CSMP Mathematics for the Intermediate Grades Part III

Worksheets

What's In This Book?

This book contains all the worksheets you will need for *CSMP for the Intermediate Grades, Part III*. Worksheets are labeled with the same letter and number as the lessons with which they are used. In this book, they are in the following order:

N Worksheets

N1	N12	N21	N30
N2	N13	N22	N31
N3	N14	N23	N32
N4	N15	N24	N33
N5	N16	N25	N34
N8	N17	N27	N35
N9	N19	N28	N36
N11	N20	N29	

L Worksheets

L2	L8	L11
L4	L9	L12
L5		

G Worksheets

G2	G6	G10
G3	G7	G11
G4	G8	G12
G5	G9	

P Worksheets

P1	P3	P6
P2	P4	P7

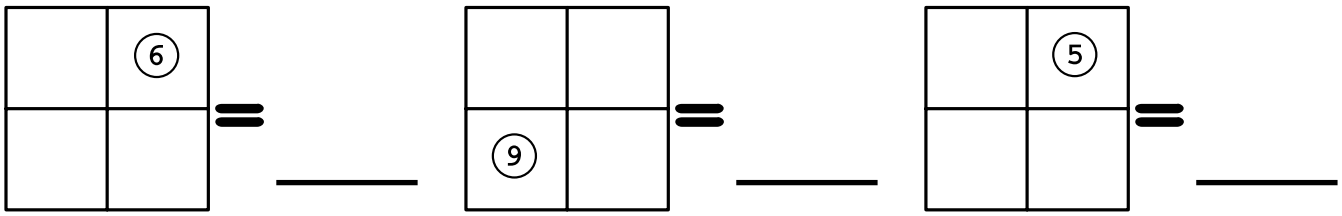
W Worksheets

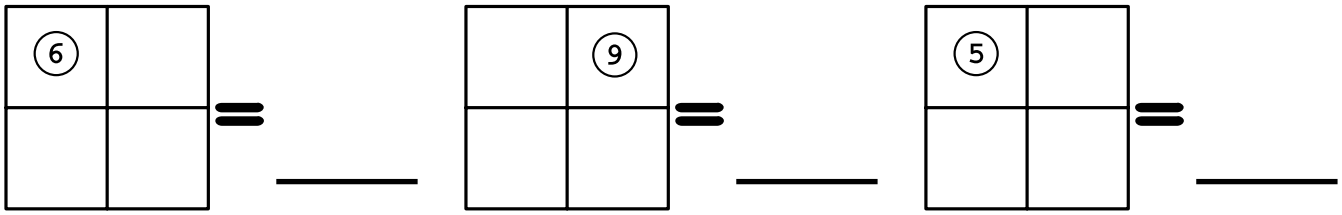
W2

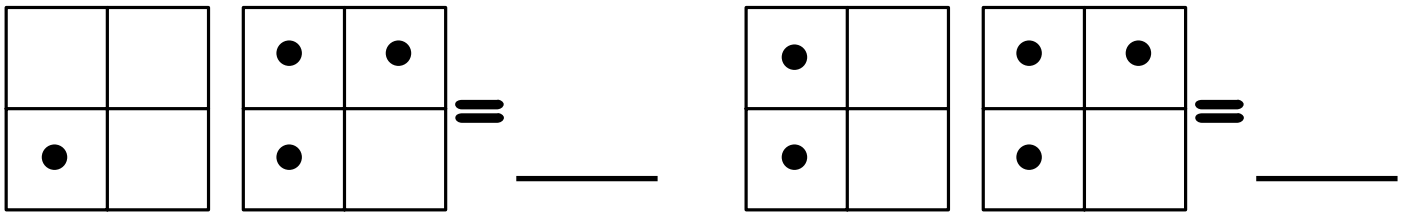
Name _____

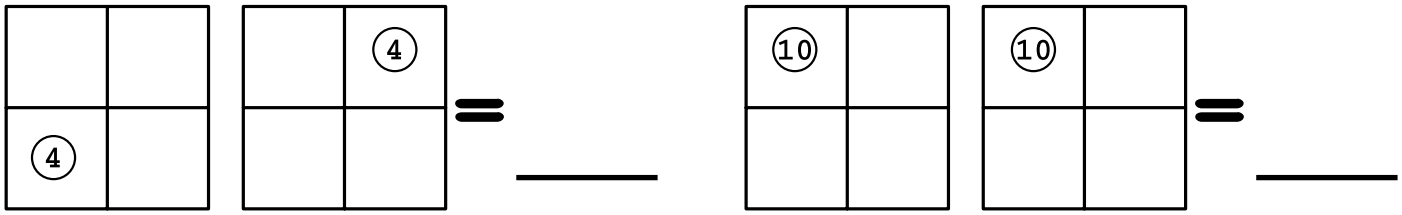
N1 *

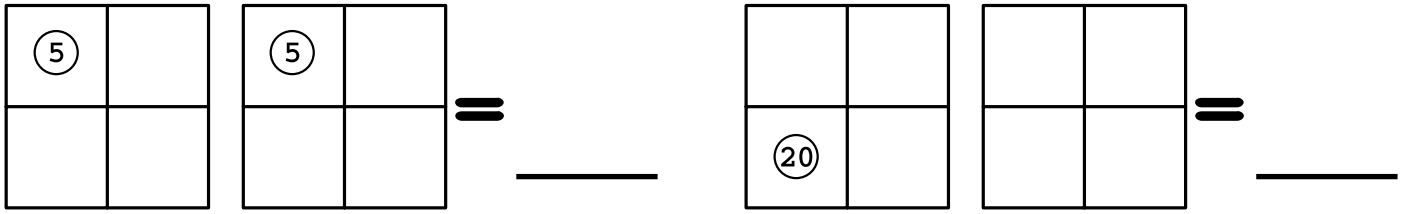
What number is on the Minicomputer?











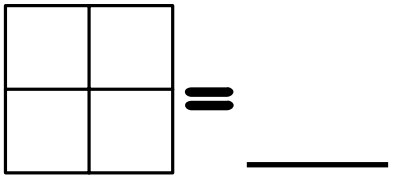
Name _____

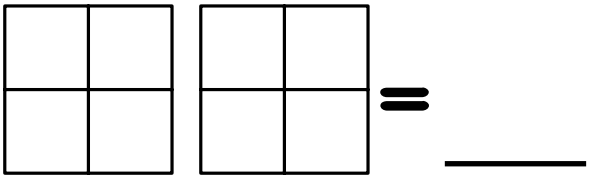
N1 **

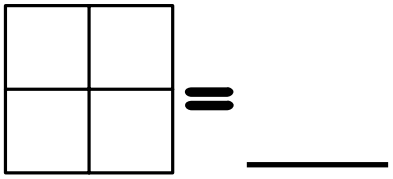
28 54 56 64 68 180 320 380 720

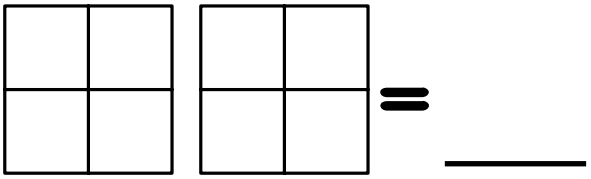
Put six of these numbers on the Minicomputer using exactly one of these checkers:

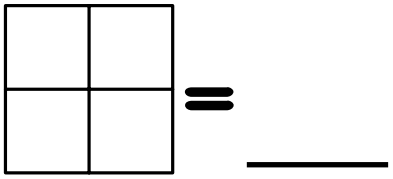
② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

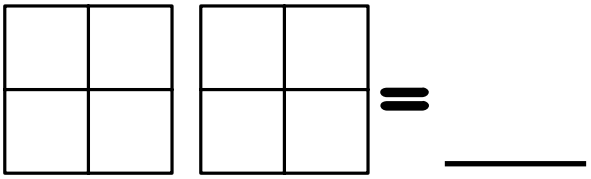
 = _____

 = _____

 = _____

 = _____

 = _____

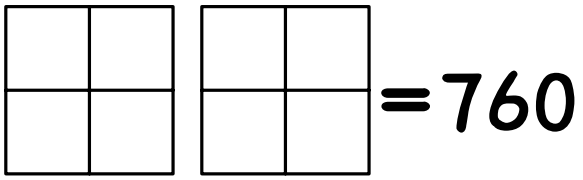
 = _____

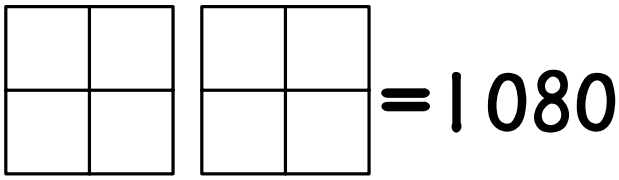
Name _____

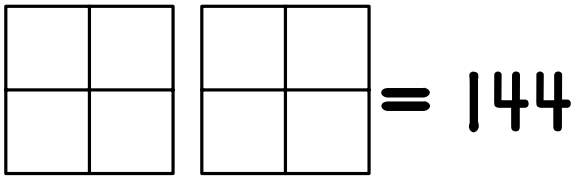
N1 ***

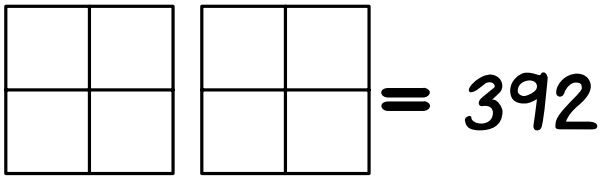
Put each number on the Minicomputer using one ⑩-checker and exactly one of these checkers:

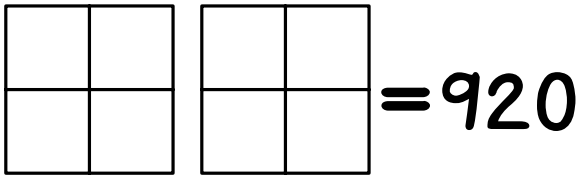
② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ^

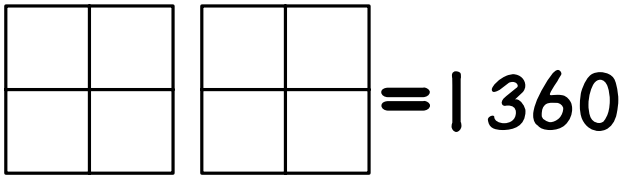
 = 760

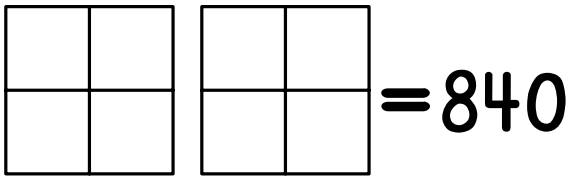
 = 1080

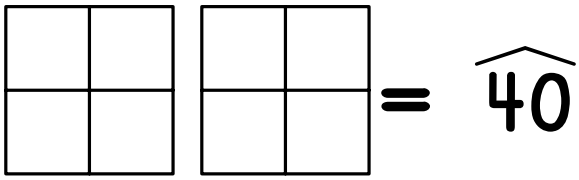
 = 144

 = 392

 = 920

 = 1360

 = 840

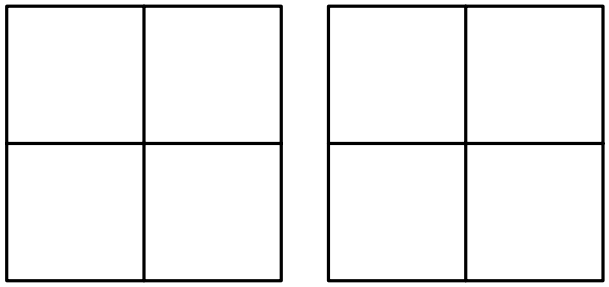
 = ^40

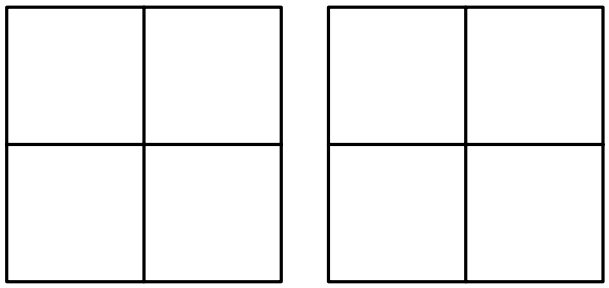
Name _____

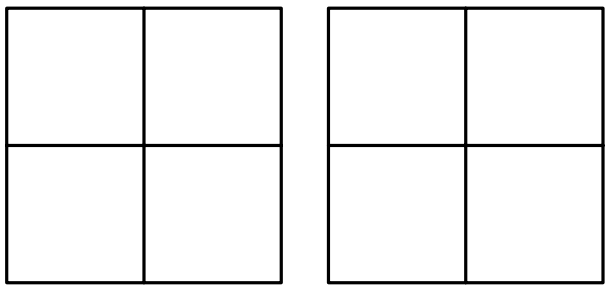
N1 ****

Put 1 000 on the Minicomputer using all of these checkers, each of them exactly once. Try to find at least three solutions.

② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

 = 1 000

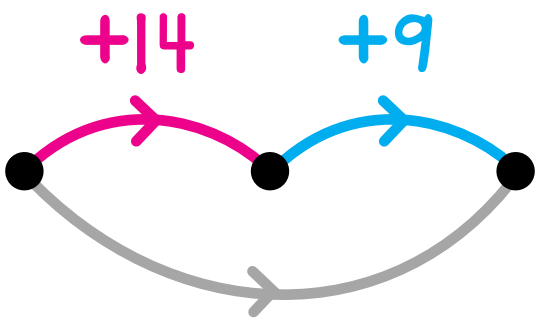
 = 1 000

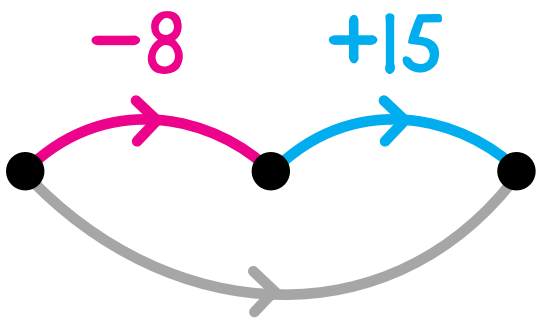
 = 1 000

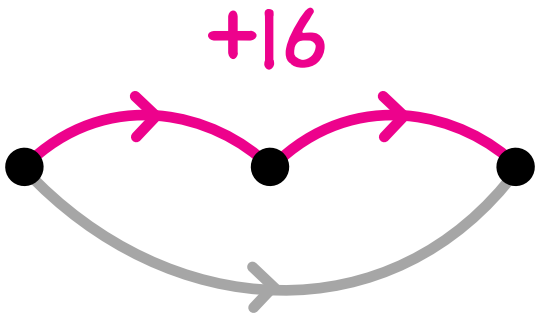
Name _____

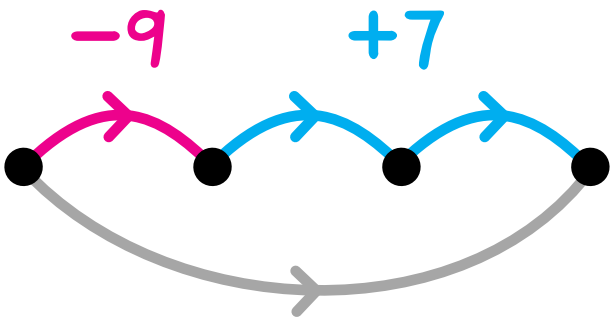
N2 *

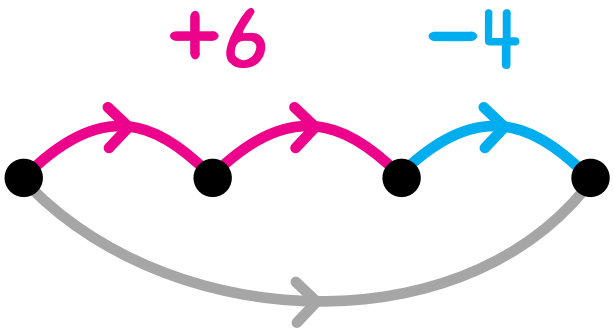
Label the gray arrows.

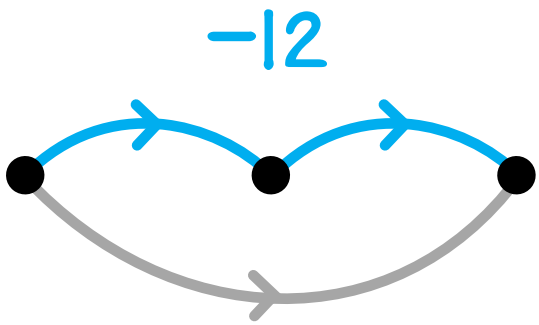








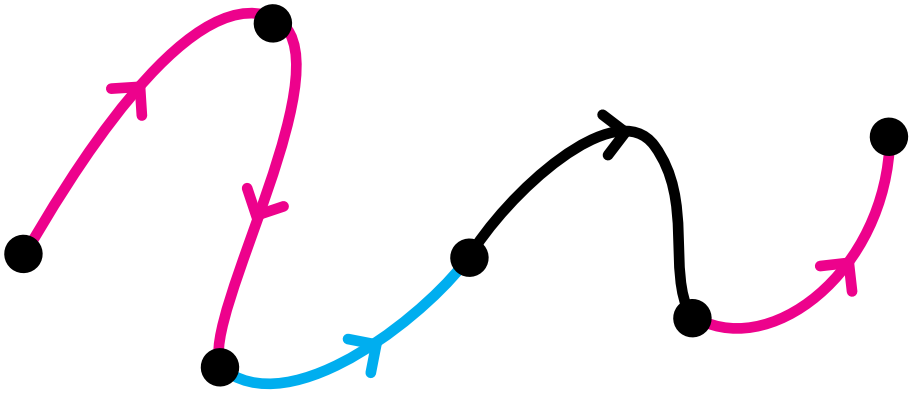




Name _____

N2 **

10 and 11 are in this arrow picture. Find and label their dots.



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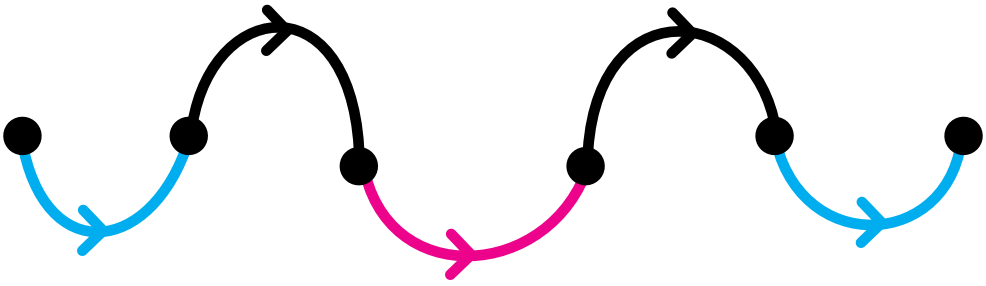
35 and 50 are in this arrow picture. Find and label their dots.

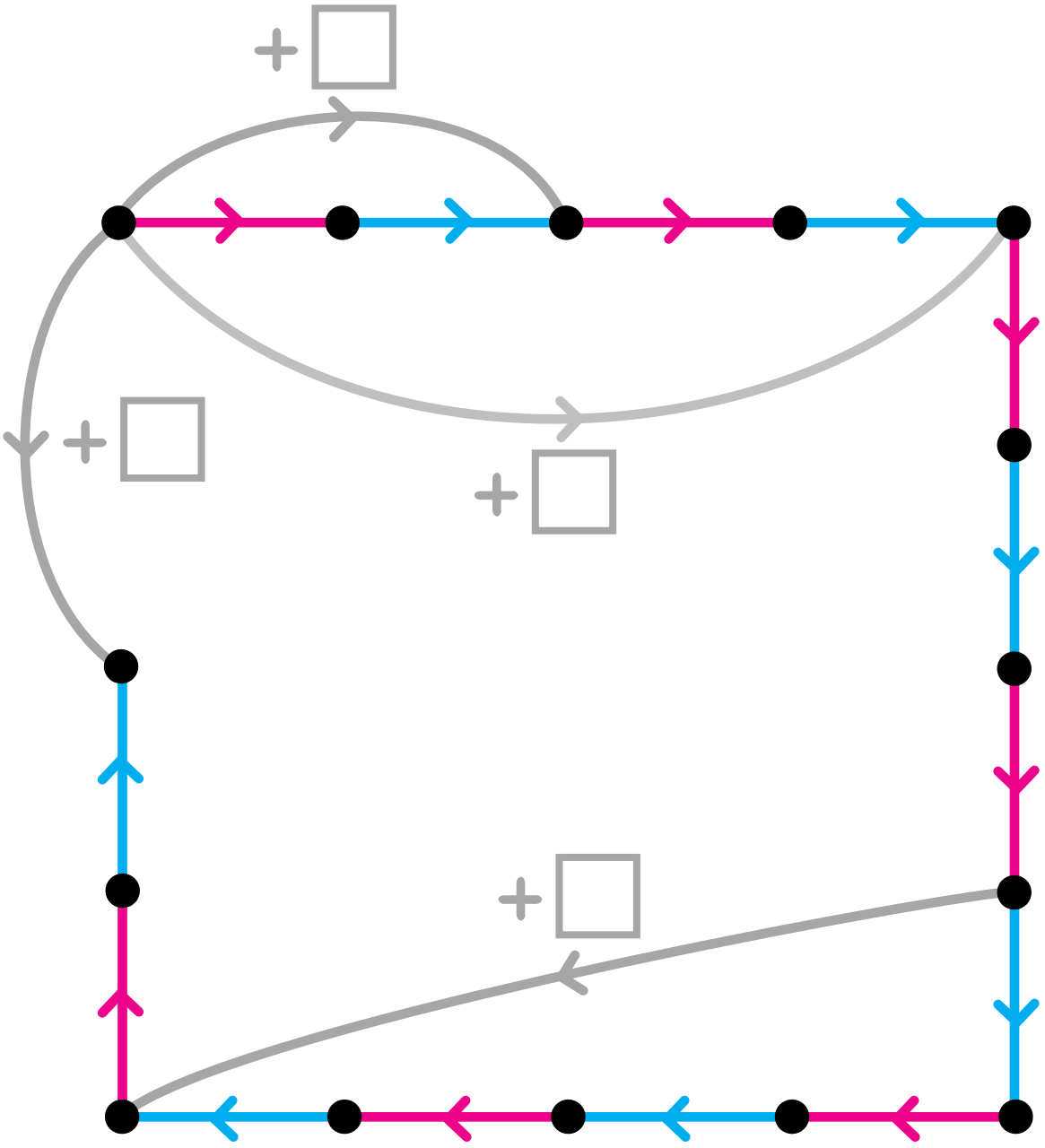


Name _____

N2 ***

Fill in the boxes for the gray arrows.

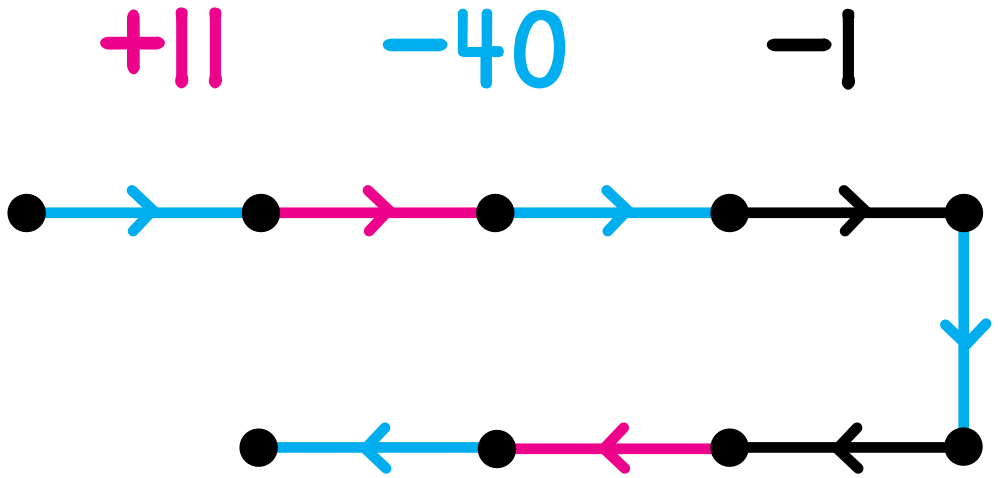
+7 +4



Name _____

N2 ****

20 and 80 are in this arrow picture. Find and label their dots.



