.	D.	E.	F.
G.	$\frac{1}{3}$	$\frac{1}{5}$	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{5}{16}$	$\frac{11}{13}$
H.	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{16}$	$\frac{1}{16}$	$\frac{13}{16}$	$\frac{7}{16}$
I.	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{15}{16}$	$\frac{7}{10}$	$\frac{7}{8}$	$\frac{9}{16}$

Chain Reactions . . . and Shortcuts



A.	B.	C.	D.	E.	F.	G.
6	12	11	14	10	16	15
1	2	13	5	17	4	35
7	8	3	18	15	20	9

+, -, × and ÷ Measurements

1 quarter = 5 nickels

1 hr. = 60 min.

1 dime = 2 nickels

1 min. = 60 sec.

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{10\text{¢}} \textcircled{5\text{¢}} \\ \hline | \quad | \quad | \\ \hline + | \quad | \quad | \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \\ \text{¢} \end{array}$$

A.

$$\begin{array}{r} \text{hr. min. sec.} \\ \hline | \quad 30 \quad 30 \\ \hline + | \quad 30 \quad 30 \\ \hline \hline \end{array}$$

B.

$$\begin{array}{r} \$100 \quad \$10 \quad \$1 \\ \hline 6 \quad 9 \quad 9 \\ \hline + 5 \quad 8 \quad 8 \\ \hline \hline \end{array} \quad \begin{array}{l} \$ \\ \$ \\ \$ \end{array}$$

C.

$$\begin{array}{r} \textcircled{25\text{¢}} \textcircled{10\text{¢}} \textcircled{5\text{¢}} \\ \hline 3 \quad 0 \quad 0 \\ \hline - | \quad | \quad | \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \\ \text{¢} \end{array}$$

D.

$$\begin{array}{r} \text{h. m. s.} \\ \hline 3 \quad 15 \quad 0 \\ \hline - | \quad 10 \quad 30 \\ \hline \hline \end{array}$$

E.

$$\begin{array}{r} \$1 \textcircled{10\text{¢}} \textcircled{1\text{¢}} \\ \hline 10 \quad 0 \quad 0 \\ \hline - 4 \quad 4 \quad 4 \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \\ \text{¢} \end{array}$$

F.

$$\begin{array}{r} \text{Q. D. N.} \\ \hline | \quad 0 \quad | \\ \hline \times 3 \quad \times 3 \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \end{array}$$

G.

$$\begin{array}{r} \text{h. m. s.} \\ \hline 0 \quad 10 \quad 10 \\ \hline \times 7 \\ \hline \hline \end{array}$$

H.

$$\begin{array}{r} \text{M. dm. cm.} \\ \hline | \quad 4 \quad 9 \\ \hline \times 6 \quad \times 6 \\ \hline \hline \end{array} \quad \begin{array}{l} \text{cm.} \\ \text{cm.} \end{array}$$

A.

$$\begin{array}{r} \text{Q. D. N.} \\ \hline 3 \quad 0 \quad | \\ \hline \div 4 \quad \div 4 \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \end{array}$$

B.

$$\begin{array}{r} \text{h. m. s.} \\ \hline | \quad 0 \quad 0 \\ \hline \div 8 \\ \hline \hline \end{array}$$

C.

$$\begin{array}{r} 100\text{'s} \quad 10\text{'s} \quad 1\text{'s} \\ \hline | \quad 4 \quad 7 \\ \hline \div 3 \quad \div 3 \\ \hline \hline \end{array} \quad \begin{array}{l} (1\text{'s}) \\ (1\text{'s}) \end{array}$$

D.

$$\begin{array}{r} \text{Q. D. N.} \\ \hline 4 \quad | \quad 0 \\ \hline - | \quad 2 \quad | \\ \hline \hline \end{array} \quad \begin{array}{l} \text{¢} \\ \text{¢} \\ \text{¢} \end{array}$$

E.

$$\begin{array}{r} \text{h. m. s.} \\ \hline | \quad 45 \quad 45 \\ \hline + | \quad 45 \quad 45 \\ \hline \hline \end{array}$$

F.

	A.	B.	C.	D.
E.	8,7,6	0,2,0	2,4,30	2,1,0
F.	8,9,4	3,1,0	3,31,30	5,5,6
G.	3,1,1	5,4,3	12,8,7	0,4,9
H.	3,0,1	1,11,10	0,7,30	1,1,0

Estimation
 . . . or “coming close” . . . with easier arithmetic.

2279 ÷ 53 =

-279

-3

→

÷

=

(

)

E.