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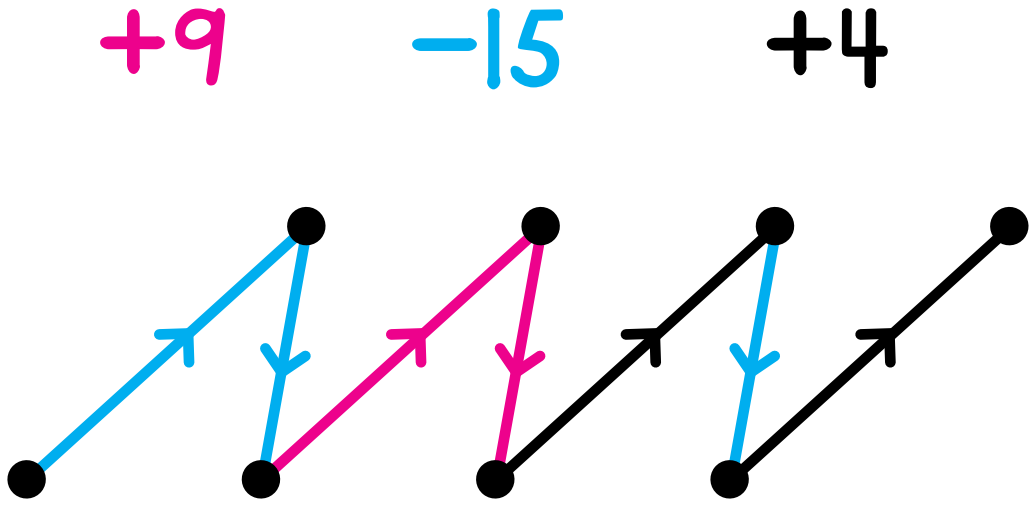
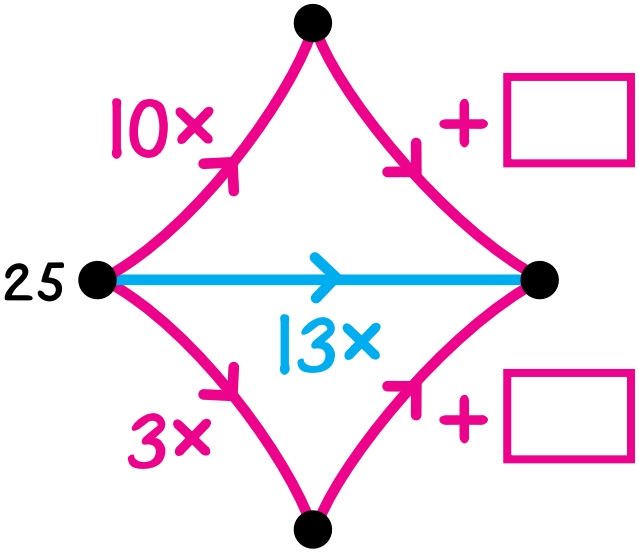
2 and 14 are in this arrow picture. Find and label their dots.

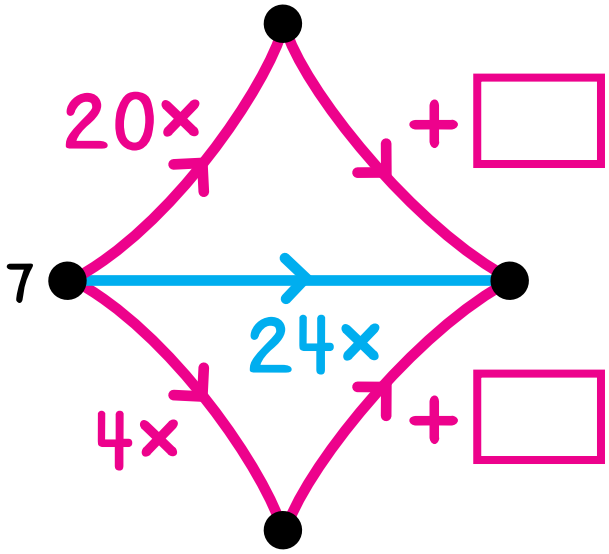


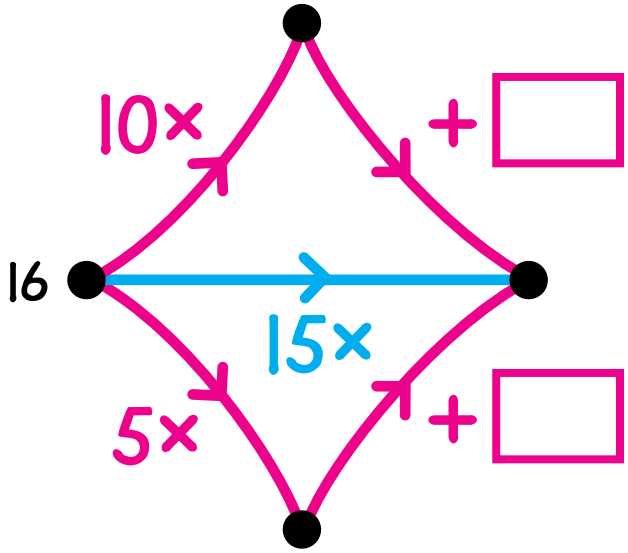
Name _____

N3 *

Fill in the boxes for the arrows and label the dots.



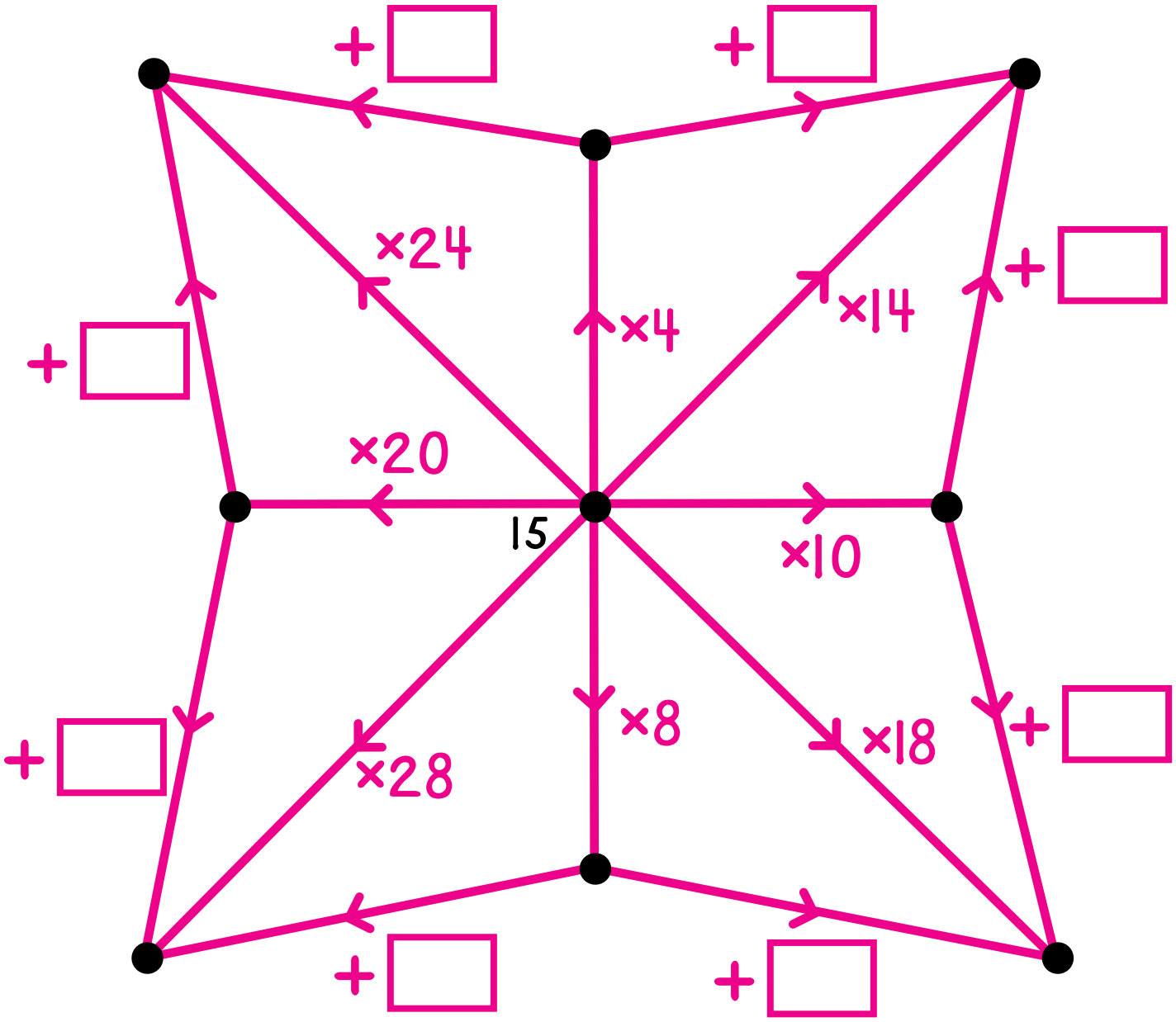




Name _____

N3 **

Fill in the boxes for the arrows and label the dots.



Name _____

N4 *

Jo is a secret number.

Clue 1

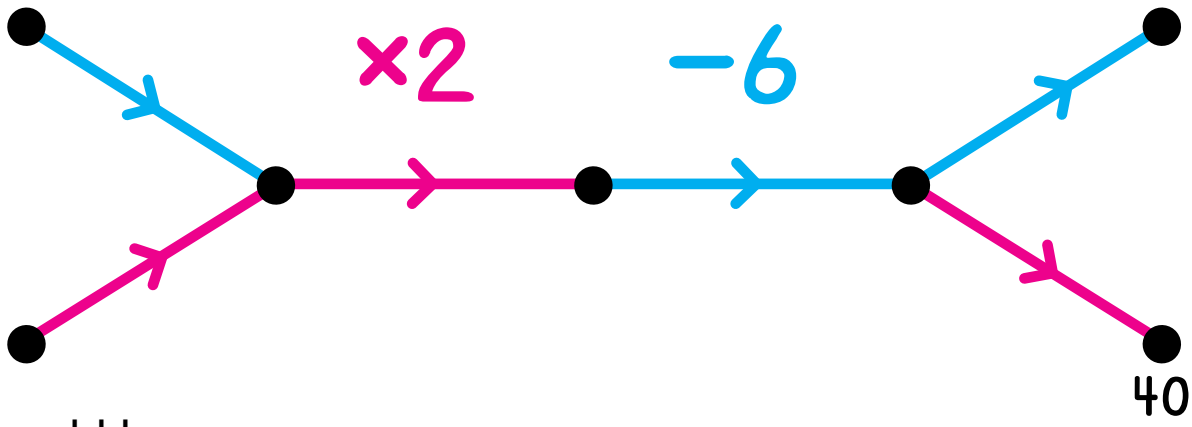
One of the symbols +, –, x, belongs in each blank of this calculator sentence. The same symbol may be used in both blanks.

7 ☐ 3 ☐ 2 = Jo

Jo could be ____, ____, ____, ____, ____, ____, ____, or ____.

Clue 2

Jo is in this arrow picture. Label all of the dots.



Jo could be _____ or _____.

Clue 3

Jo is a prime number.

Who is Jo? _____

Name _____

N4 **

Lou is a secret number.

Clue 1

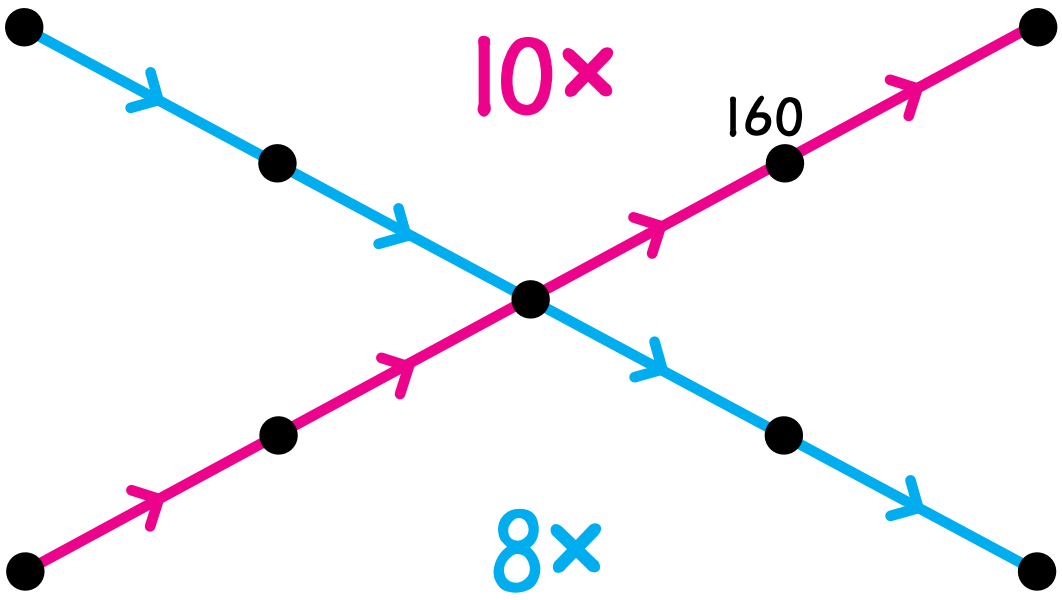
One of the symbols –, x, ÷ belongs in each blank of this calculator sentence. Each symbol may be used only once.

6 ☐ 3 ☐ 2 ☐ 10 = Lou

Lou could be _____, _____, _____, _____, _____, or _____.

Clue 2

Lou is in this arrow picture. Label all of the dots.



Who is Lou? _____

Name _____

N4 ***

Kir is a secret number.

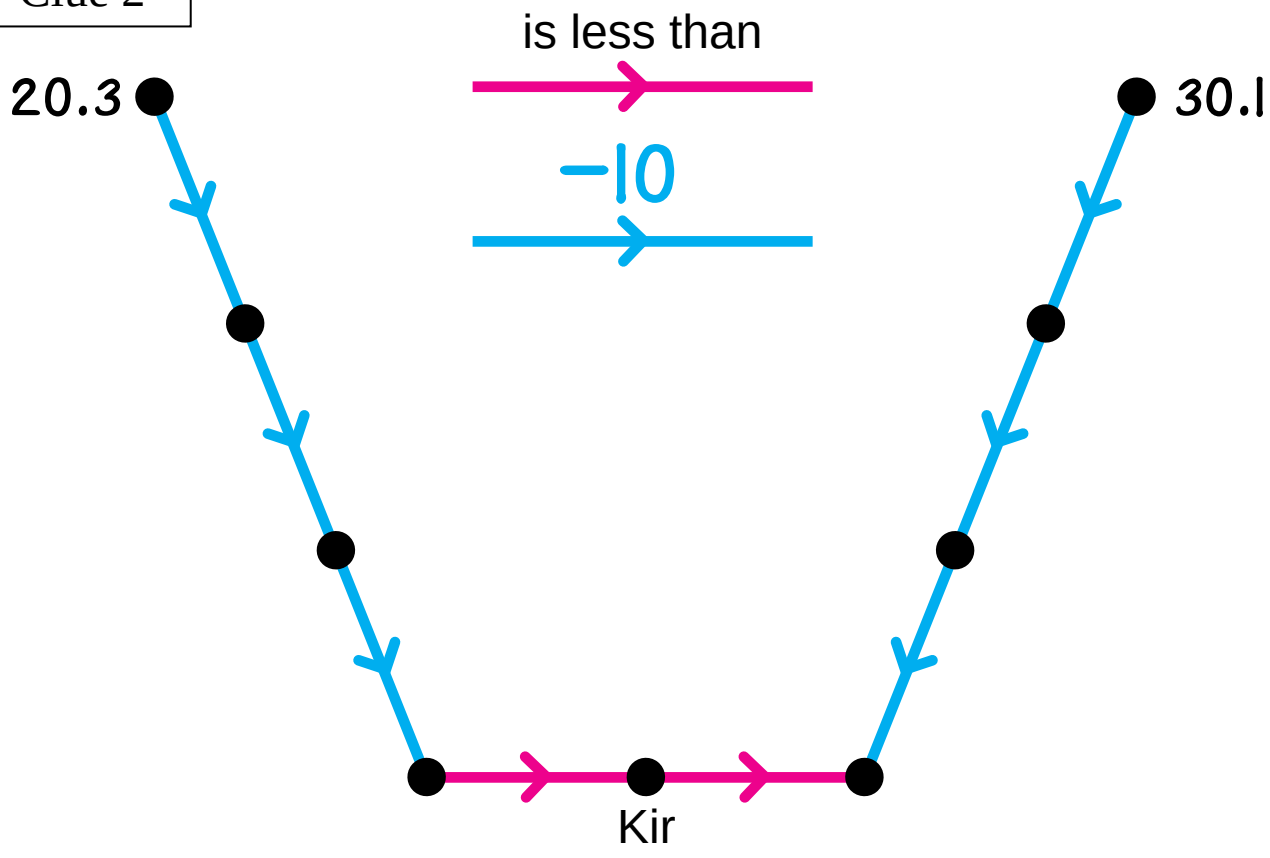
Clue 1

One of the symbols +, ÷ belongs in each blank of this calculator sentence. The same symbol may be used in all three blanks.

9 □ 2 □ 10 □ 10 = Kir

Kir could be _____, _____, _____, _____, _____, _____, _____, or _____.

Clue 2



Who is Kir? _____

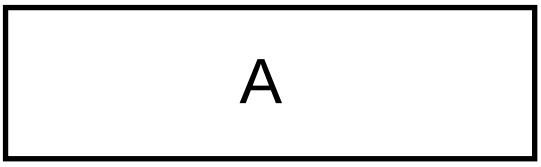
Name _____

N5(a)

0 Dividers

List the rectangles _____

How many rectangles? _____



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1 Divider

List the rectangles _____

How many rectangles? _____

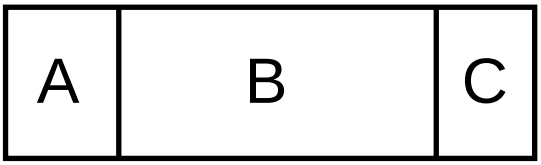
---

2 Dividers

List the rectangles _____

_____

How many rectangles? _____



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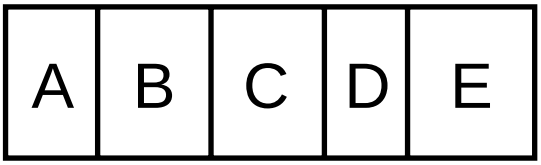
4 Dividers

List the rectangles _____

_____

_____

How many rectangles? _____



Name _____ N5(b)

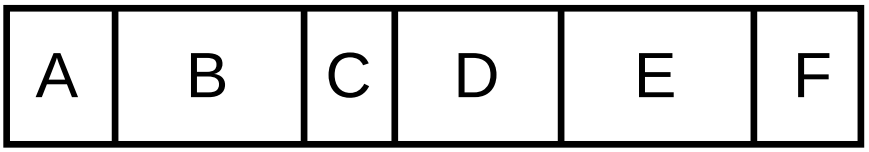
Check your answers on N5(a). Use the answers to complete this table.

Number of Dividers	0	1	2	3	4	
Number of Rectangles				10		

What pattern do you see in the second row of numbers? _____

Use your pattern to predict the number of rectangles formed when 5 dividers are used. _____ rectangles

5 Dividers



List the rectangles. _____

_____

How many rectangles?_____ Was your prediction correct? _____

Use your previous answers and a pattern to complete this table.

Number of Dividers	0	1	2	3	4	5	6	7	8	9
Number of Rectangles				10						

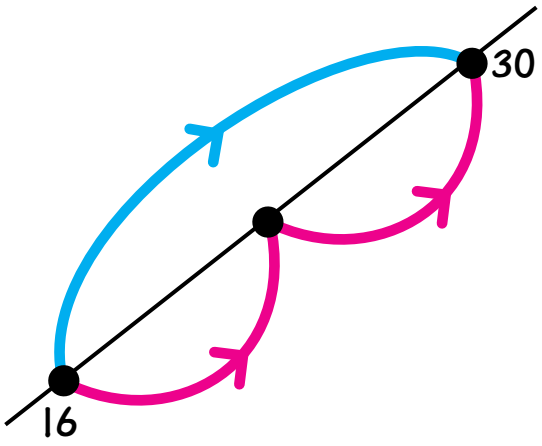
Do you recognize the sequence of numbers in the second row? _____

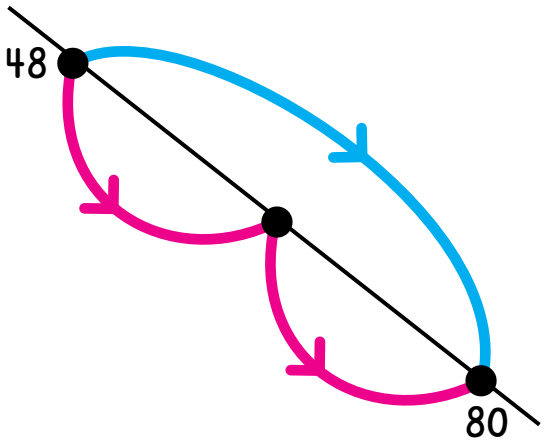
What do we call these numbers? _____

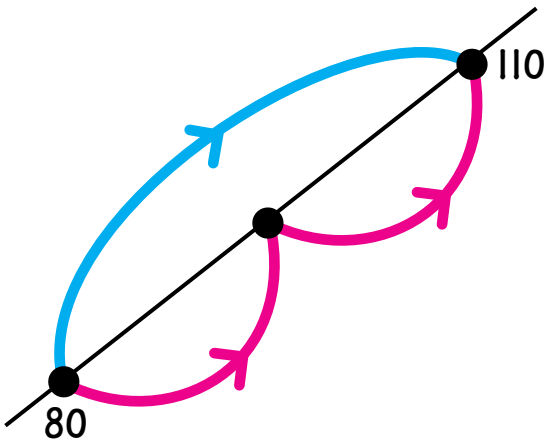
Name _____

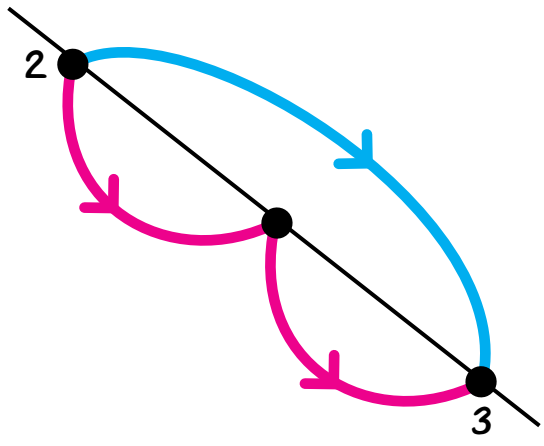
N8 *

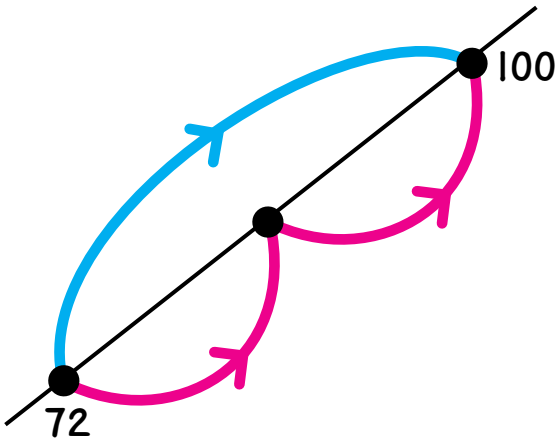
Label the dots. Label each arrow + some whole number.

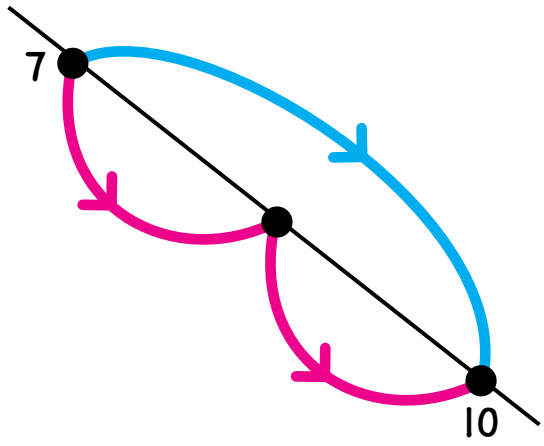








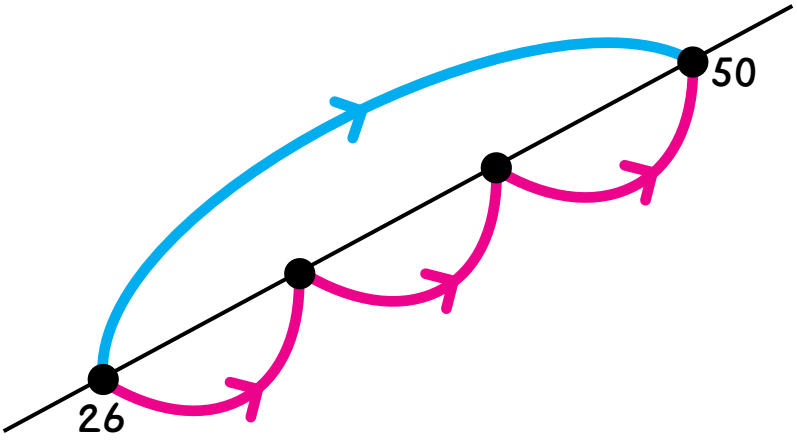


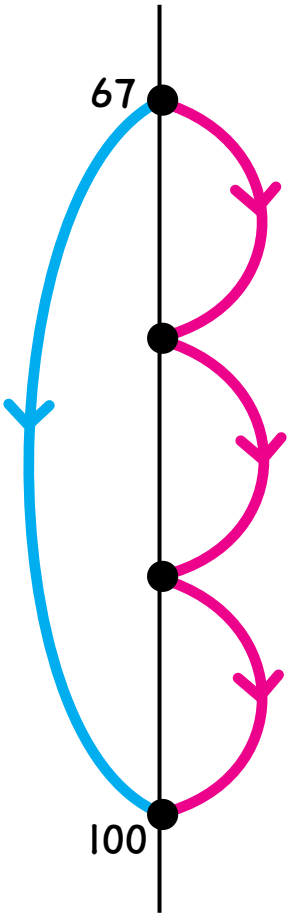


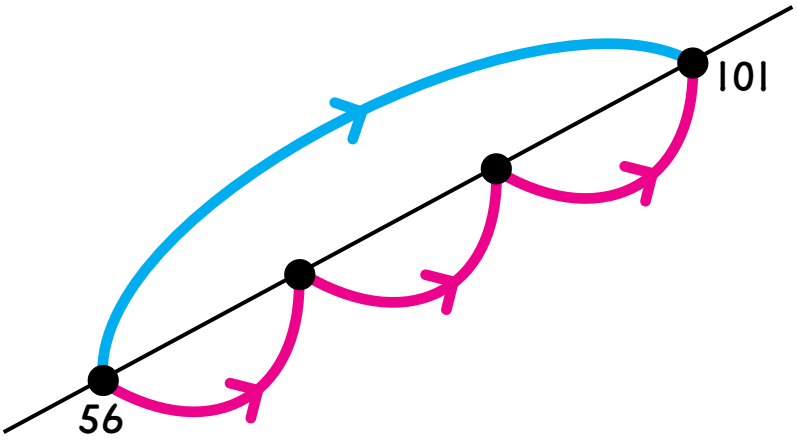
Name _____

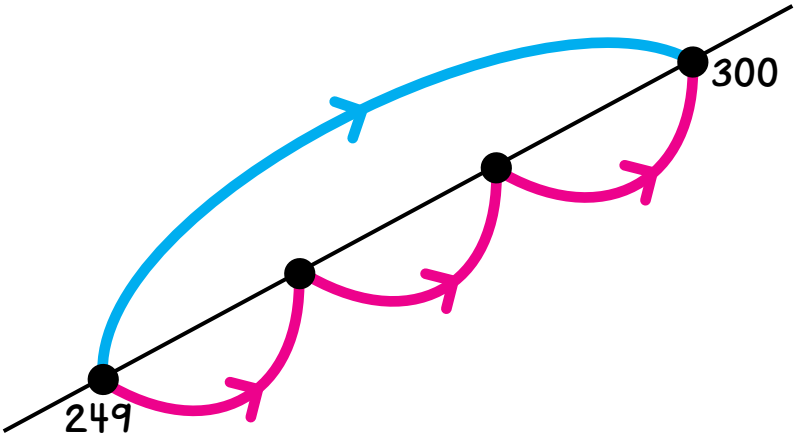
N8 **

Label the dots. Label each arrow + some whole number.





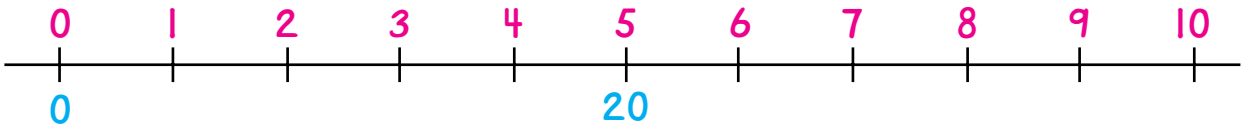


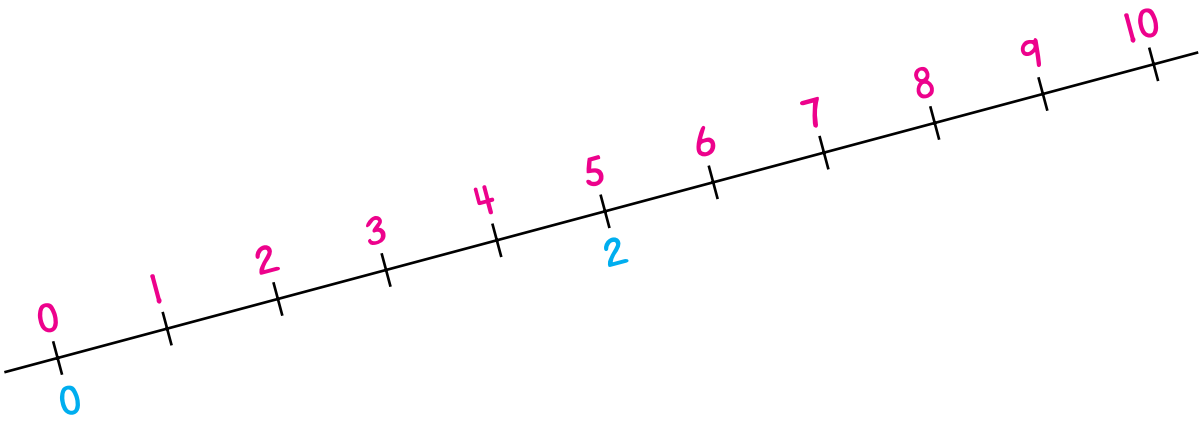


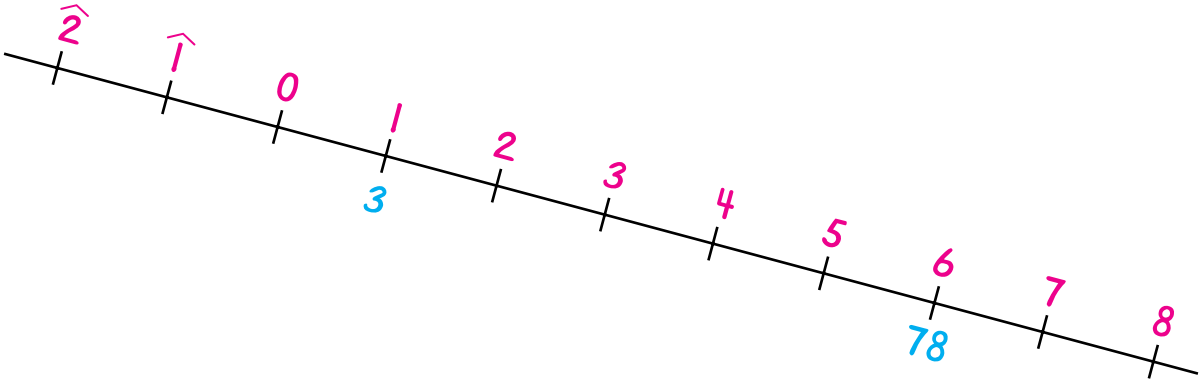
Name _____

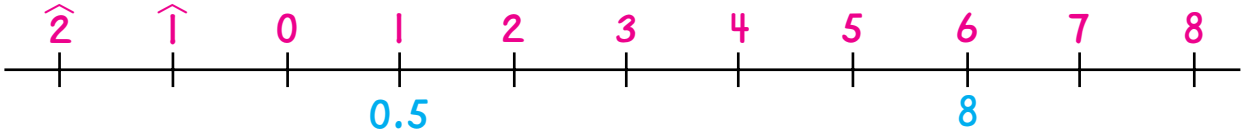
N8 ***

Label the marks using the blue scale.





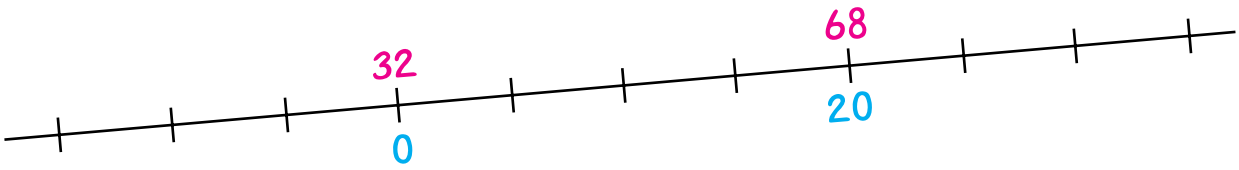


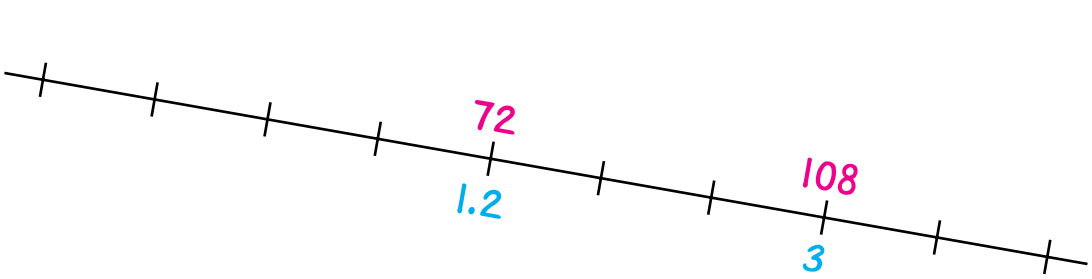


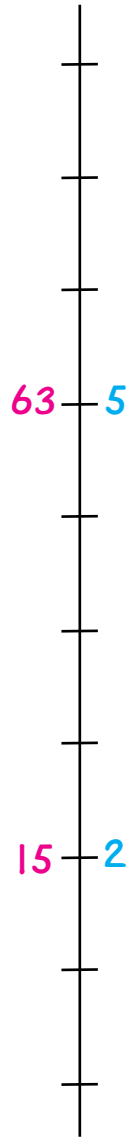
Name _____

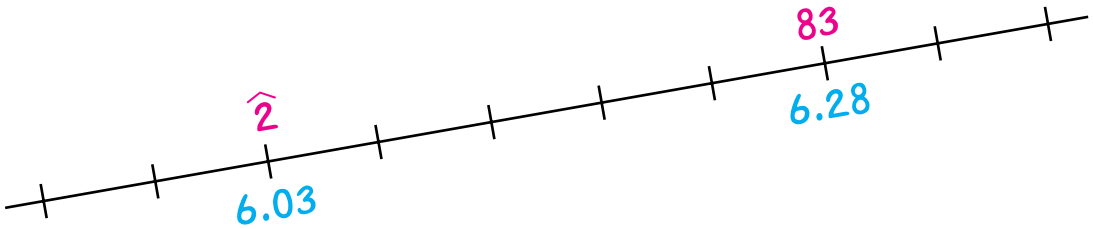
N8 ****

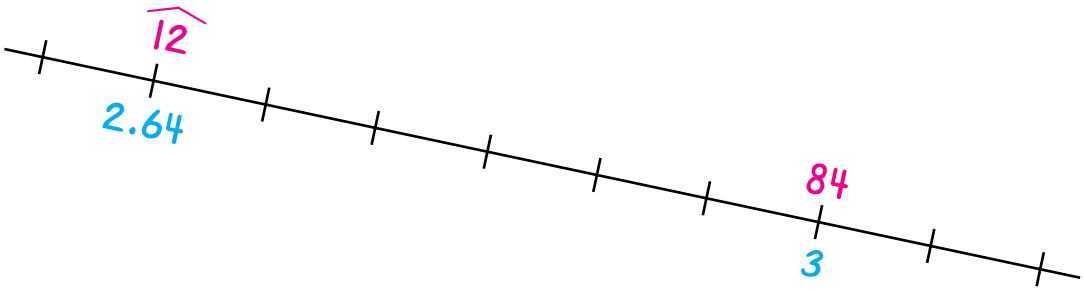
Label each mark two ways, once using the red scale and once using the blue scale.







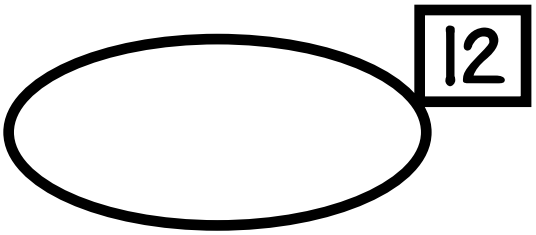




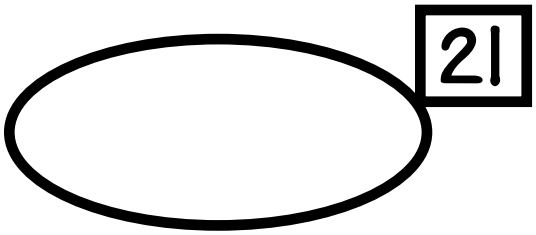
Name _____

N9 *

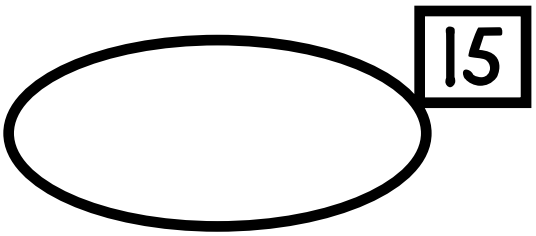
A zookeeper feeds three monkeys. Bobo eats two shares.
Complete the number sentences.



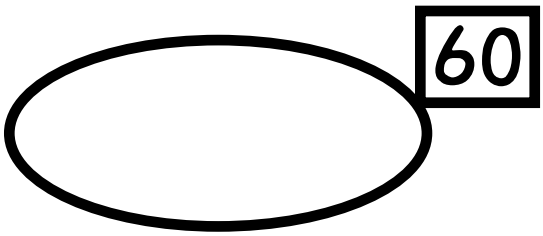
$\frac{2}{3} \times 12 =$ _____



$\frac{2}{3} \times 21 =$ _____

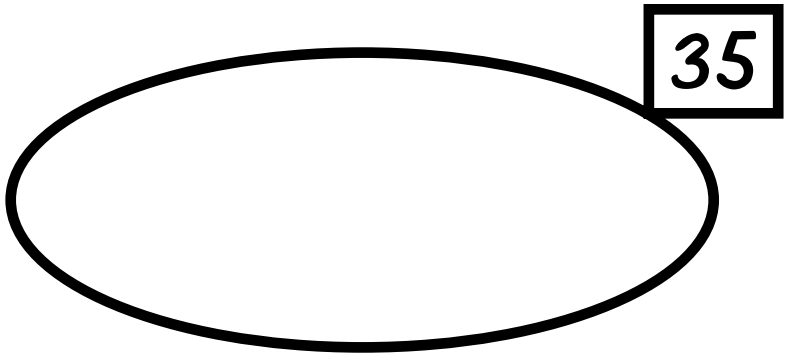


$\frac{2}{3} \times 15 =$ _____



$\frac{2}{3} \times 60 =$ _____

A zookeeper feeds 35 bananas to five monkeys.



Complete.

$\frac{1}{5} \times 35 =$ _____

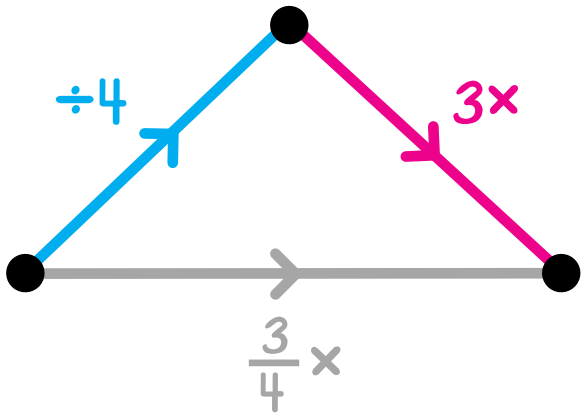
$\frac{4}{5} \times 35 =$ _____

$\frac{3}{5} \times 35 =$ _____

$\frac{5}{5} \times 35 =$ _____

Name _____

N9 **

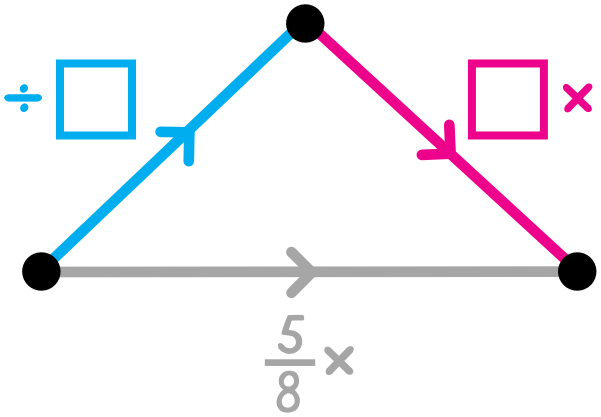


Complete.

$\frac{3}{4} \times 28 =$ _____ $\frac{3}{4} \times$ ___ $= 42$

$\frac{3}{4} \times 60 =$ _____ $\frac{3}{4} \times$ ___ $= 60$

Fill in the boxes for the blue and red arrows.



Complete.

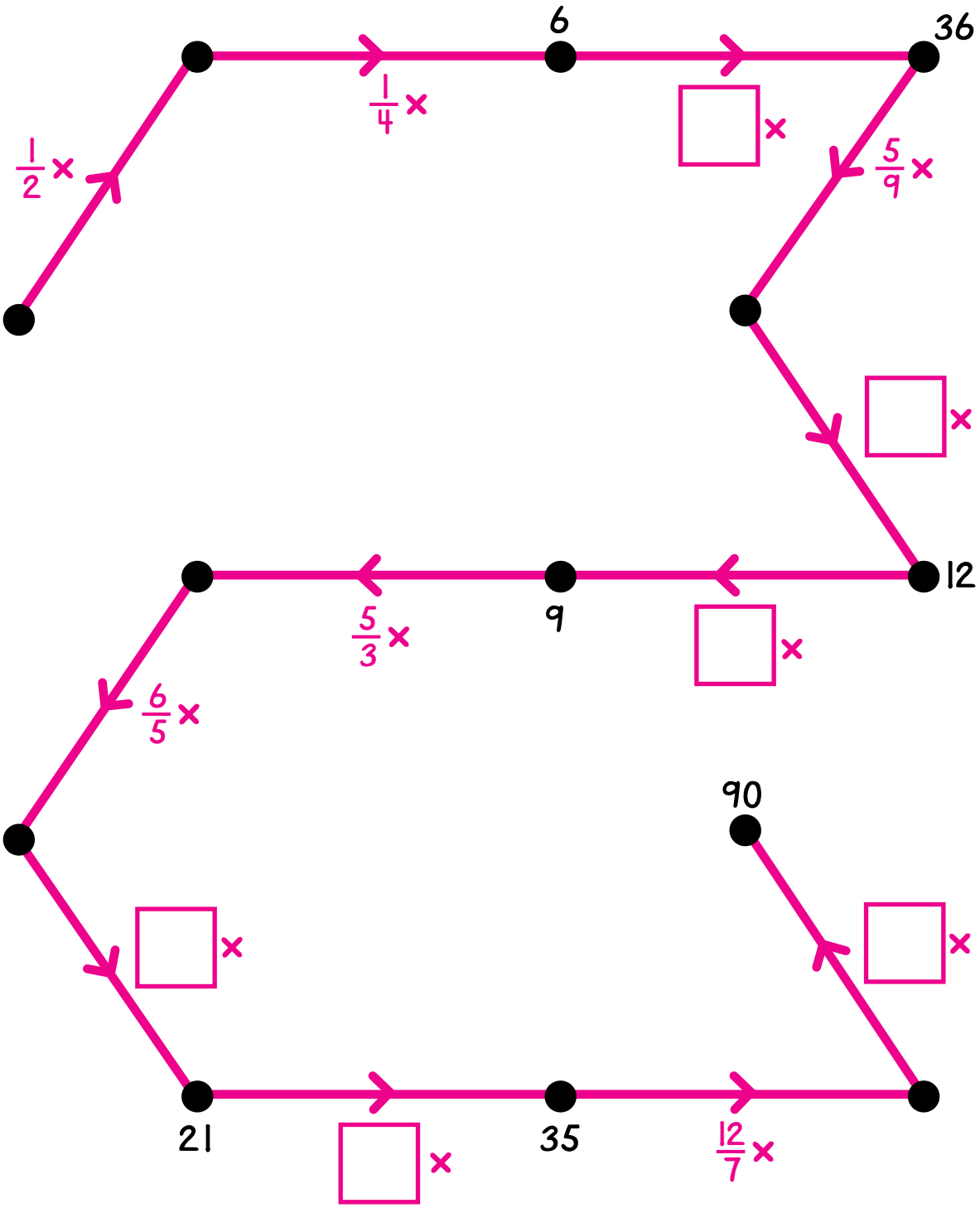
$\frac{5}{8} \times 24 =$ _____ $\frac{5}{8} \times 56 =$ _____

$\frac{5}{8} \times$ ___ $= 45$ $\frac{5}{8} \times$ ___ $= 100$

Name _____

N9 ***

Label the dots and fill in the boxes for the arrows.



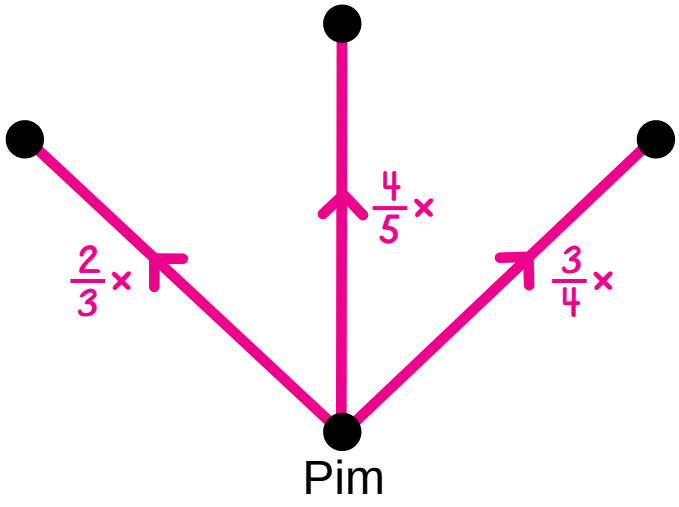
Name _____

N9 ****

Pim is a secret number.

Clue 1

In this picture, all of the dots are for positive whole numbers.



Pim could be _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and so on.

Clue 2

Pim is a square number less than 1 000.

Who is Pim? _____

Name _____

N11 *

Nabu must place 390 bottles into cartons that hold 12 bottles each. Build an arrow road to calculate the number of cartons he can fill.

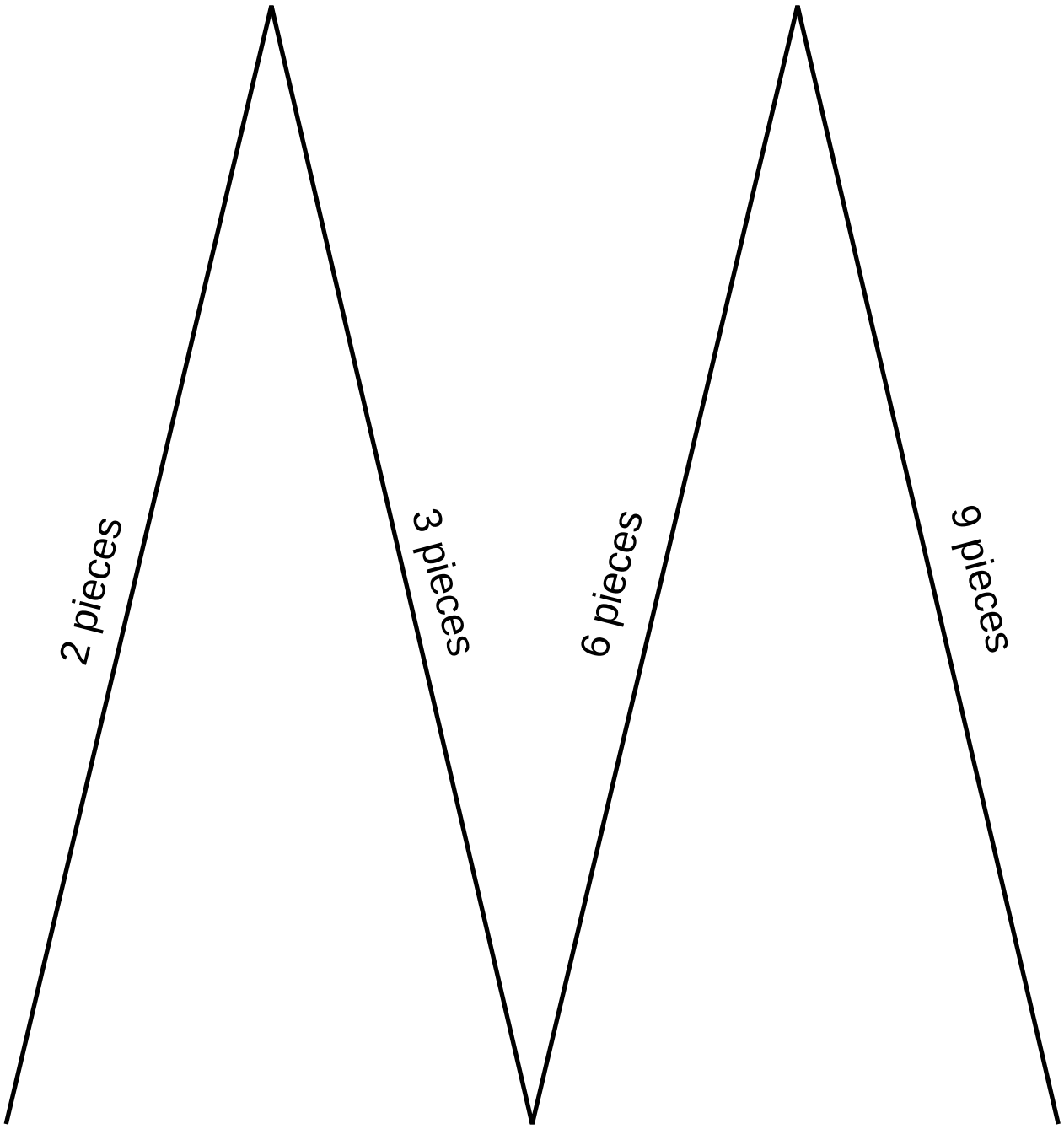
How many cartons can Nabu fill? _____

How many bottles will be left over? _____

Name _____

N11 **

Use a ruler to divide each line segment into the indicated number of pieces all the same size.