-79

-3

→

÷

=

(

)

F.

+21

-3

→

÷

=

(

)

G.

(How close?)

Getting an exact result

53|2279

5005 ÷ 35 =

→

4000 ÷ 40

=

(

)

E.

→

6000 ÷ 30

=

(

)

F.

→

4500 ÷ 30

=

(

)

G.

35|5005

9,265 ÷ 85 =

+735

+15

→

÷

=

(

)

D.

+635

+5

→

÷

=

(

)

F.

-265

+5

→

÷

=

(

)

E.

85|9,265

2

5

7

9

B.

2

9

5

7

F.

63

C.

45

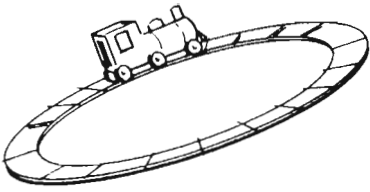
C.

56

C.

Factor Trees
(excluding 1 as a factor)

	A	B	C	D
E.	-43	-3	3,3,7	-9
F.	+57	630	2,3,5,11	+1
G.	+18	+3	3,3,5	+7
H	-19	+14	2,2,2,7	-17



Lou found it took his model train 5 seconds to go around a circular track. He measured the track as 8 feet around. He wondered how many miles per hour the train was going.

Lou made a table like this: (Please fill in the missing entries.)

time	5 sec.	10 sec.	15 sec.	20 sec.	40 sec.	60 sec.
distance	8 ft.	ft.	ft.	ft.	ft.	ft.

60 seconds = 1 minute

time	1 min.	2 min.	20 min.	40 min.	60 min.
distance	ft.	ft.	ft.	ft.	ft.

There are 5,280 feet in one mile. How do you think Lou answers his question: How many miles per hour was his train travelling? "about ____ m.p.h."

Please make up your own problem of a similar kind.



Marie found she rode ____ ft. on her bicycle in ____ second.
About how many miles per hour was she riding.

The blanks below may help you solve your problem.

time	sec.				
distance	ft.				

time					
distance					

On Your Own (VIII)

$$\begin{array}{r} 1738 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 1305 \\ - 879 \\ \hline \end{array}$$

$$35 \overline{) 5110}$$

Please circle the letter after the line you think will be the best "estimate".

$4500 \div 66$

$4200 \div 70$ A.

$4200 \div 60$ B.

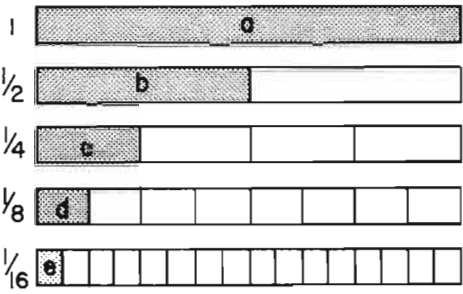
$4800 \div 60$ C.

$8513 \div 125$

$8500 \div 100$ D.

$9000 \div 100$ E.

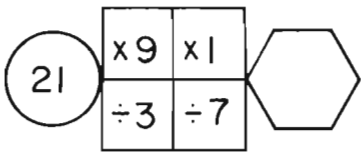
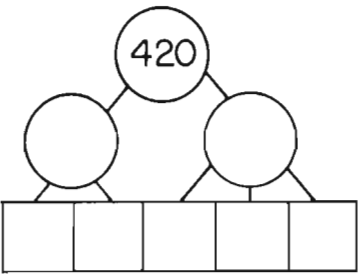
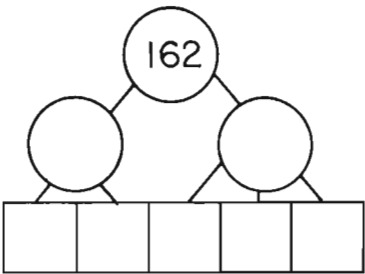
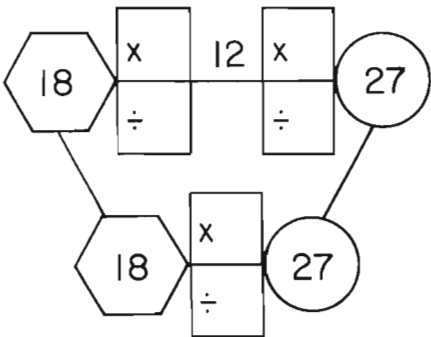
$8000 \div 100$ F.