Name _____

N11 ***

Nabu must place 1120 bottles in cartons that hold 21 bottles each. Build an arrow road to calculate the number of cartons he can fill.

How many cartons can Nabu fill? _____

How many bottles will be left over? _____

Use your arrow road to fill in the boxes of this division problem.

$$\begin{array}{r} \square\ R = \square \\ 21\overline{)\,1120} \end{array}$$

Name _____

N11 ****

Use an arrow road to solve this problem.

$$75\overline{)25\,890}$$

Fill in the boxes.

$$75\overline{)25\,890}\quad \square \text{ R} = \square$$

Name _____ N12 *

Add one pair of parentheses to make each number sentence true.

$5 + 4 \times 7 = 33$ $5 + 4 \times 7 = 63$

$9 - 4 + 8 = \widehat{3}$ $9 - 4 + 8 = 13$

$11 - 8 \div 2 = 1.5$ $11 - 8 \div 2 = 7$

Complete.

$((4 \times 6) - 3) + 5 =$ ____ $4 \times (6 - (3 + 5)) =$ ____

$(4 \times 6) - (3 + 5) =$ ____ $(4 \times 6) - (3 + 5) =$ ____

$(4 \times (6 - 3)) + 5 =$ ____ $4 \times ((6 - 3) + 5) =$ ____

Name _____

N12 **

Add one pair of parentheses to make each number sentence true.

$(3 \times 6) + 4 \times 4 = 88$

$(3 \times 6) + 4 \times 4 = 34$

$3 \times (6 + 4) \times 4 = 120$

$3 \times 6 + (4 \times 4) = 66$

Add two pairs of parentheses to make each number sentence true.

$2 \times 9 + 3 \div 10 = 2.4$

$2 \times 9 + 3 \div 10 = 18.3$

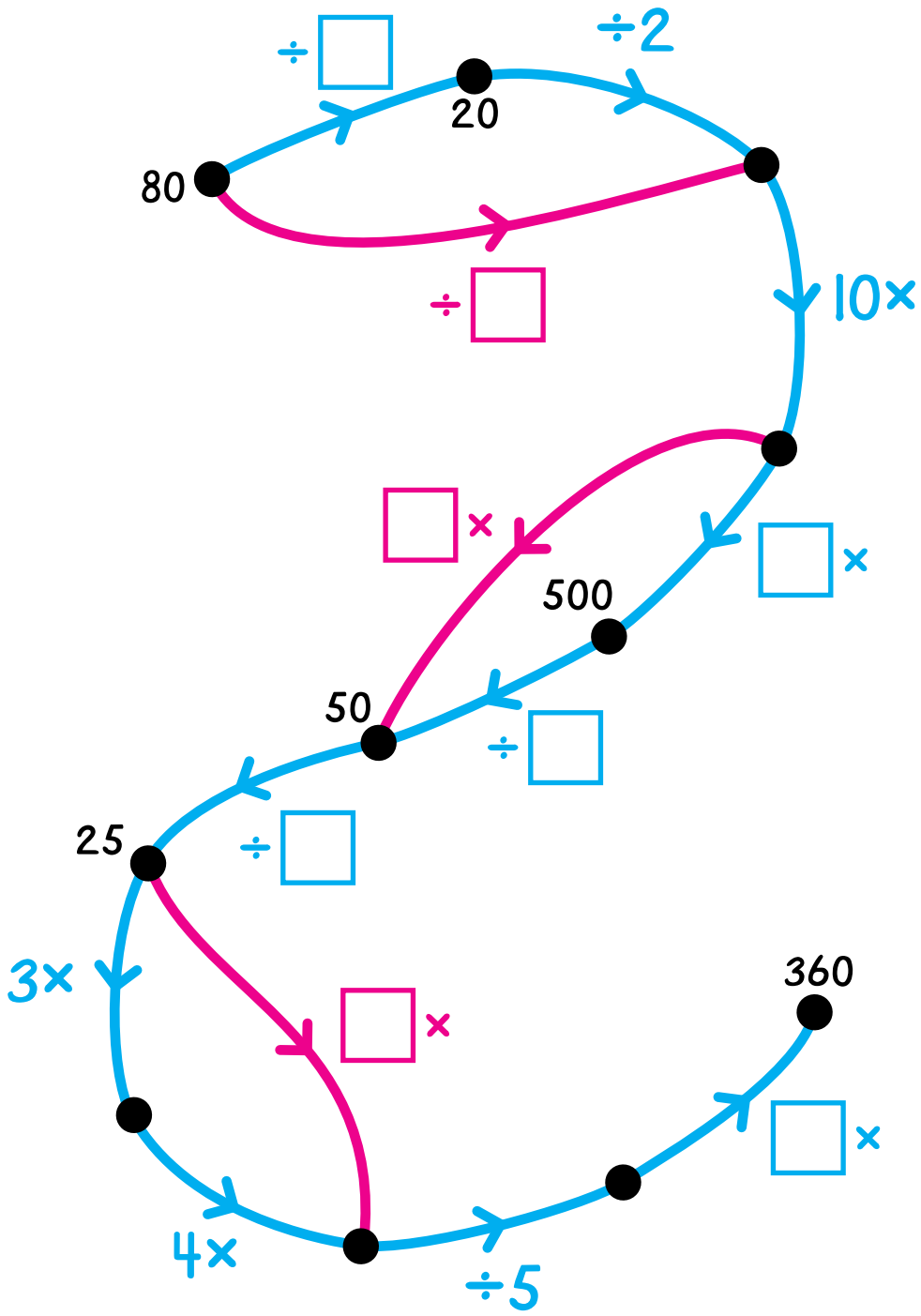
$2 \times 9 + 3 \div 10 = 18.6$

$2 \times 9 + 3 \div 10 = 2.1$

Name _____

N13 *

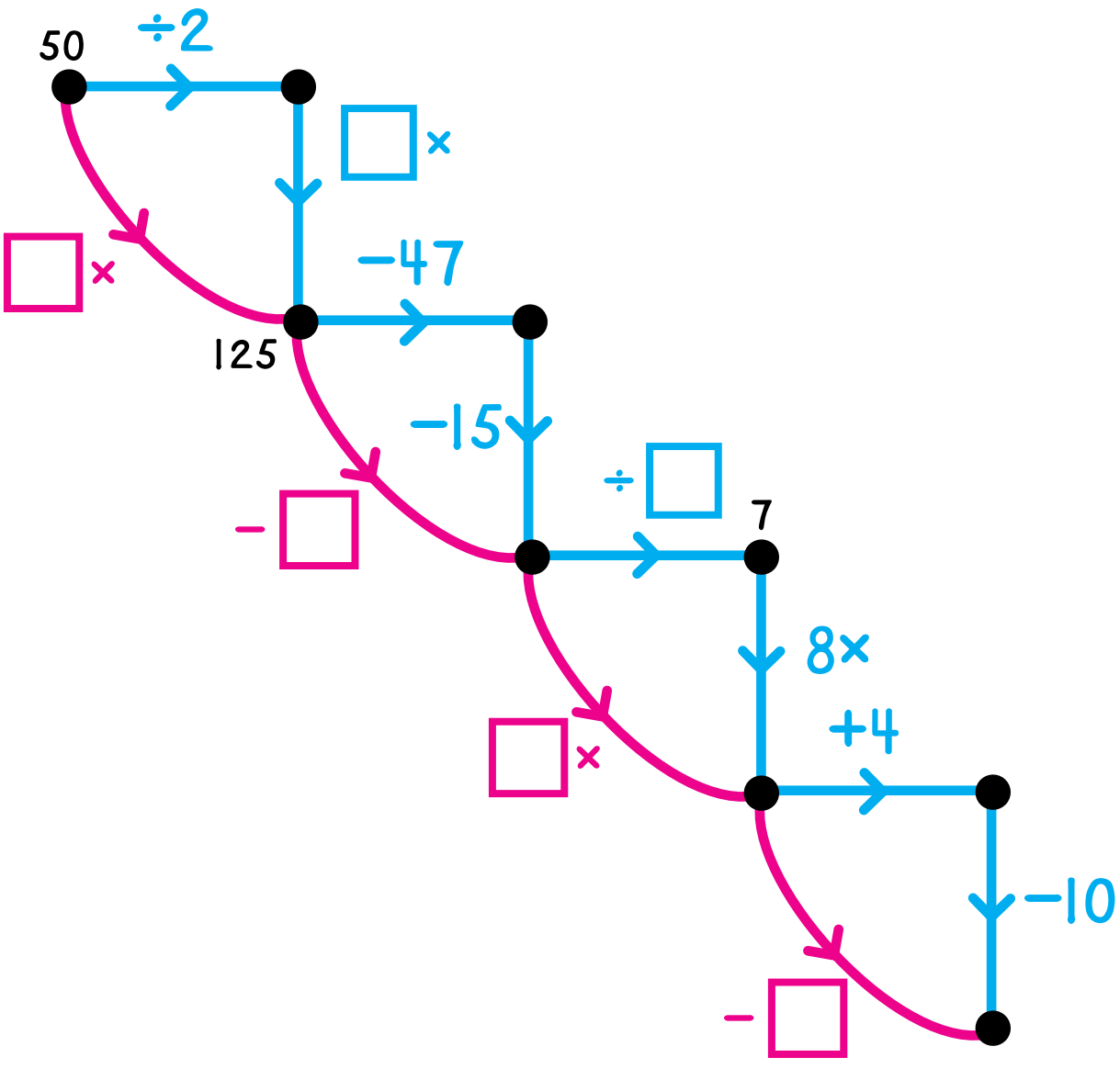
Label the dots and fill in the boxes for the arrows.



Name _____

N13 **

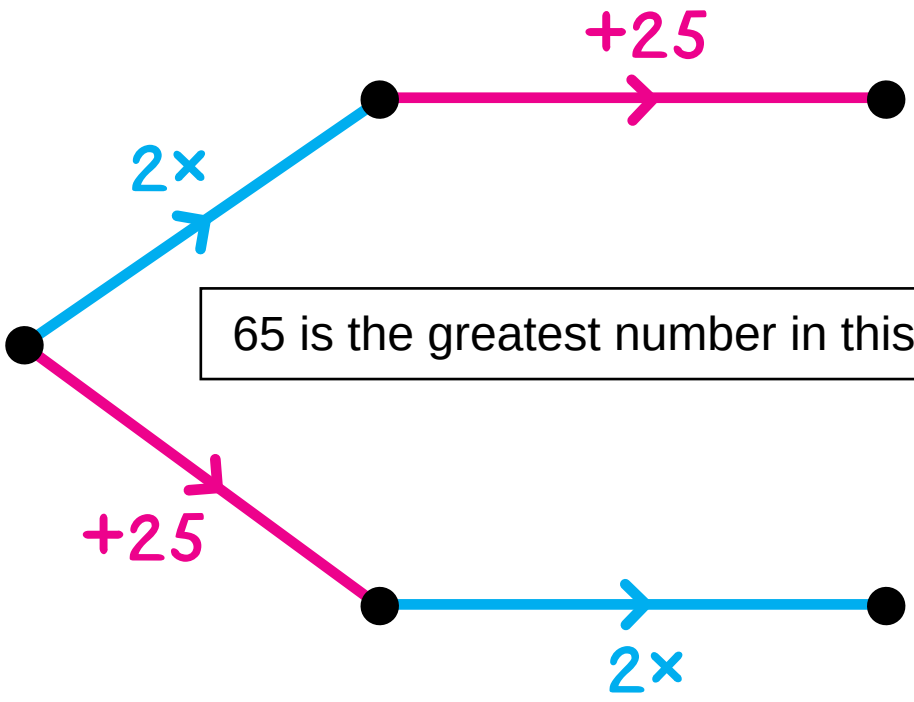
Label the dots and fill in the boxes for the arrows.



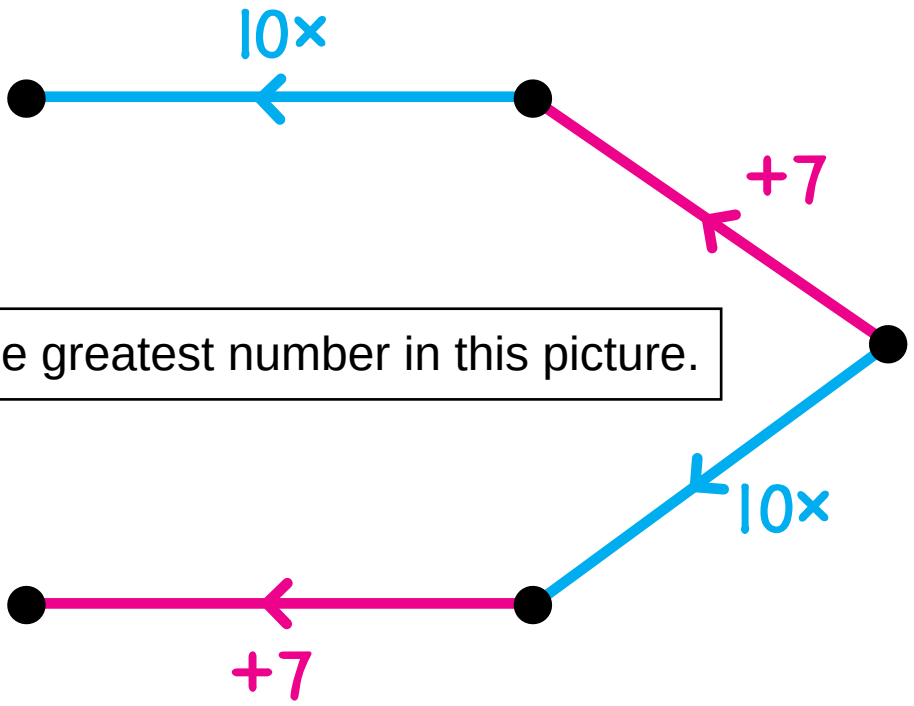
Name _____

N13 ***

Label the dots.



65 is the greatest number in this picture.



86 is the greatest number in this picture.

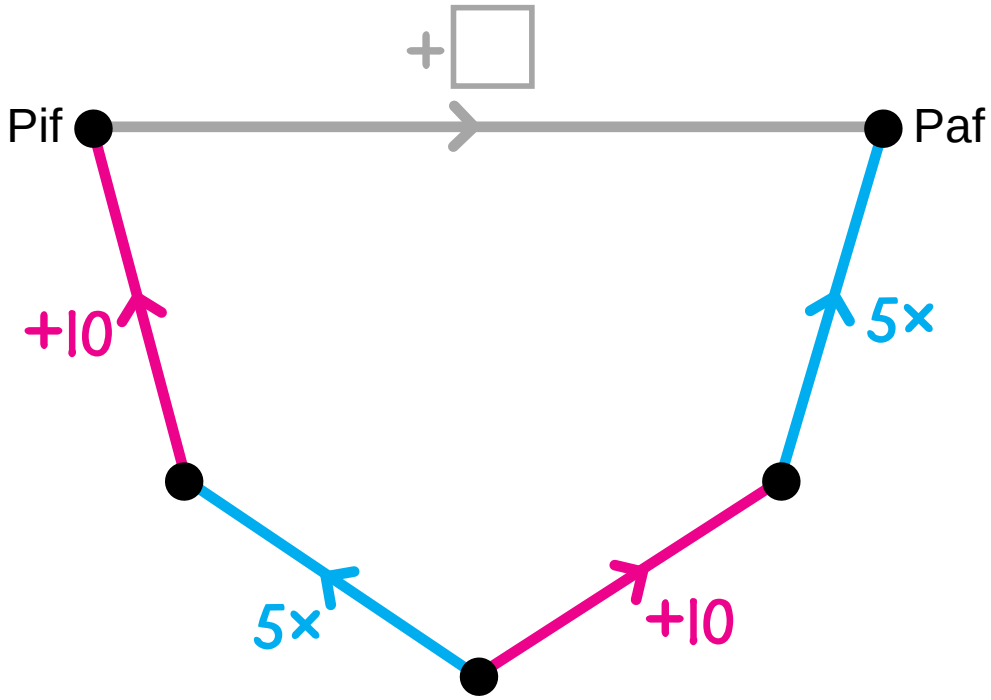
Name _____

N13 ****

Pif and Paf are two secret numbers.

Clue 1

Fill in the box for the arrow from Pif to Paf.



Clue 2

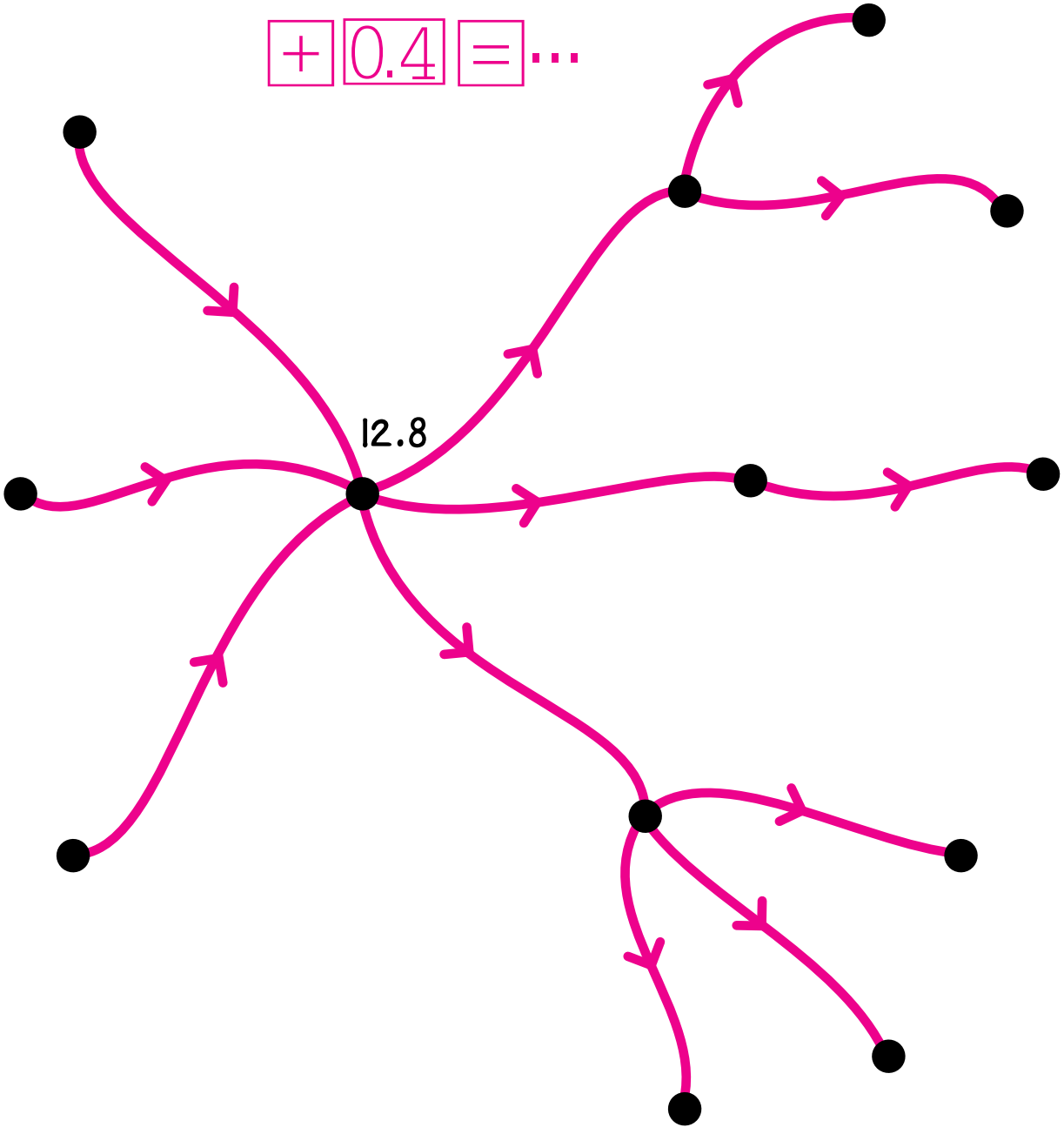
Who is Pif? _____

Who is Paf? _____

Name _____

N14 *

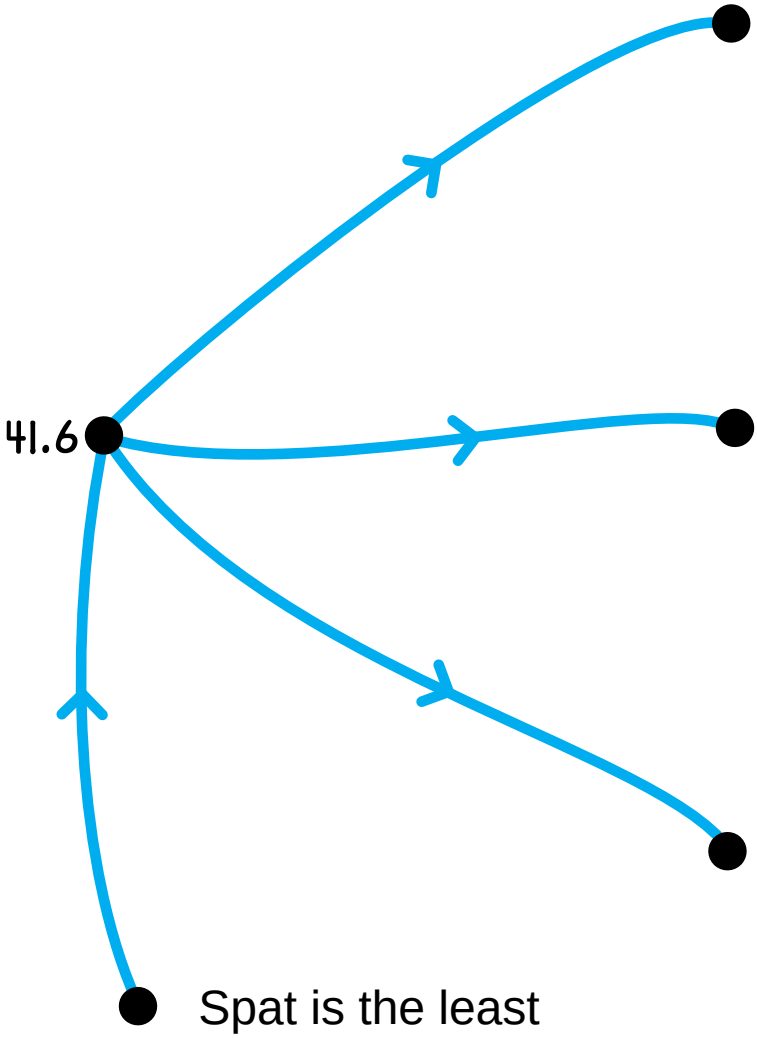
Label the dots. Many solutions are possible.



Name _____

N14 **

+ 0.5 = ...



Spot is the least number greater than 100 that could be here.
Who is Spot? _____

Spoc is the greatest number less than 100 that could be here.
Who is Spoc? _____

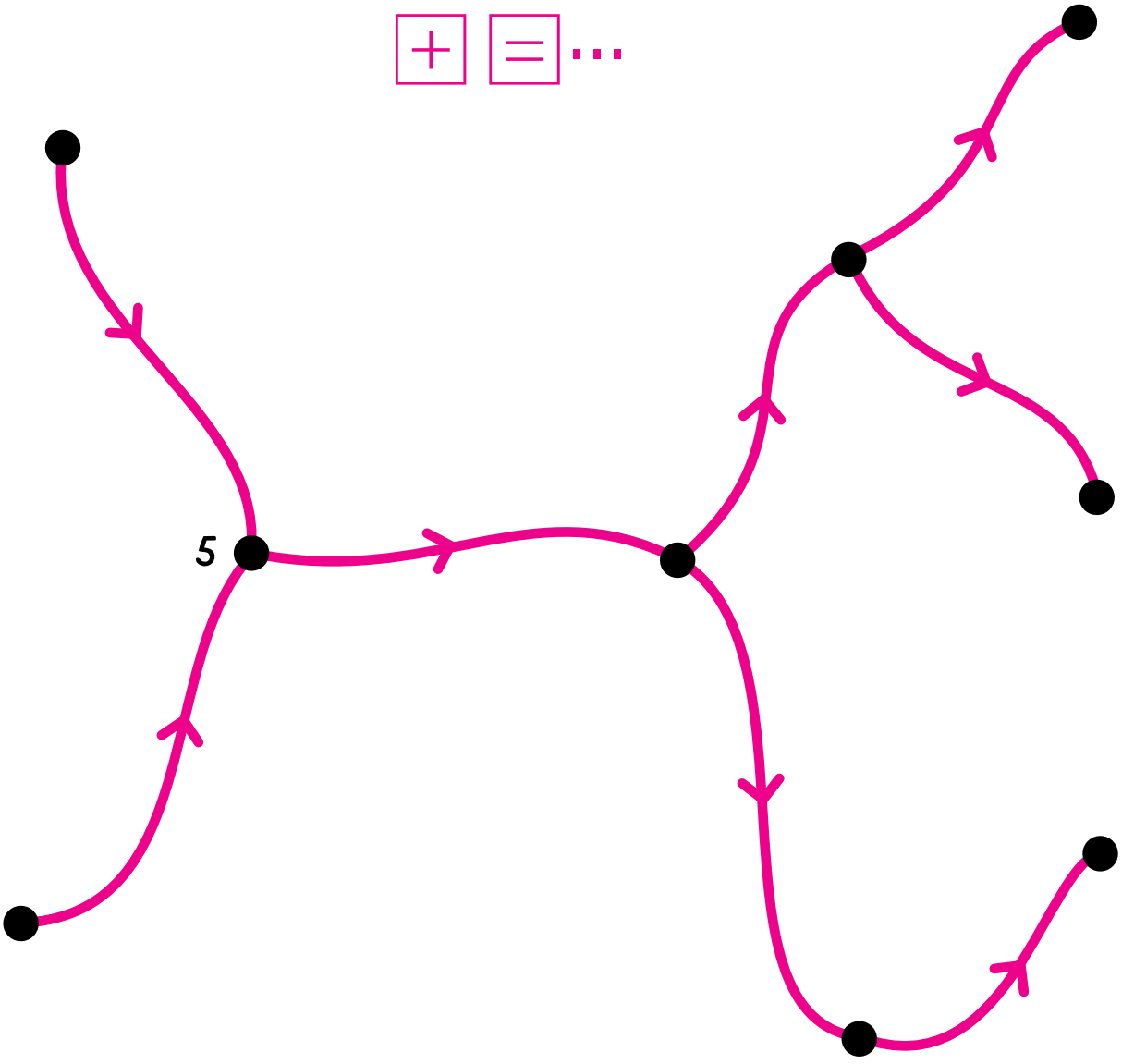
Span is the least number greater than 278.3 that could be here.
Who is Span? _____

Spat is the least positive number that could be here.
Who is Spat? _____

Name _____

N14 ***

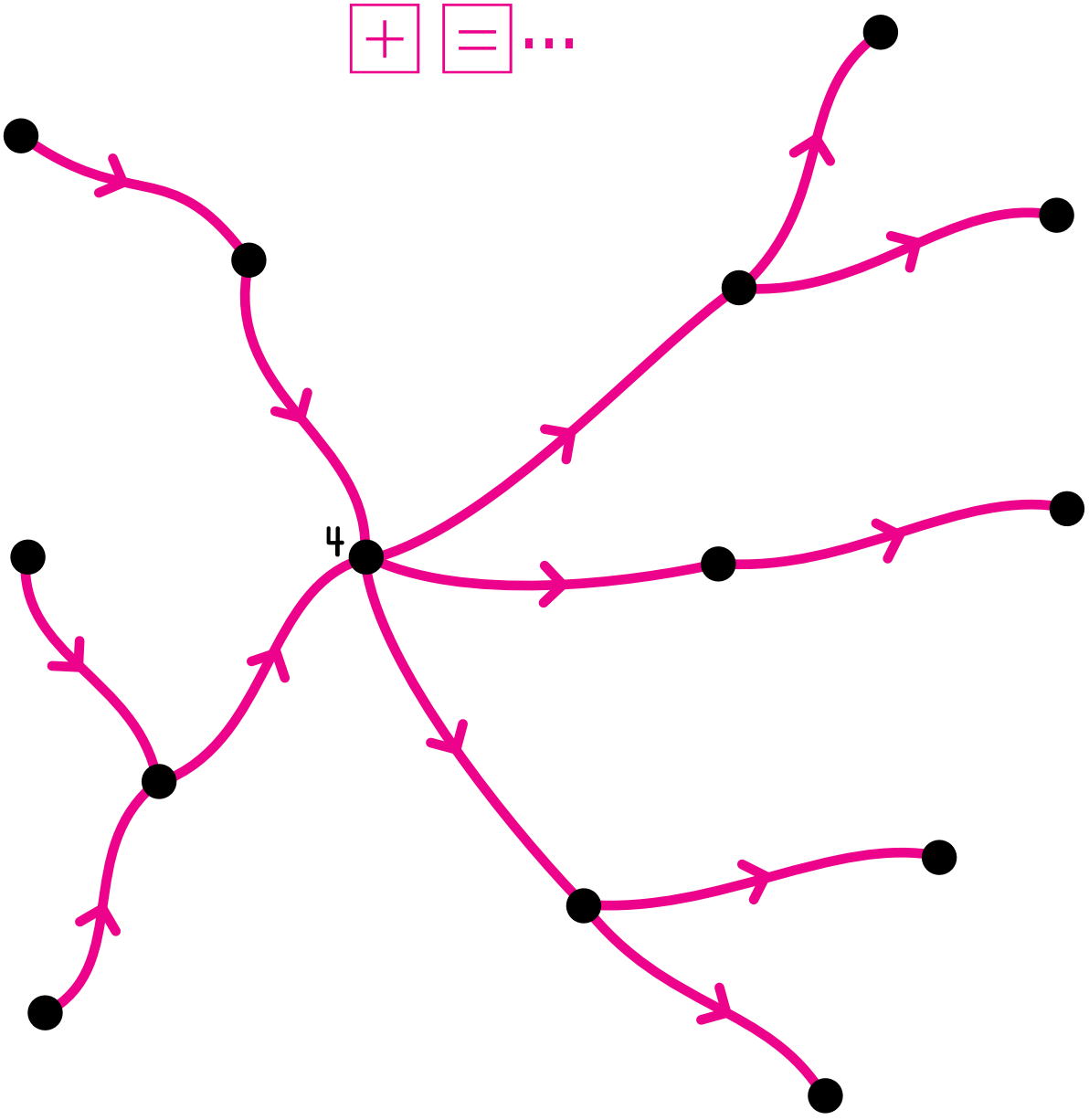
Label the dots. Label each arrow x some number. Many solutions are possible.



Name _____

N14 ****

Label the dots. Label each arrow x some number. Many solutions are possible.



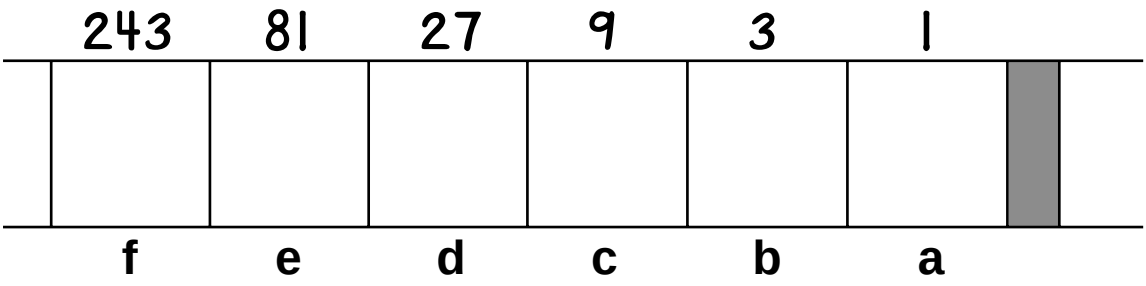
Name _____

N15

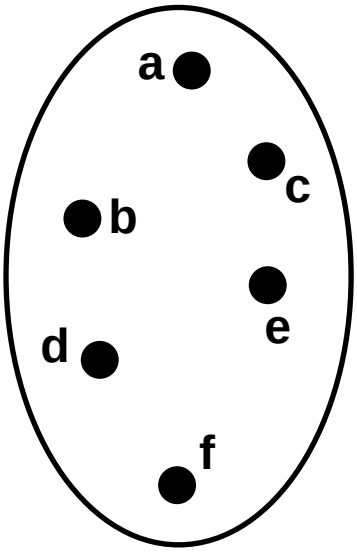
Headquarters receives this message from Boris.

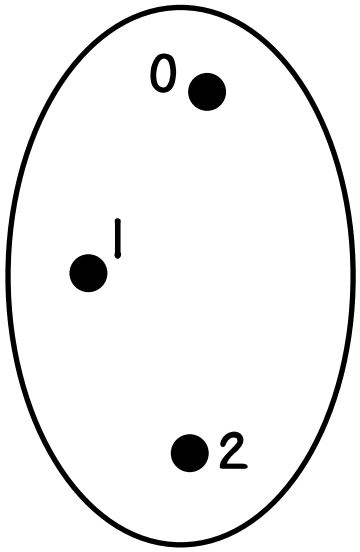
150
code 3

Put 150 on this base three abacus with two or fewer checkers on each board.



Draw arrows to show Boris's assignment.

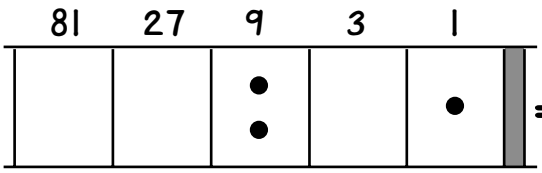
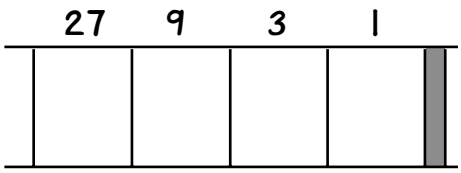
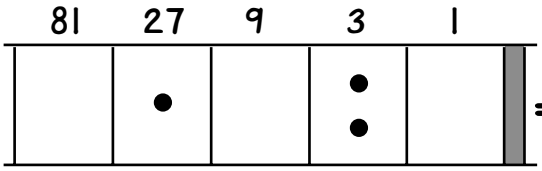
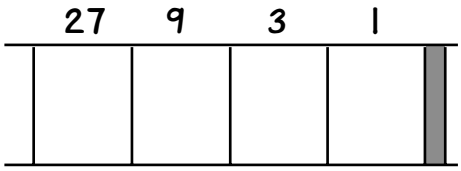
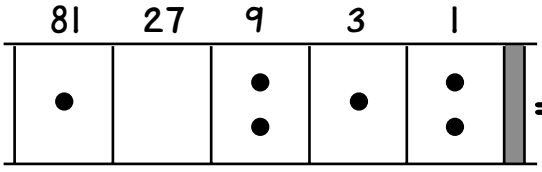
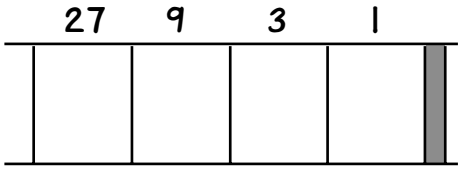
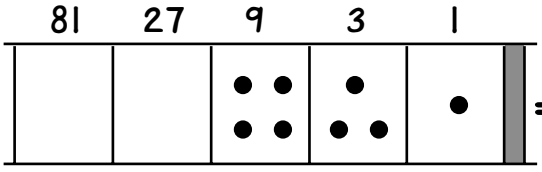
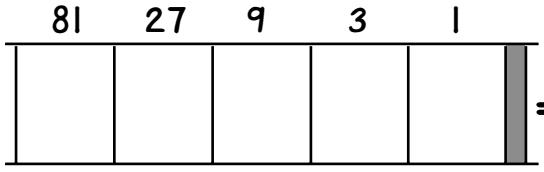




Name _____

N15 *

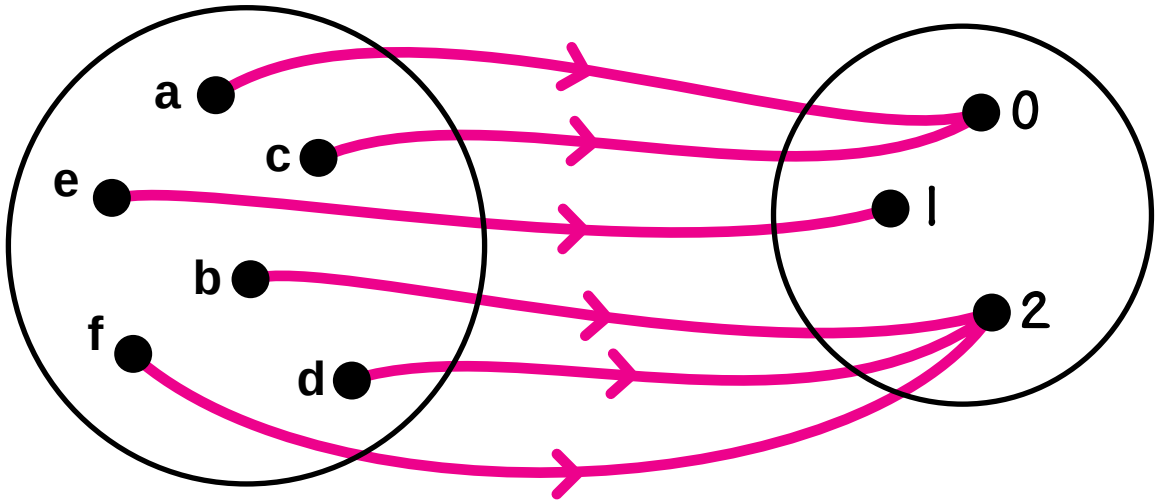
Base Three Abacus

What number is on the abacus?	Put the number on the abacus. Use at most two checkers on each board.
	
	
	
	

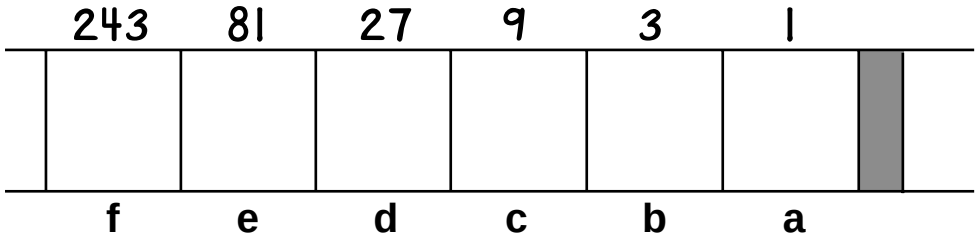
Name _____

N15 **

This arrow picture shows how Boris assigns his six helpers to watch three bridges.



Show the assignment on this base three abacus.



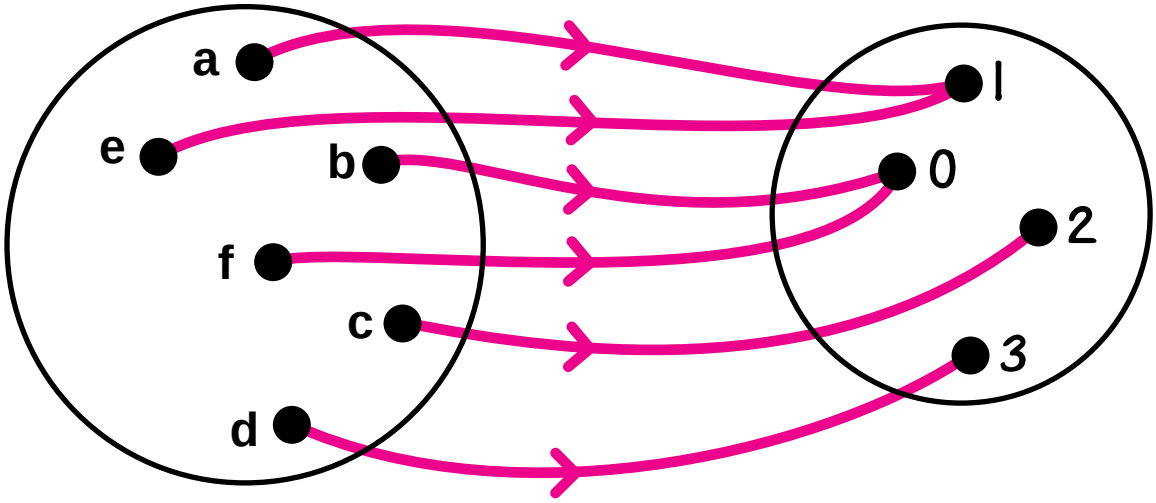
Write the secret message Boris sends to Headquarters to tell them the assignment.

_____ code *3*

Name _____

N15 ***

Today Boris has four bridges to observe. This arrow picture shows how he assigns his six helpers.



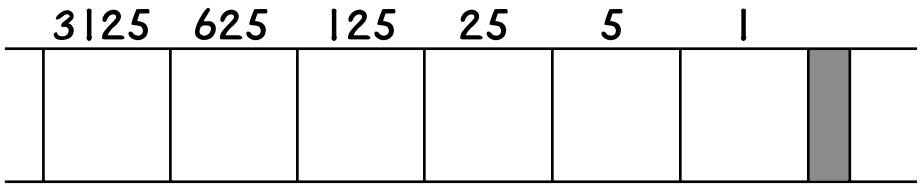
Because there are now four bridges, Boris must change his code. Can you change Boris's code to send this message secretly? Explain.

Write Boris's message here.

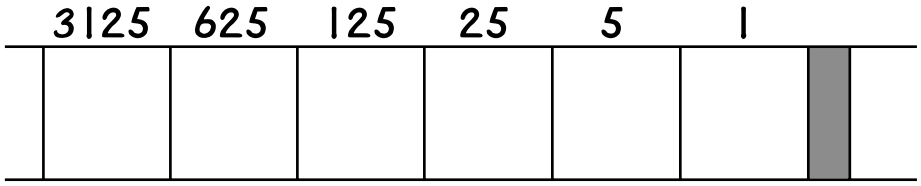
Name _____

N16

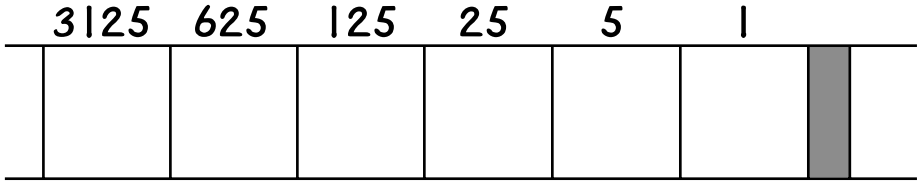
Put each number on the base five abacus.



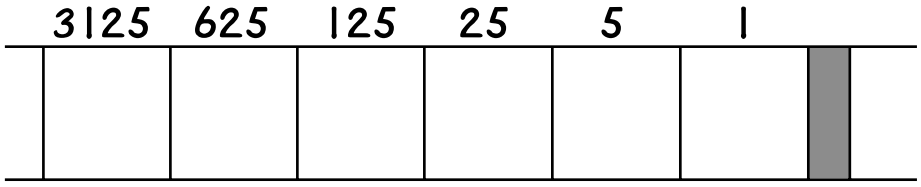
= 12



= 60

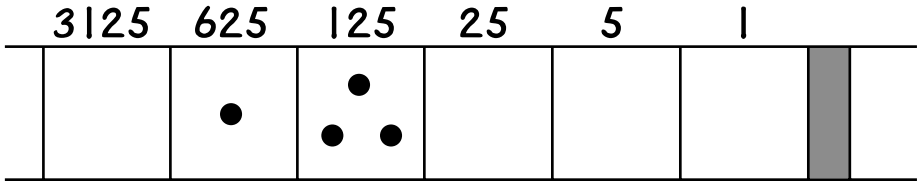


= 300



= 1500

What number is on this base five abacus?

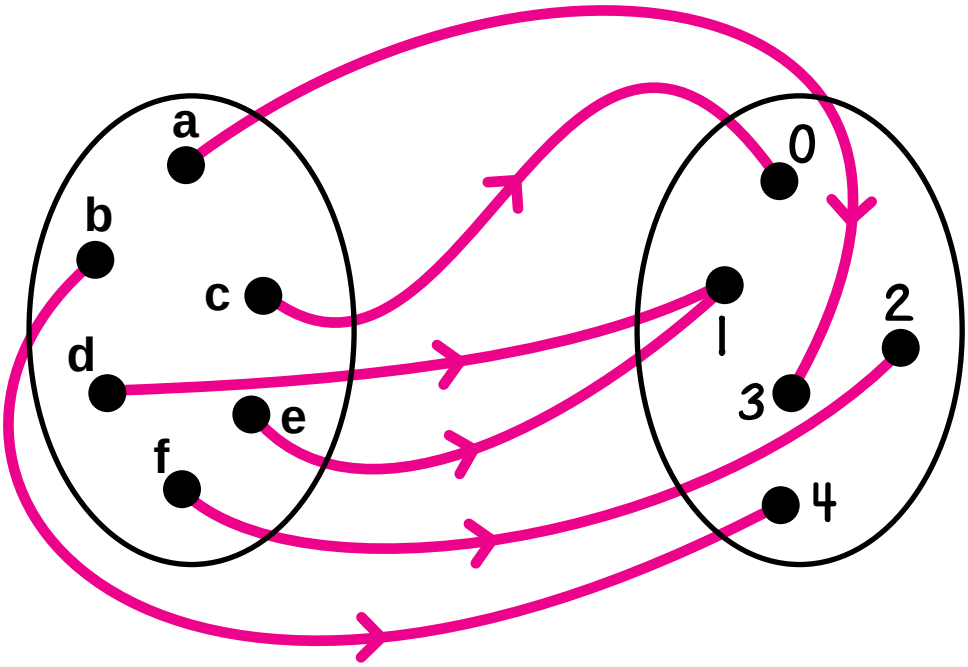


= _____

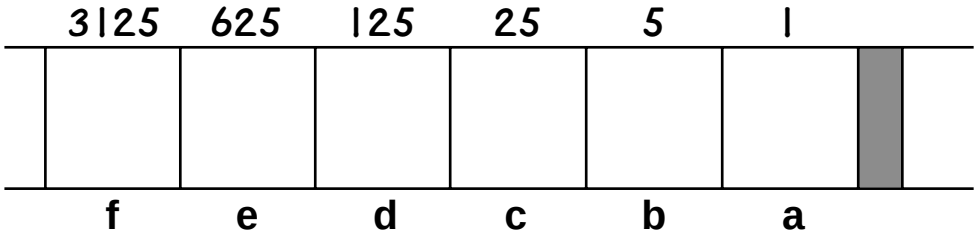
Name _____

N16 *

Natasha posts this spy assignment on the bulletin board.



Draw checkers to show this assignment on a base five abacus.



What number does Natasha send to Headquarters?

_____ code 5

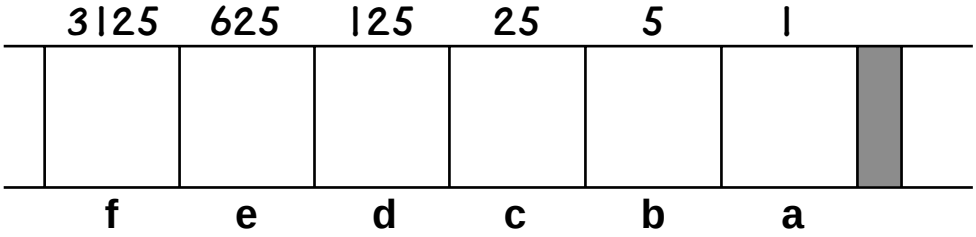
Name _____

N16 **

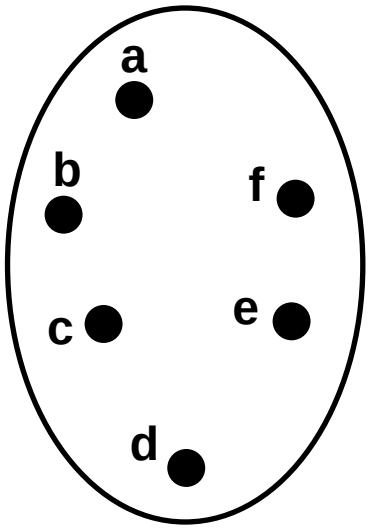
Headquarters receives this message from Natasha. Headquarters needs to know which spies are watching bridge 2 today.