$$\frac{1}{4} \times b = \underline{\hspace{2cm}}$$

$$\frac{3}{4} \times c = \underline{\hspace{2cm}}$$

$$\frac{1}{2} \times 5d = \underline{\hspace{2cm}}$$



100 %	10 %	5 %	110 %	205 %
\$ 10.00	\$	\$	\$	\$
\$ 5.00	\$	\$	\$	\$
\$ 15.00	\$	\$	\$	\$

1 hour = 60 minutes

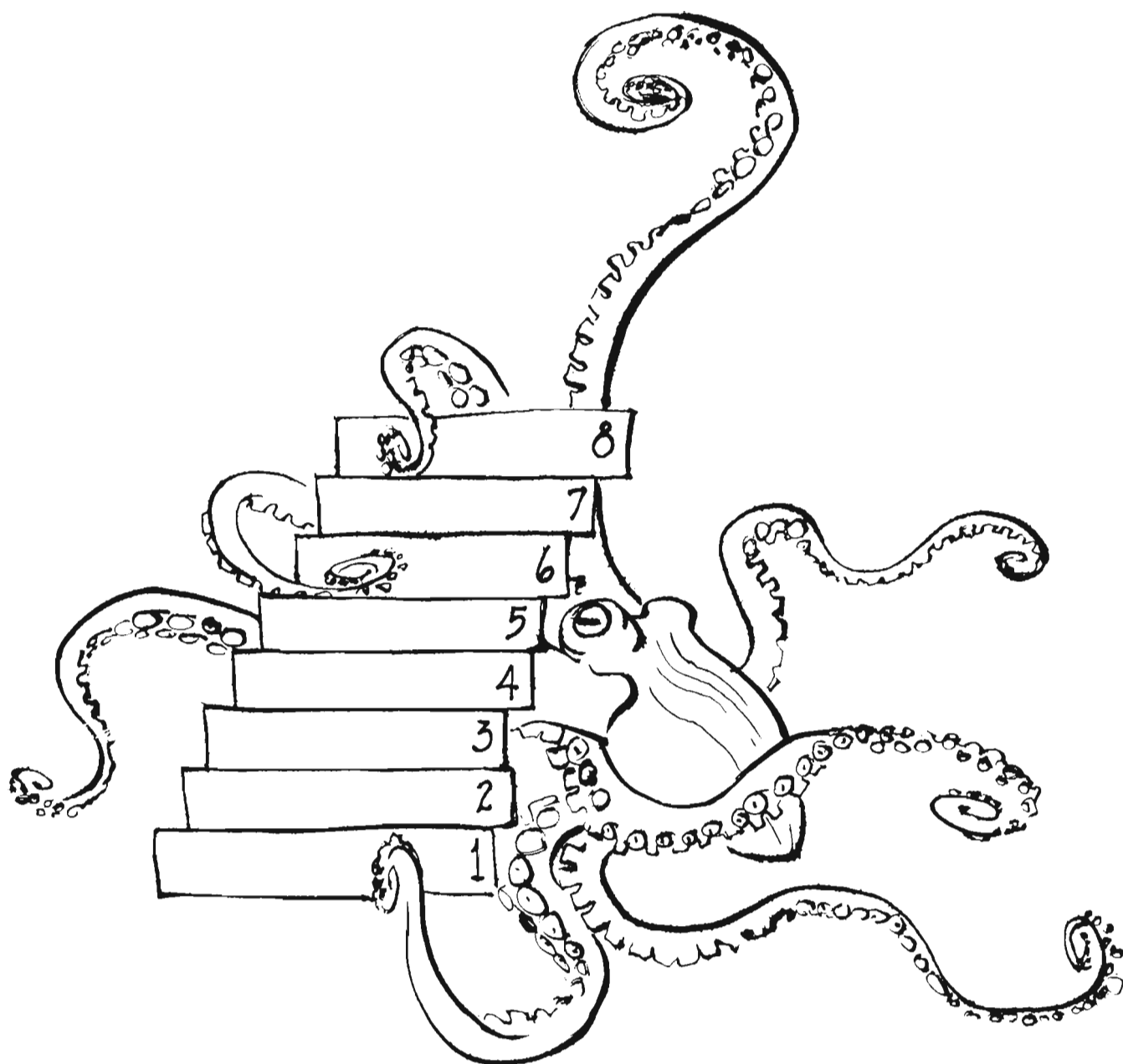
h.	m.	s.
1	30	45
+	1	30
		15

1 minute = 60 seconds

h.	m.	s.
1	0	0
-	9	48



How do you feel?





*this book
belongs to* _____

*este libro
es de* _____