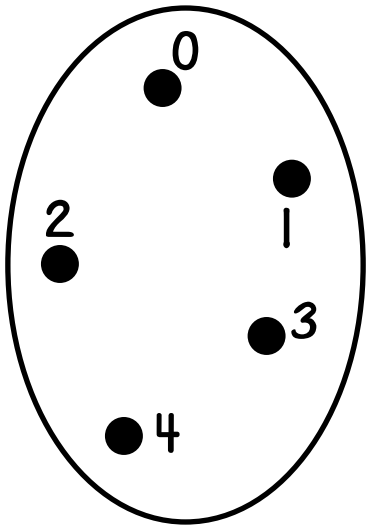
1647 code 5

Put this number on the base five abacus.



Draw arrows in the picture below to show Natasha's spy assignment.



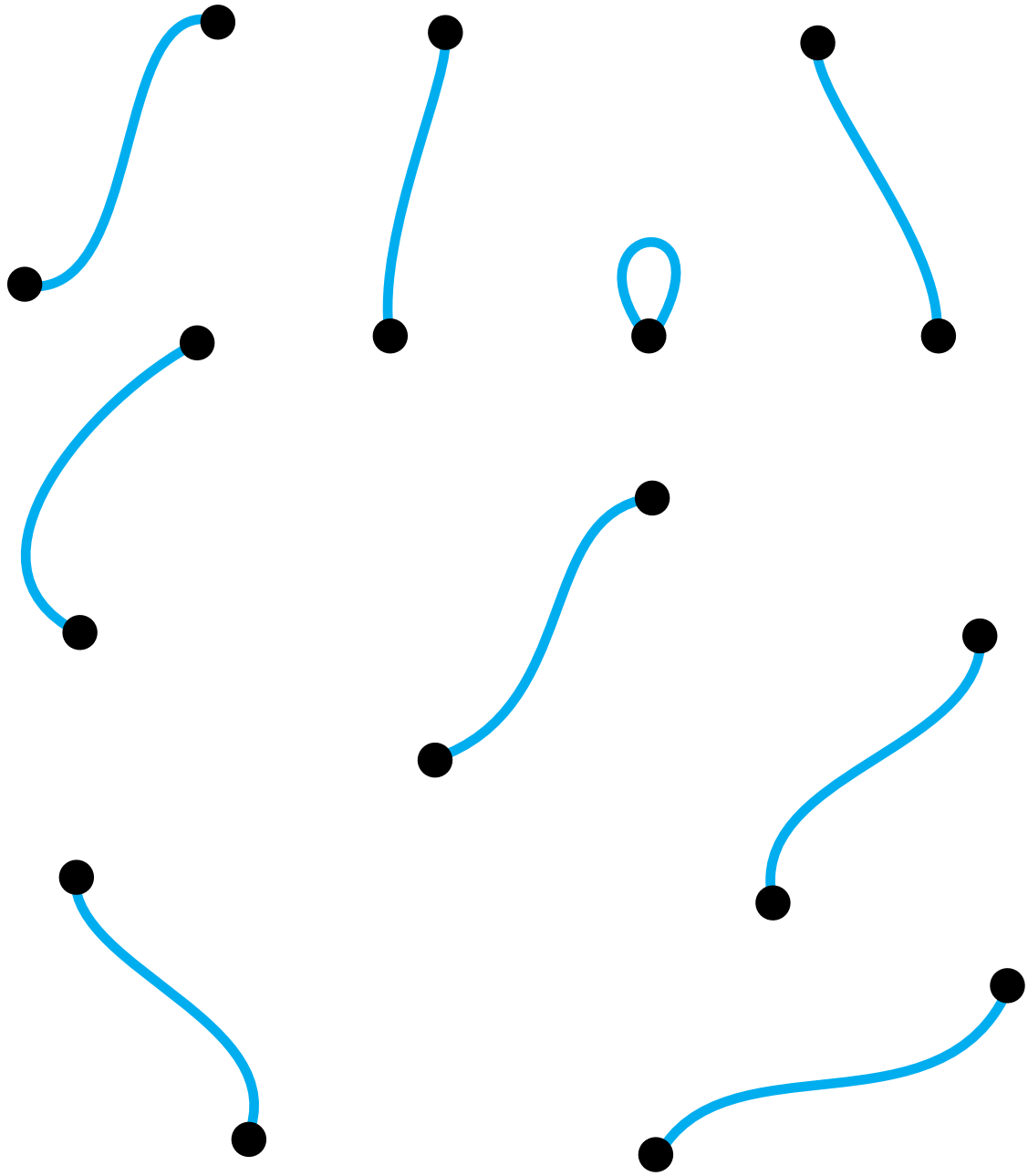


Which spies are watching bridge 2? _____

Name _____

N17 *

Two numbers are joined by a blue cord if and only if their product equals 36. Label the dots. Many solutions are possible.



Name _____

N17 **

Complete. Watch for patterns to help you.

8 × 8 =	72 ÷ 8 =
8 × 16 =	720 ÷ 8 =
8 × 1.6 =	7 200 ÷ 8 =
8 × 32 =	7 256 ÷ 8 =
8 × 320 =	7.2 ÷ 8 =
8 × 3.2 =	736 ÷ 8 =
8 × 0.32 =	73.6 ÷ 8 =
	72.56 ÷ 8 =

27.5 ÷ 5 =	15.6 × 4 =
94.5 ÷ 9 =	21.3 × 7 =
8.16 ÷ 3 =	5.62 × 6 =

Name _____

N19 *

797 soldiers march in rows of 15 soldiers each. Use an arrow road to calculate the number of rows of soldiers.

Complete.

$$15\overline{)797}\quad \square \text{ R } = \square$$

Name _____

N19 **

870 soldiers march in rows of 14 soldiers each. Use an arrow road to calculate the number of rows of soldiers.

870

●

Complete.

$$14 \overline{)\,870} \qquad \square \text{ R } = \square$$

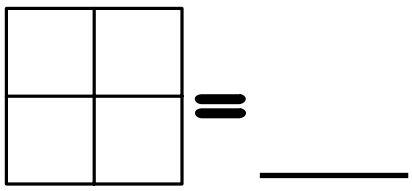
Name _____

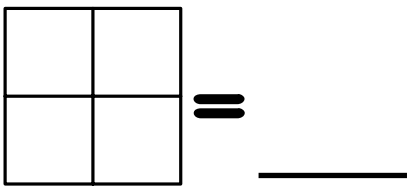
N20 *

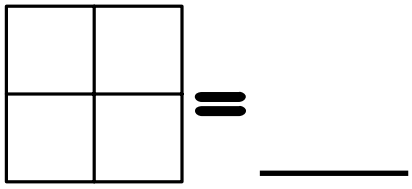
14 15 24 28 30 40 48 54 64

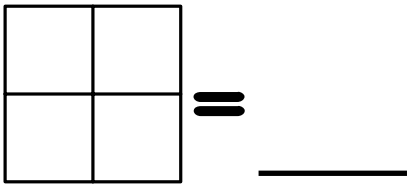
Put six of these numbers on the ones board of the Minicomputer using exactly one of these checkers for each number.

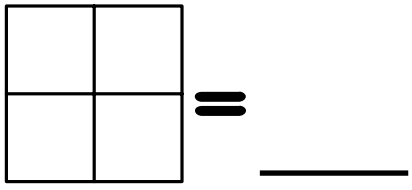
② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

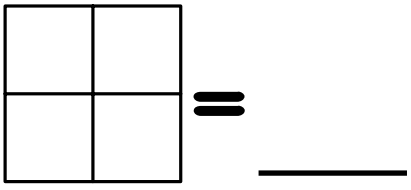
 = _____

 = _____

 = _____

 = _____

 = _____

 = _____

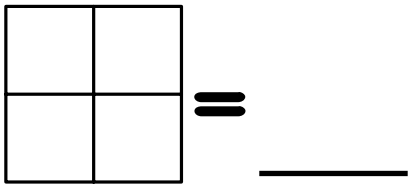
Name _____

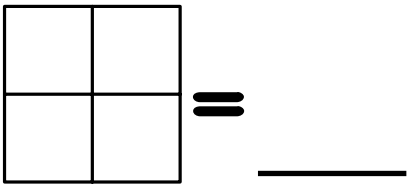
N20 **

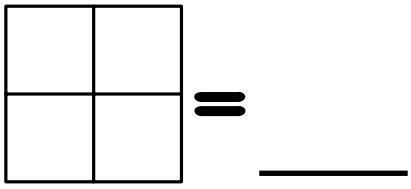
11 21 30 38 42 47 54 112 115

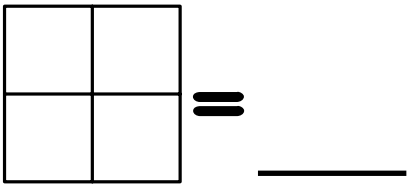
Put six of these numbers on the Minicomputer using exactly one negative checker and exactly one of these checkers for each number.

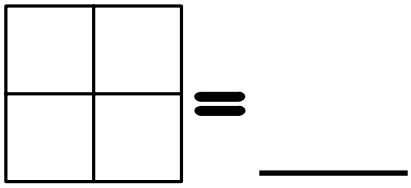
② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

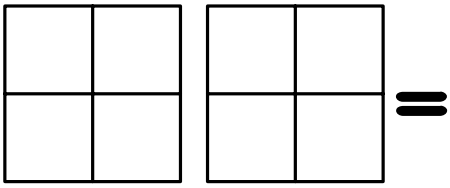
 = _____

 = _____

 = _____

 = _____

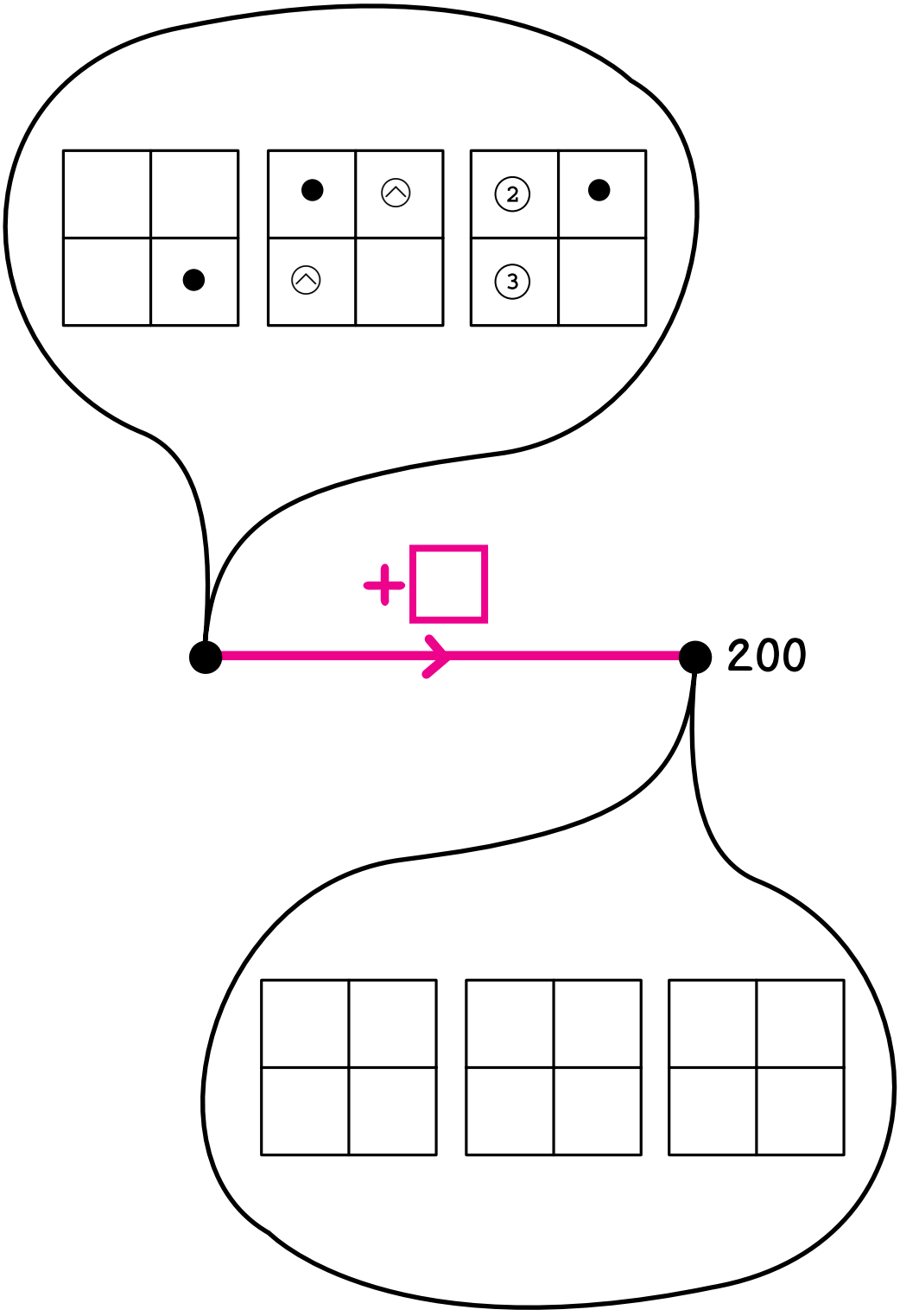
 = _____

 = _____

Name _____

N20 ***

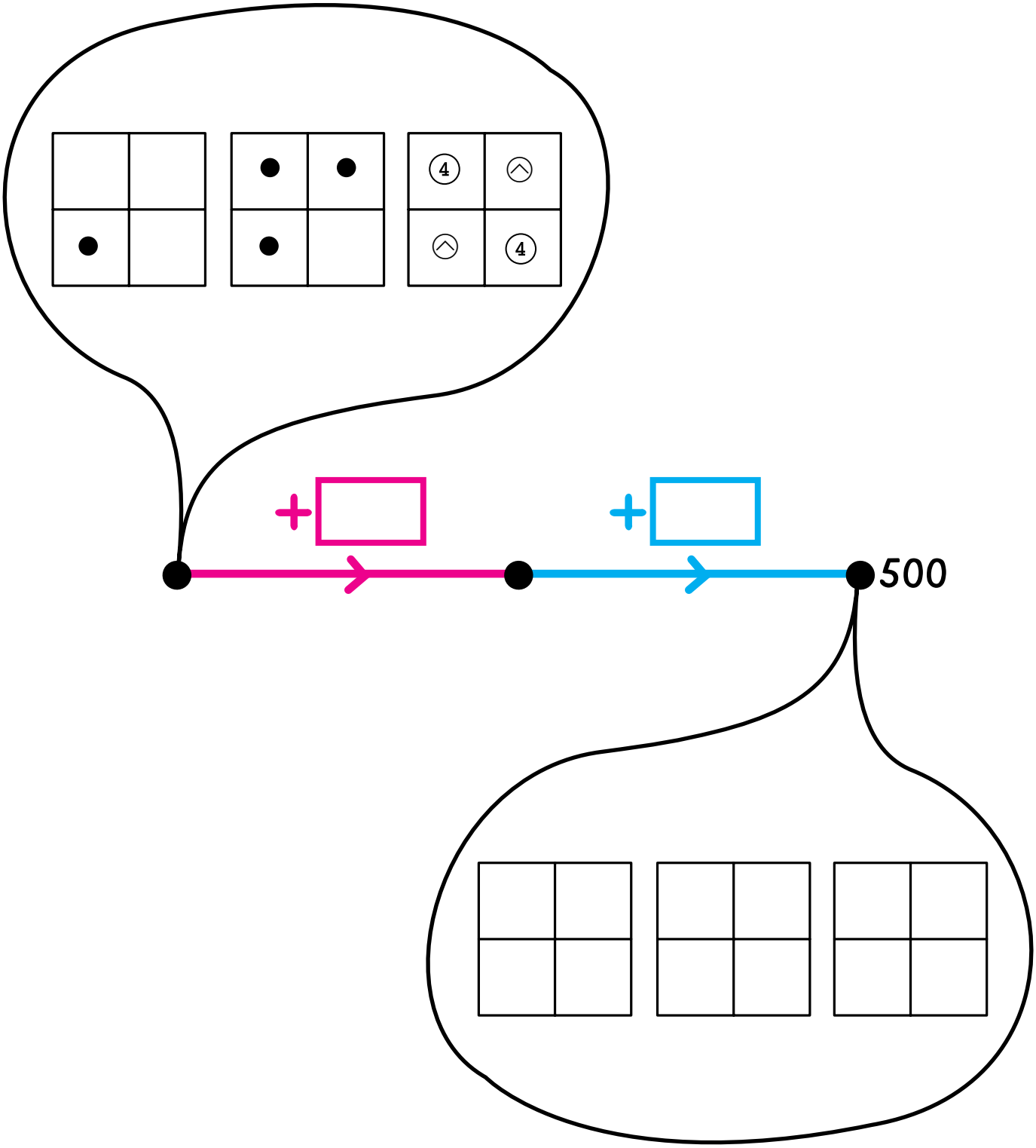
Solve this puzzle by moving exactly one checker.



Name _____

N20 ****

Solve this puzzle by moving exactly two checkers, one for each arrow.



Name _____

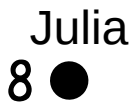
N21(a)

Clue 1

Julia lives at 8. A cheapest bus ride from Theresa's house to Julia's house costs 20¢. Draw roads to show all of the possible address numbers that Theresa could have.

+1 or −1

×10 or ÷10



Theresa's address number could be _____, _____, _____, _____, _____, _____, or _____.

Name _____

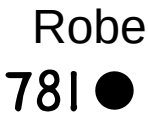
N21(b)

Clue 2

Theresa's friend Roberto lives at 781. A cheapest bus ride from Theresa's house to Roberto's house costs 30¢. Build a road to find Theresa's address number.

+1 or −1

×10 or ÷10



What is Theresa's address number?

Name _____

N22 *

Find all of the whole numbers exactly two cords from 61.

+1 or −1

×10 or ÷10

The eight numbers that are exactly two cords from 61 are ____, ____, ____, ____, ____, ____, ____, and _____.

Name _____

N22 **

Draw a road to show the greatest number exactly five cords from 692.

+1 or −1

×10 or ÷10

Draw a road to show the least whole number exactly five cords from 692.

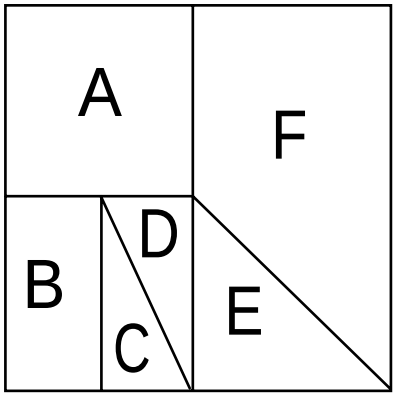
+1 or −1

×10 or ÷10

Name _____

N23 *

What fraction of the whole shape is each region?



A ____ D ____

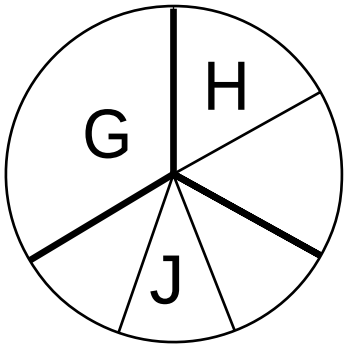
B ____ E ____

C ____ F ____

Complete.

$\frac{1}{4} = \frac{\square}{8}$ $\frac{1}{4} = \frac{\square}{16}$ $\frac{1}{2} = \frac{\square}{8}$

What fraction of the whole shape is each region?



G ____

H ____

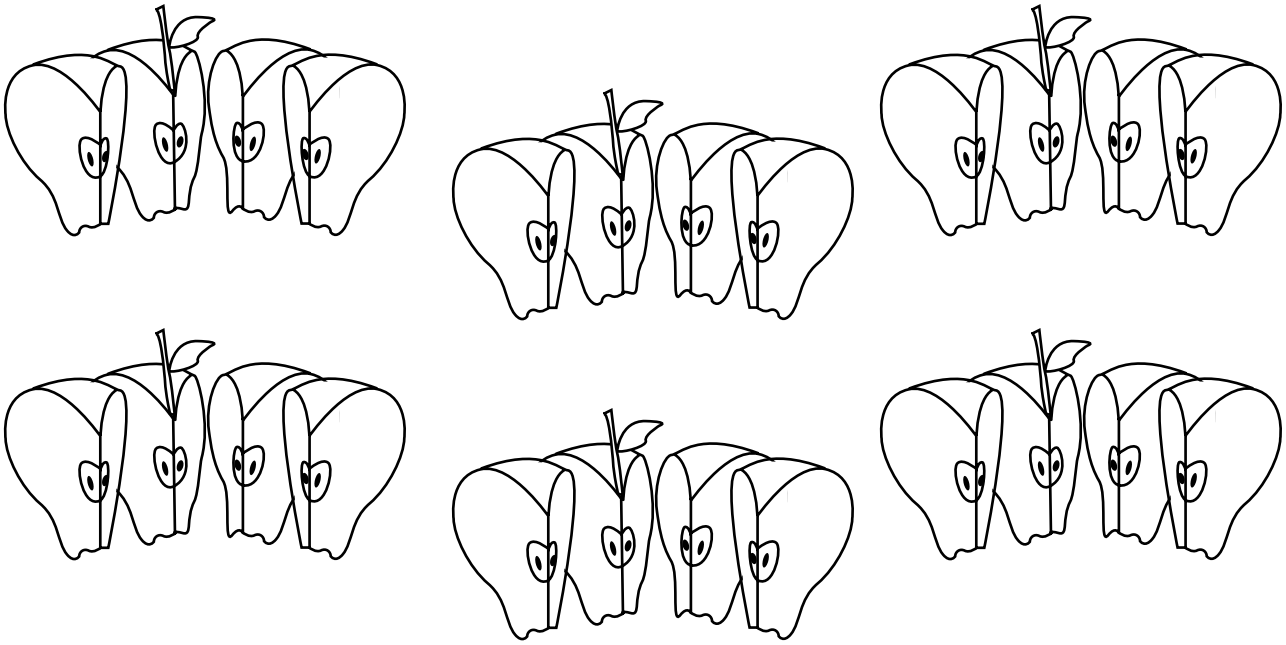
J ____

Complete.

$\frac{1}{3} = \frac{\square}{6} = \frac{\square}{9} = \frac{\square}{12} = \frac{\square}{15}$

Name _____

N23 **



Complete.

$\frac{3}{4} + \frac{1}{4} =$ _____

$1\frac{1}{4} + 3\frac{3}{4} =$ _____

$1 - \frac{1}{4} =$ _____

$5 - 2\frac{1}{4} =$ _____

$\frac{3}{4} + \frac{1}{2} =$ _____

$1\frac{3}{4} + 2\frac{1}{2} =$ _____

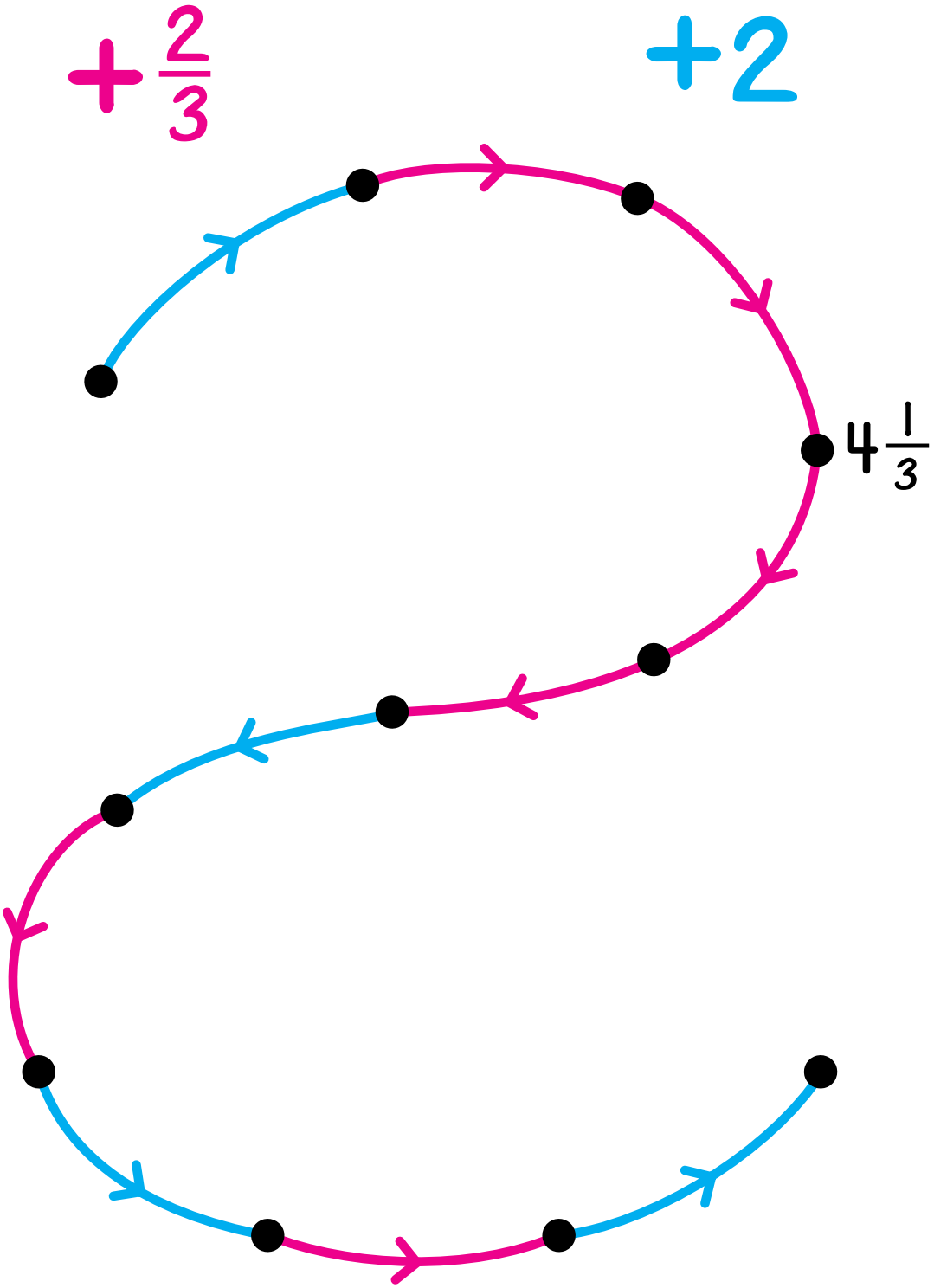
$3 \times \frac{3}{4} =$ _____

$\frac{1}{2} \div 2 =$ _____

Name _____

N23 ***

Label the dots.



Name _____

N24 *

Build an arrow road from 1 to 10. Try to use fewer than seven of these red and blue arrows.

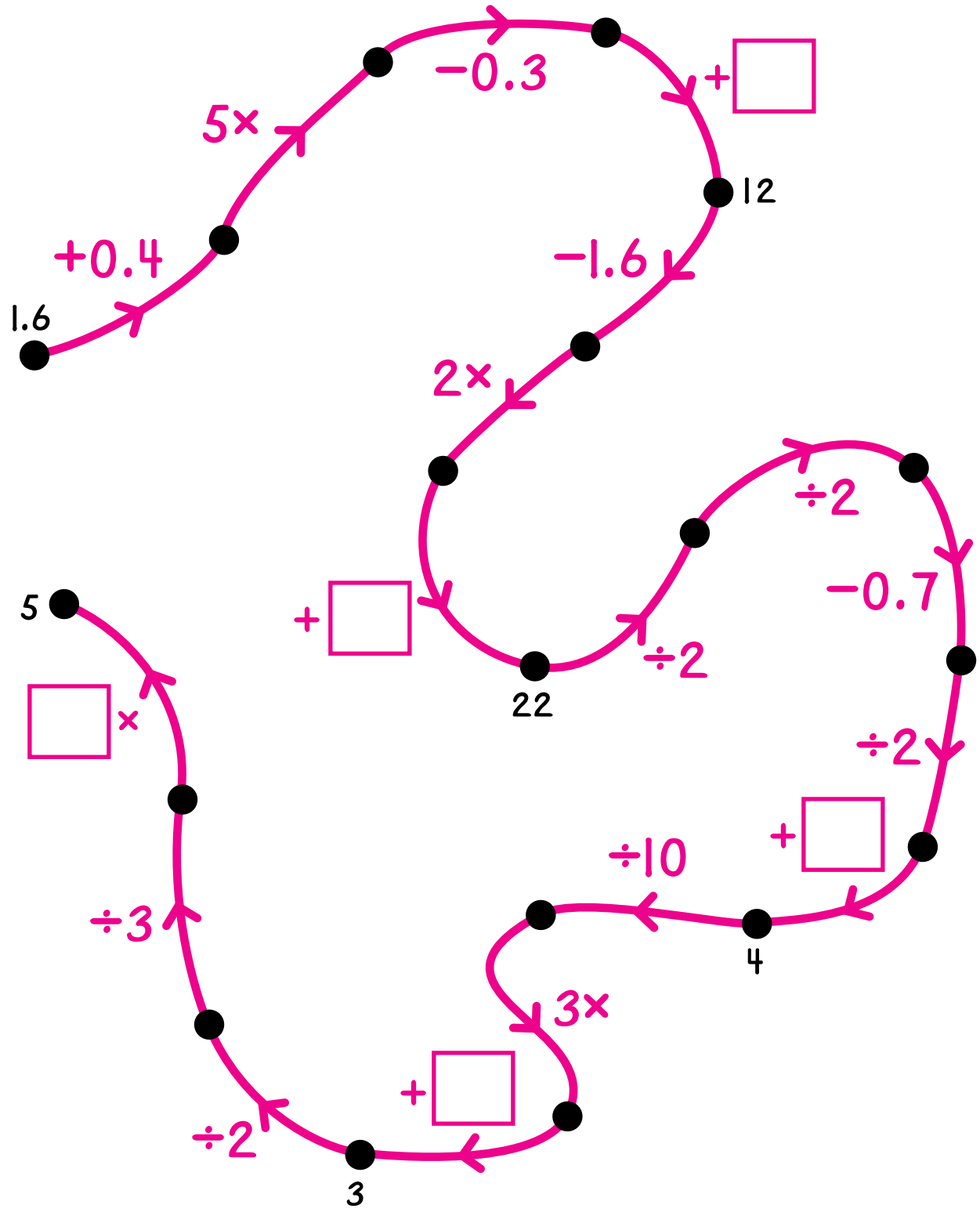
1

10

Name _____

N24 **

Label the dots and fill in the boxes for the arrows.



Name _____

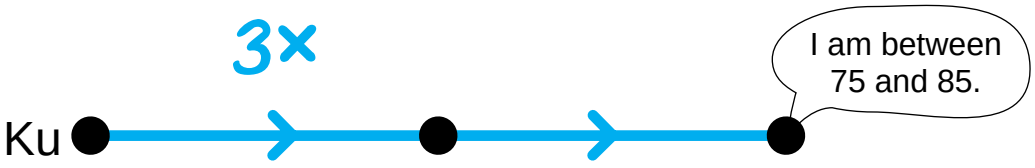
N24 ***

Ku is a secret number.

Clue 1

Ku is the ending number of an arrow road starting at 1.5 and using exactly two red arrows and two blue arrows.

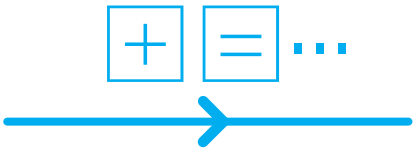
Clue 2



Who is Ku? _____

Name _____

N24 ****



+0.1 or −0.1

Use at most three arrows or cords to build a road.

from 0.7 to 20

0.7 ● ● 20

---

from 0.8 to 10.8

0.8 ● ● 10.8

---

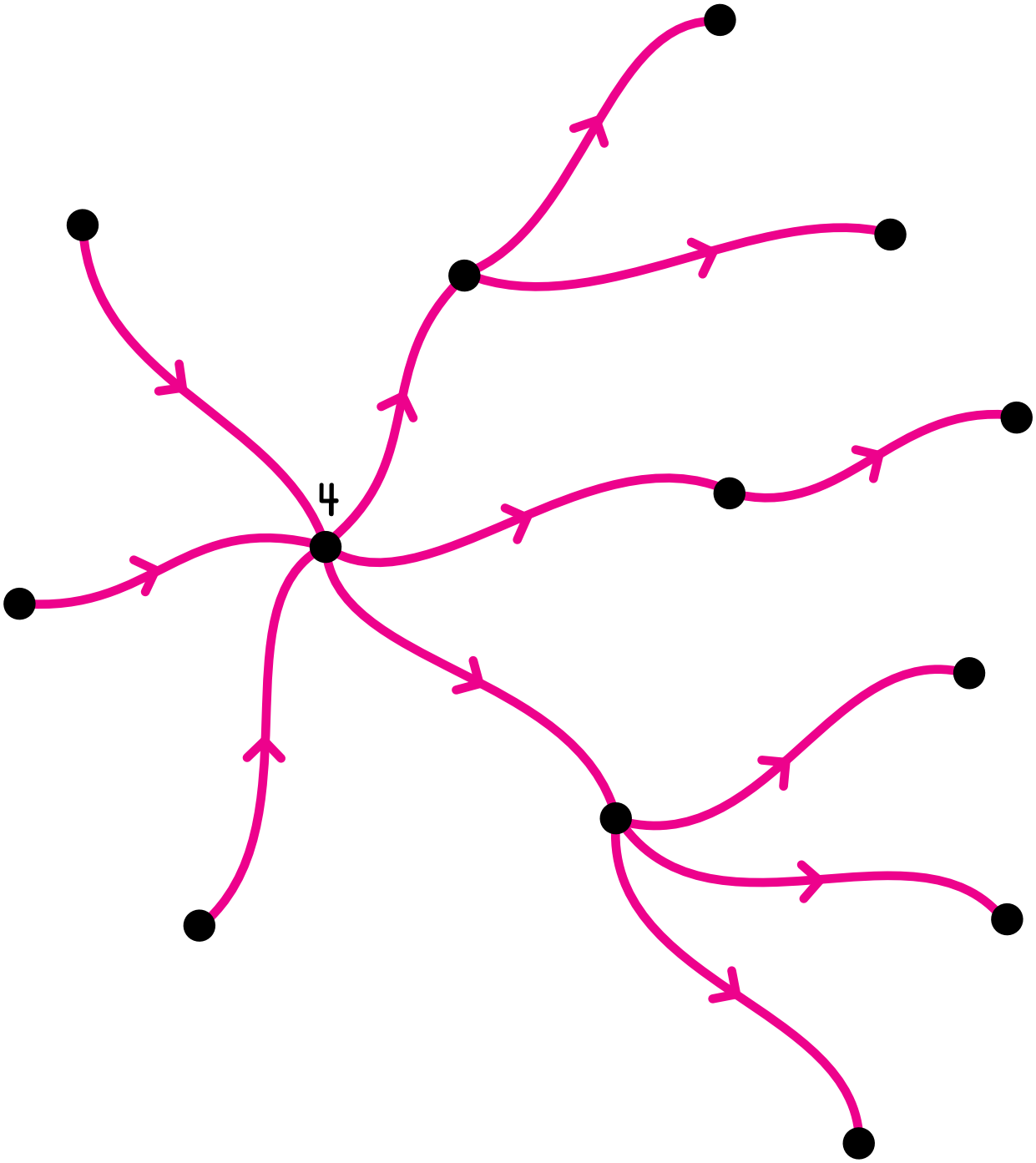
from 0.15 to 13.1

0.15 ● ● 13.1

Name _____

N25 *

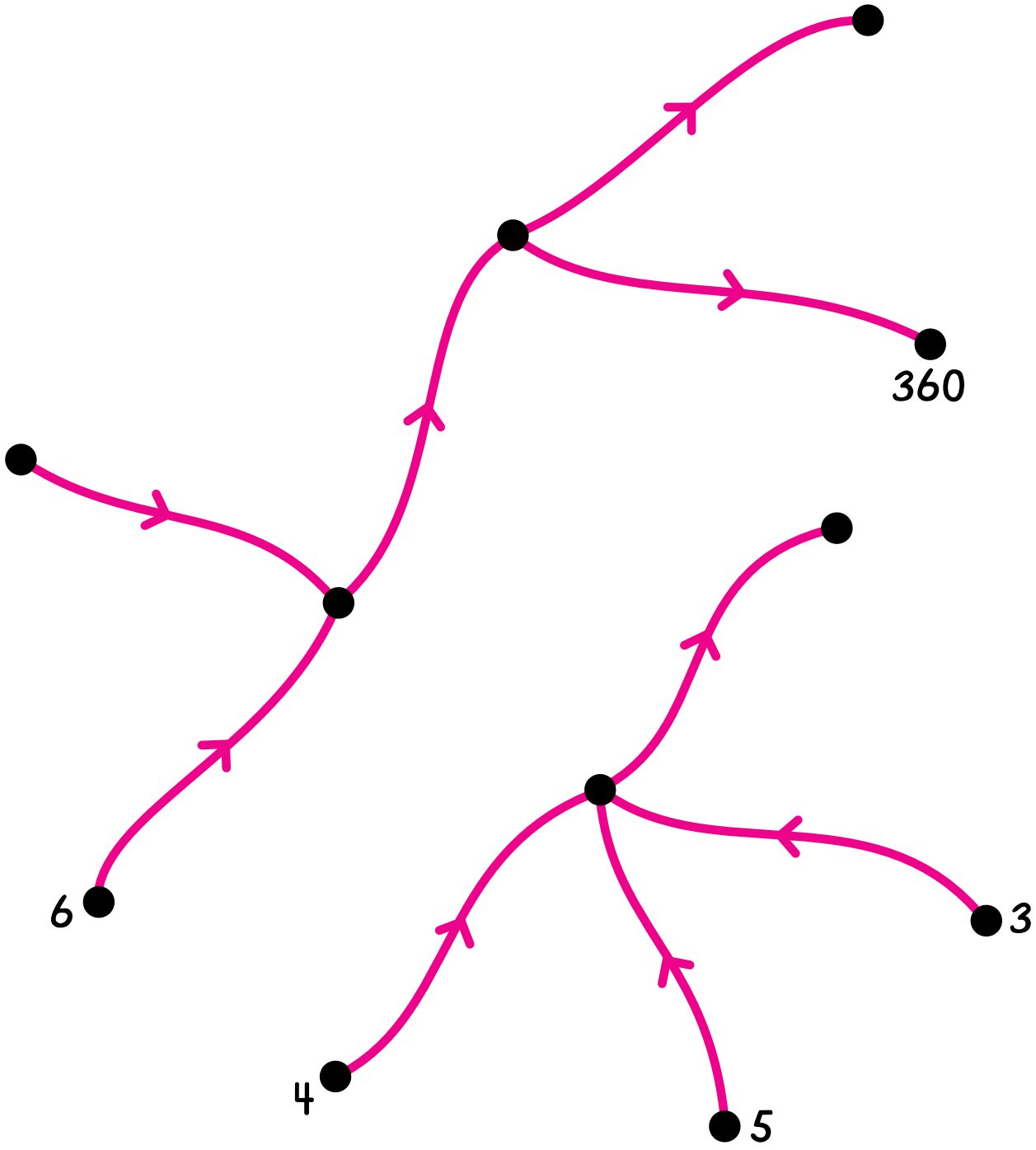
Label each arrow × some whole number and label the dots.
Many solutions are possible.



Name _____

N25 **

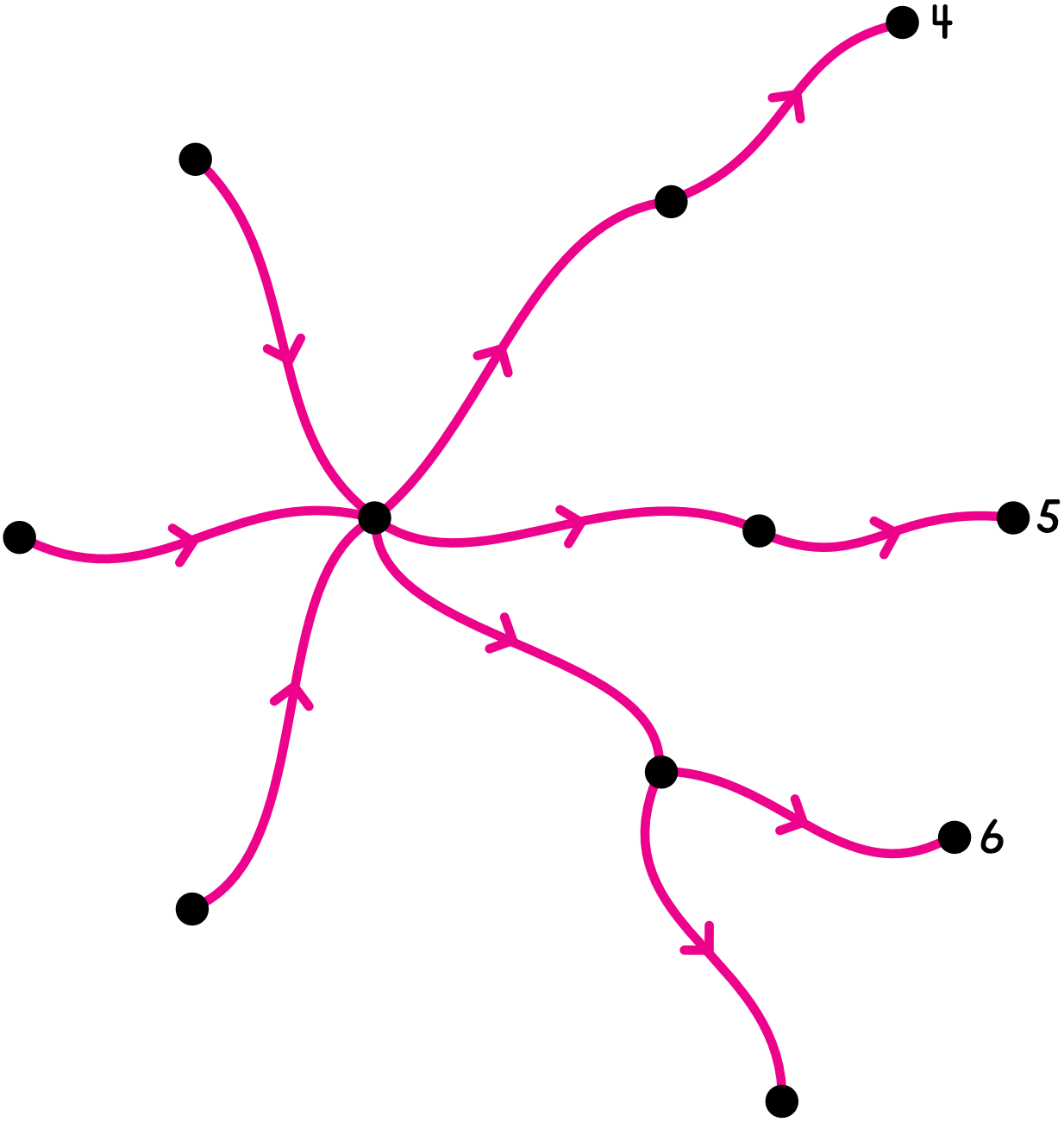
Label each arrow × some whole number and label the dots.
Many solutions are possible.



Name _____

N25 ***

Label each arrow × some whole number and label the dots.
Many solutions are possible.



Name _____

N25 ****

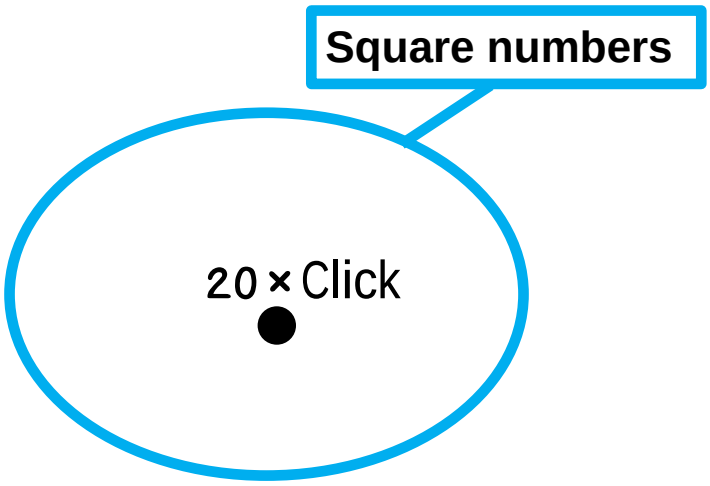
Click is a secret number.

Clue 1

Each red arrow is for × some whole number greater than 1.

Click could be _____, _____, _____, or _____.

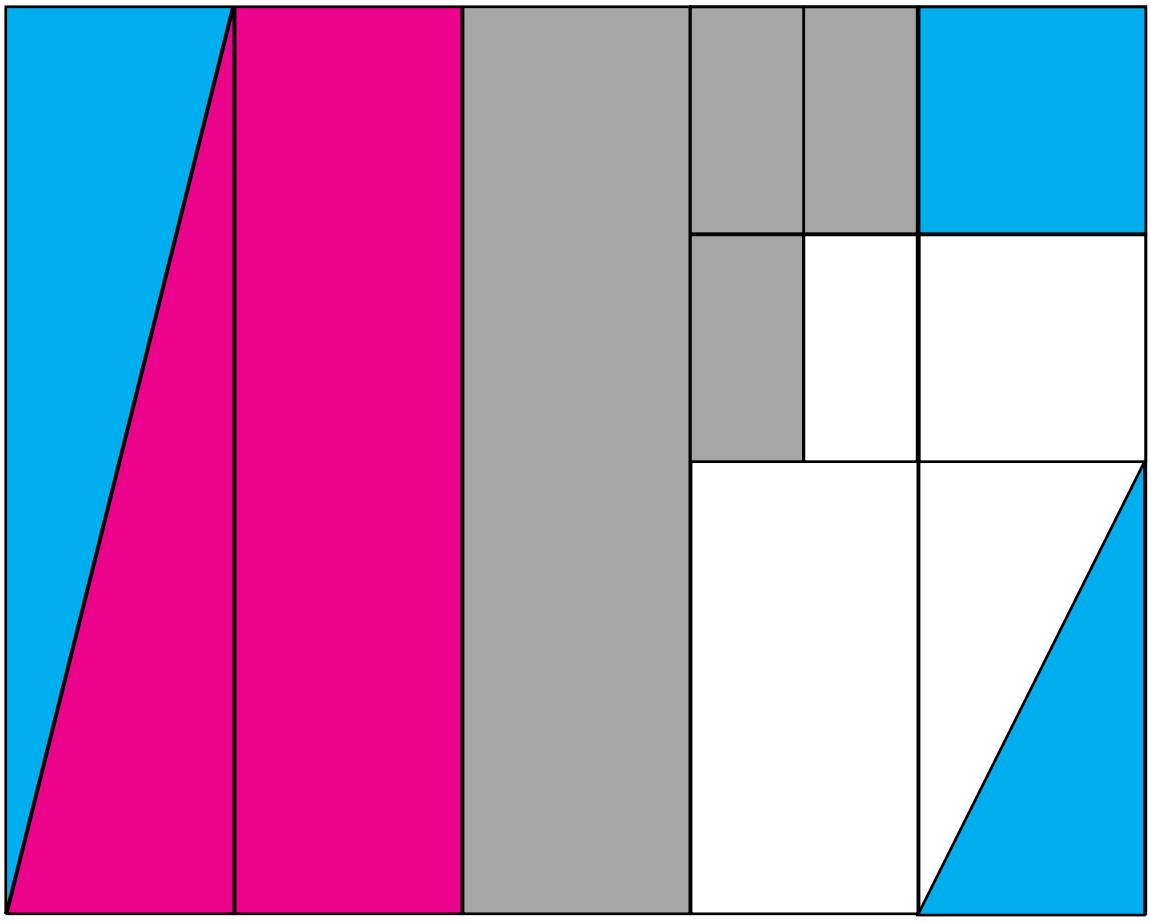
Clue 2



Who is Click? _____

Name _____

N27



Red _____

Gray _____

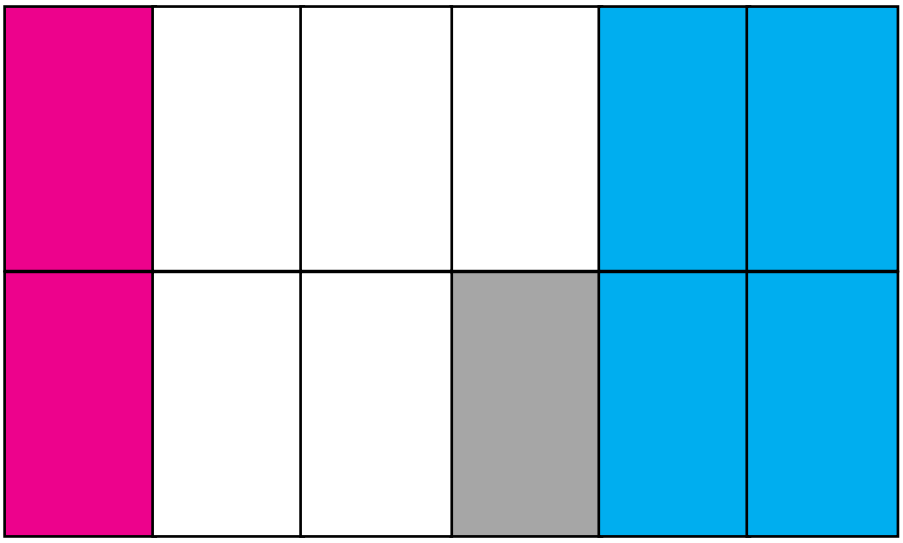
Blue _____

White _____

Name _____

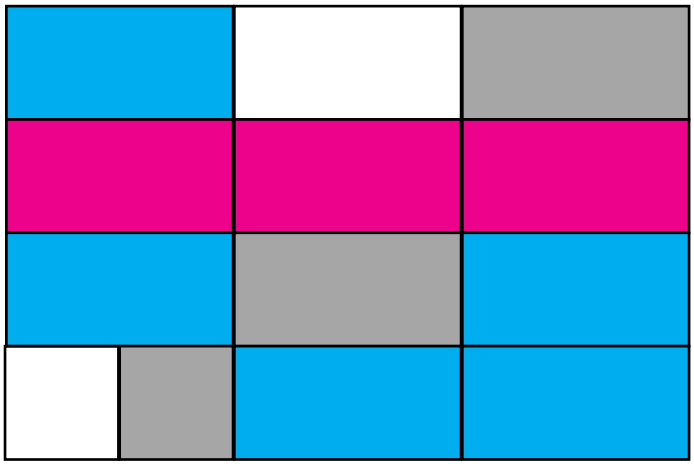
N27 *

What fraction of the rectangle is each color?



Red _____ White _____

Blue _____ Gray _____

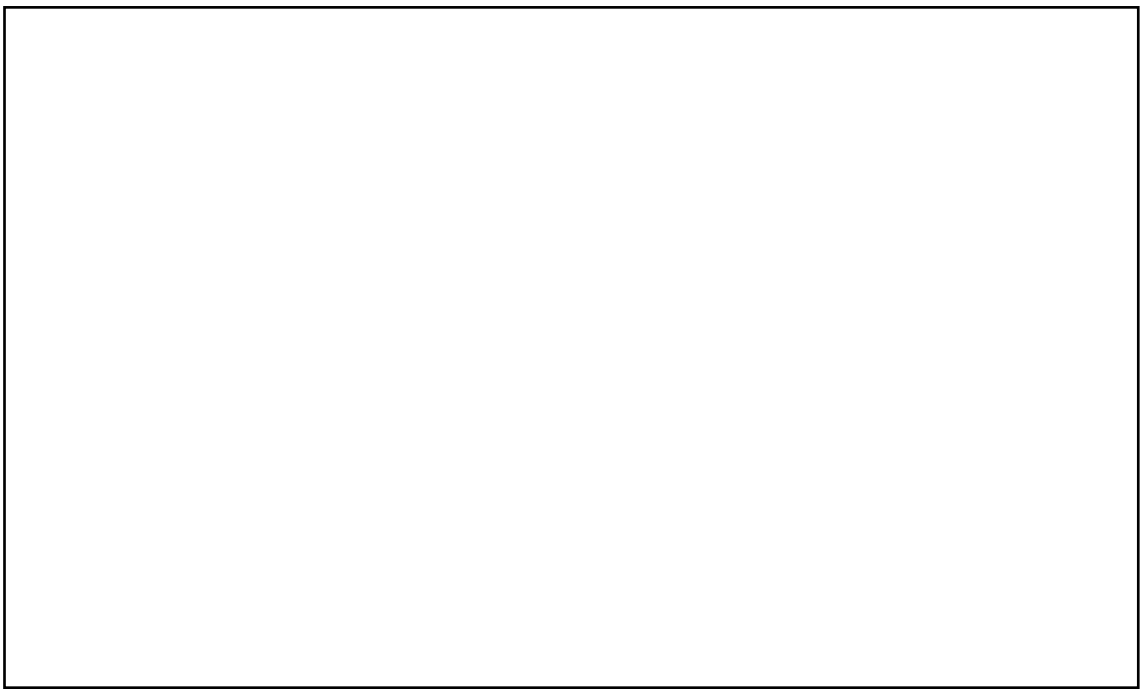


Red _____ White _____

Blue _____ Gray _____

Name _____ N27 **

Color two-thirds of this region red. Use a ruler.



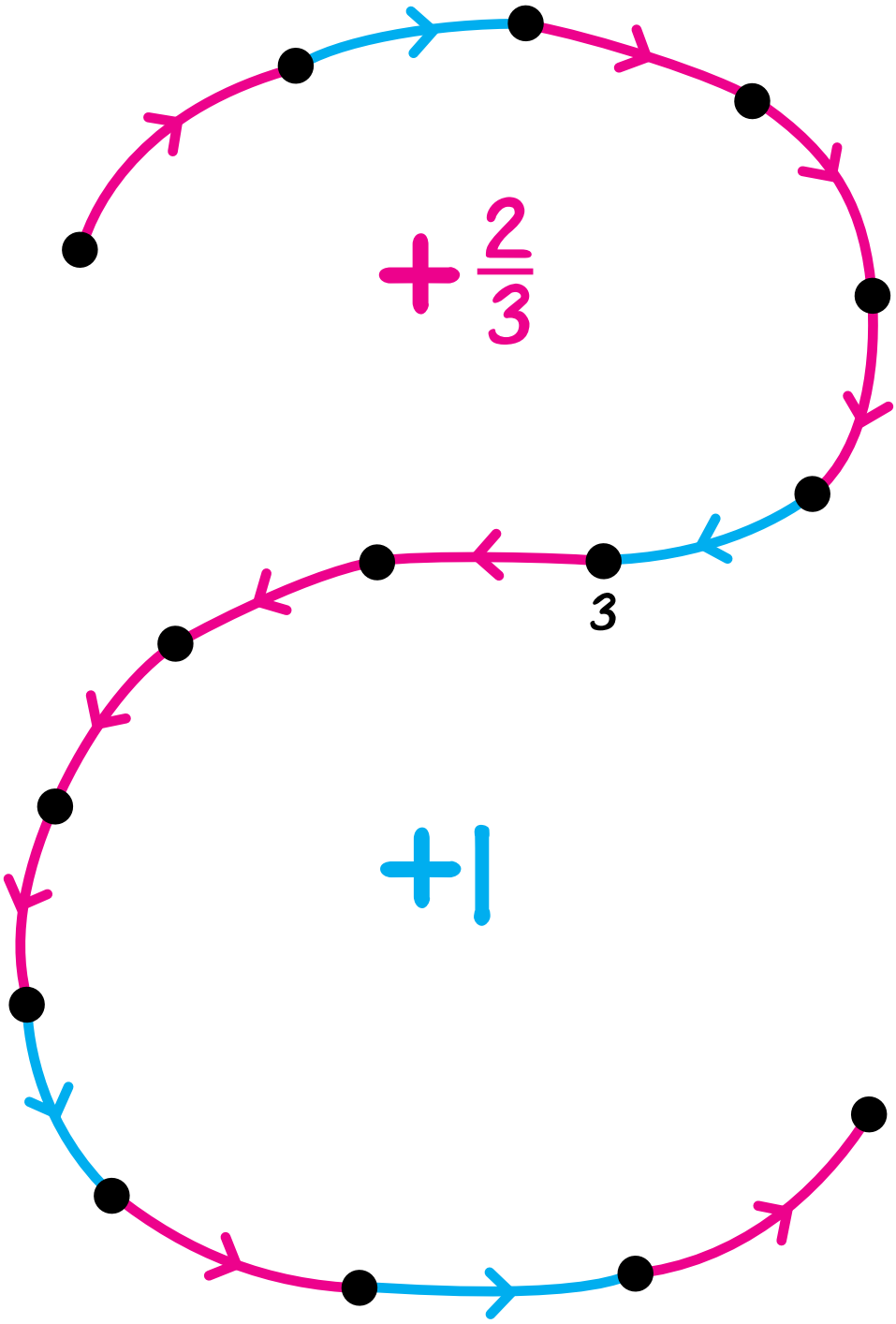
What fraction of this rectangle is shaded? _____

What fraction of this rectangle is not shaded? _____

Name _____

N27 ***

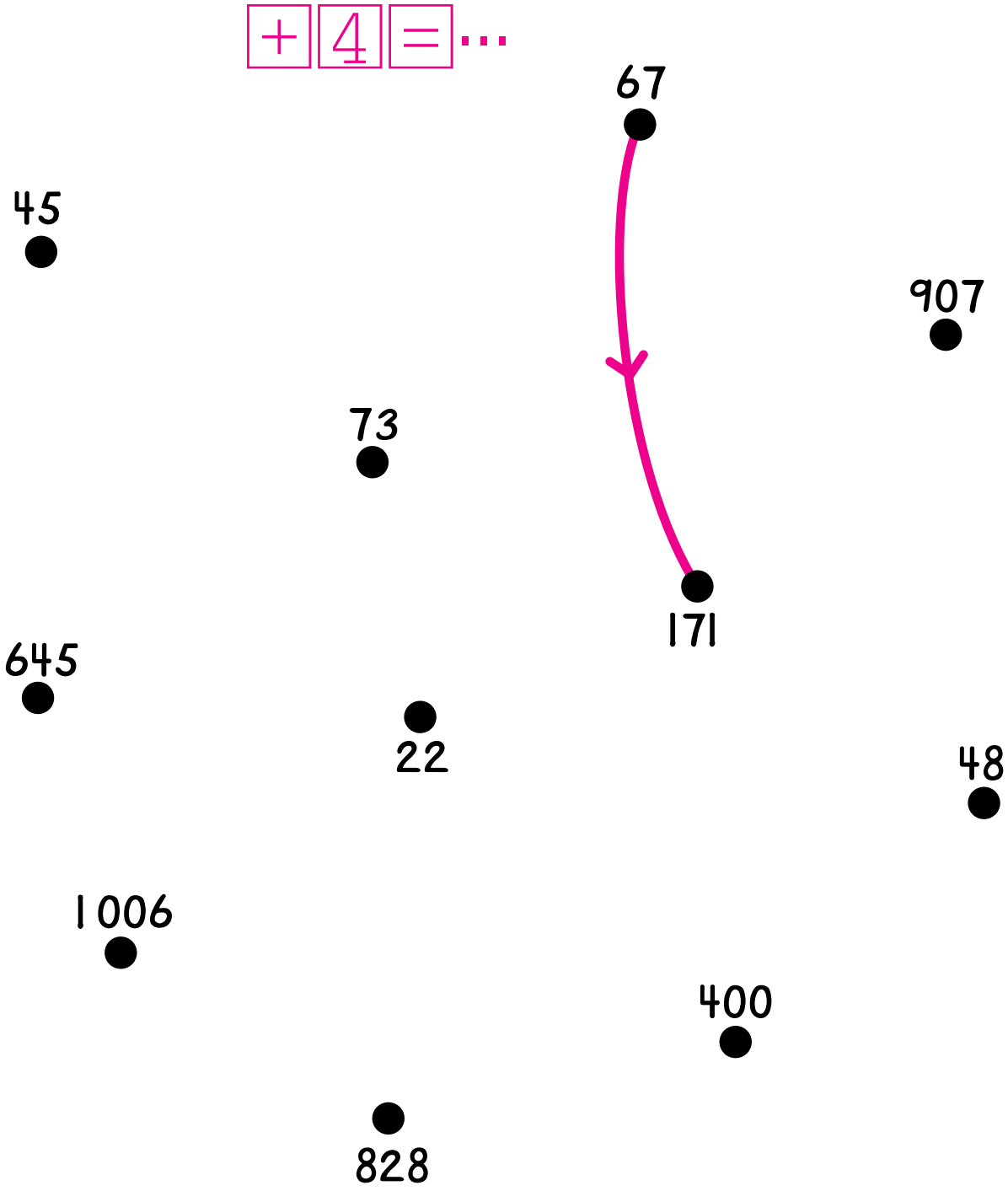
Label the dots.



Name _____

N28 *

Draw all of the possible red arrows in this picture. One is done for you.



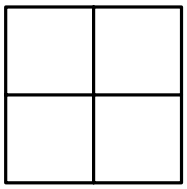
Name _____

N28 **

Flip is a secret number.

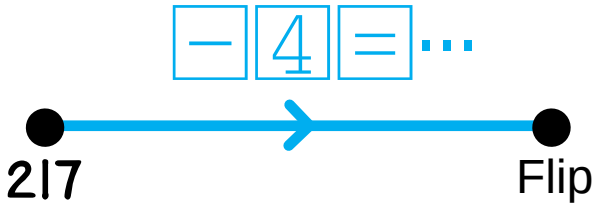
Clue 1

Flip can be put on this Minicomputer board using exactly two regular checkers.



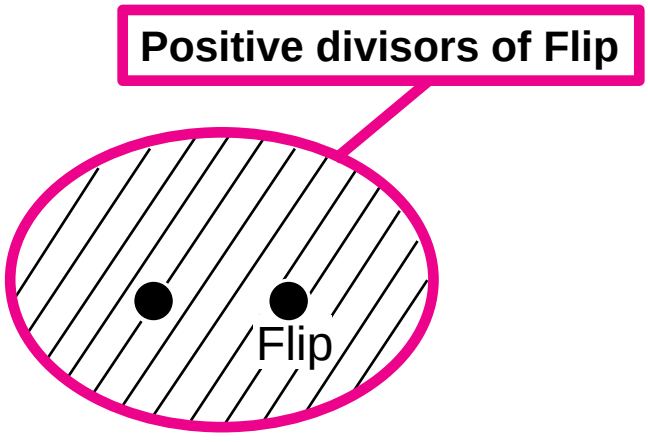
Flip could be ___, ___, ___, ___, ___, ___, ___, ___, ___, or ___.

Clue 2



Flip could be ___ or ___.

Clue 3

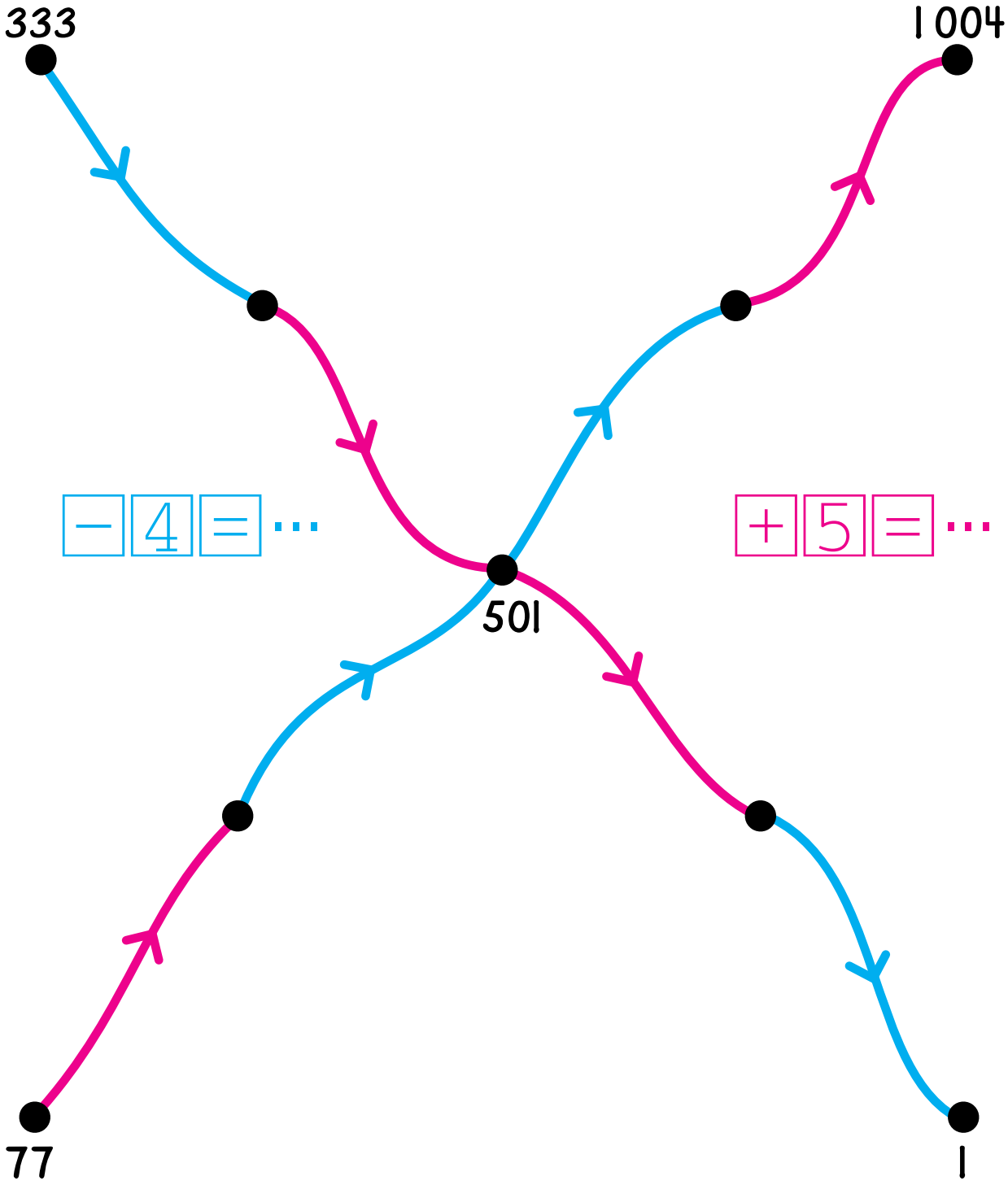


Who is Flip? _____

Name _____

N28 ***

Label the dots. Many solutions are possible.

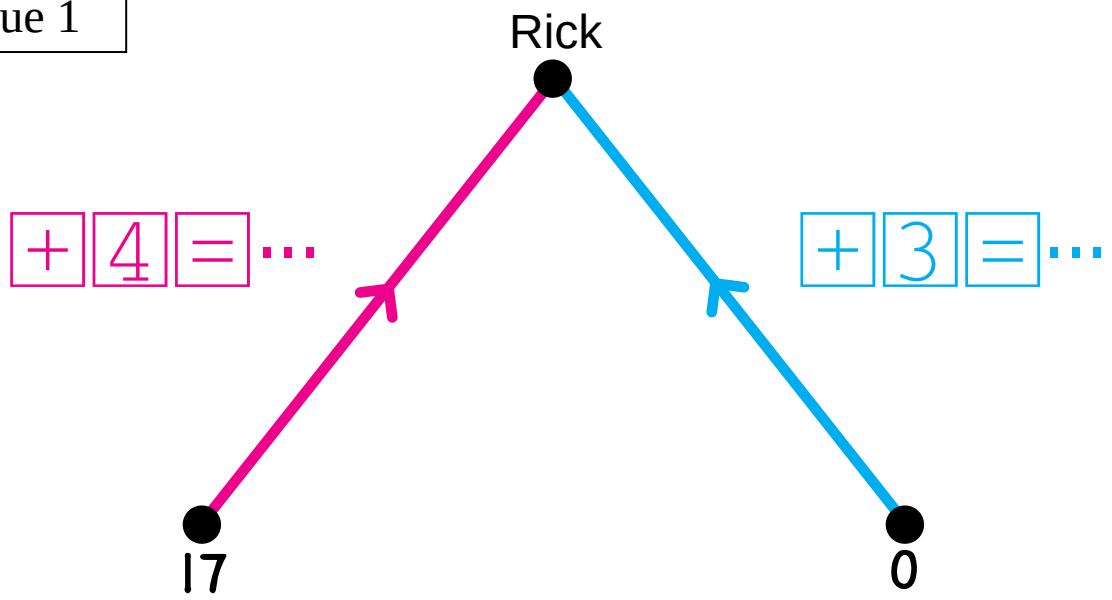


Name _____

N28 ★★★★

Rick is a secret number.

Clue 1



Rick could be ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, ___, and so on.

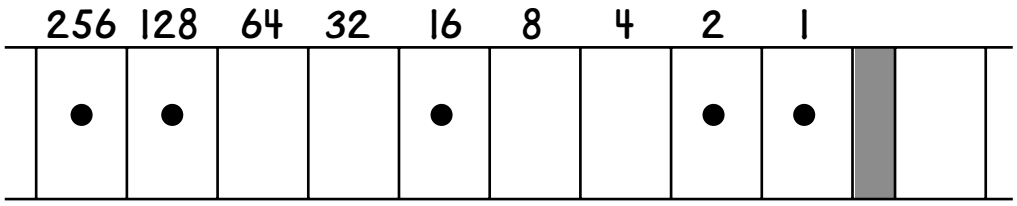
Clue 2

$$1200 < \text{Rick} < 1220$$

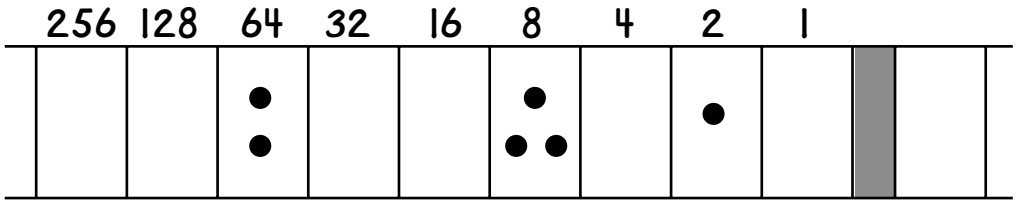
Who is Rick? _____

Name _____ N29

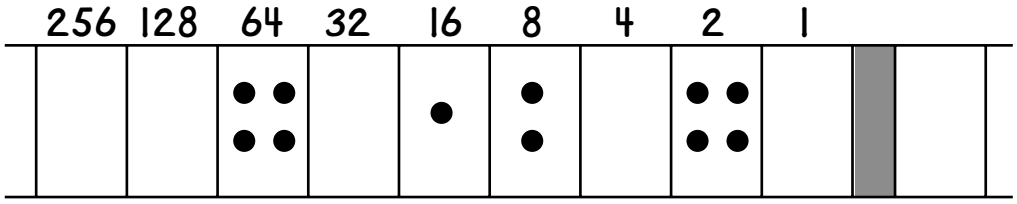
What number is on the binary abacus? Make trades if you wish.



= _____

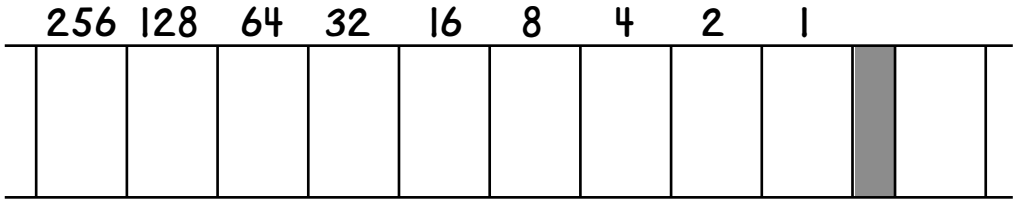


= _____

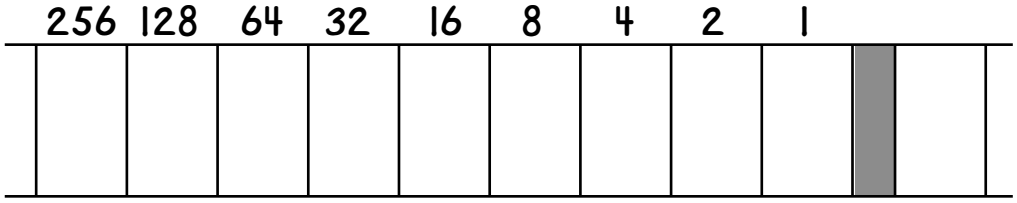


= _____

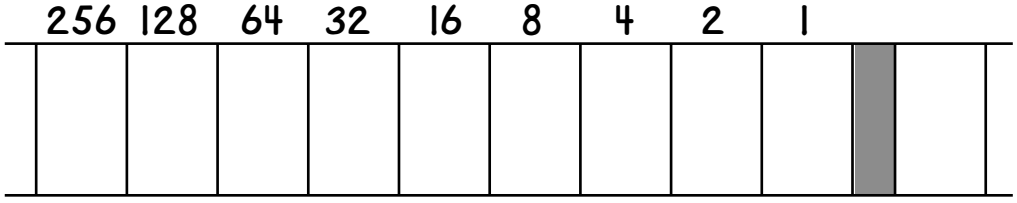
Put each number on the binary abacus. Use at most one checker on a board.



= 50



= 100

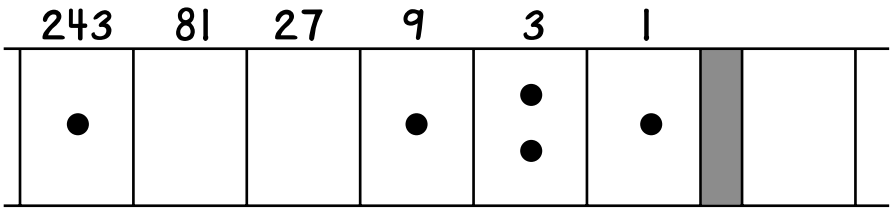


= 200

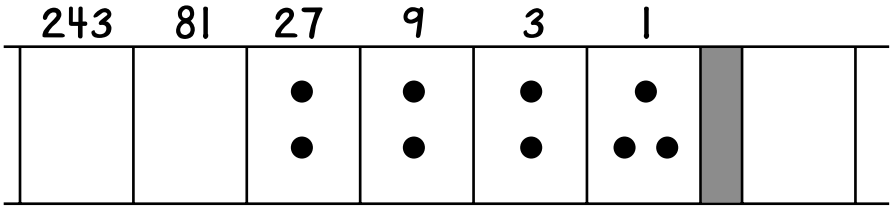
Name _____

N30

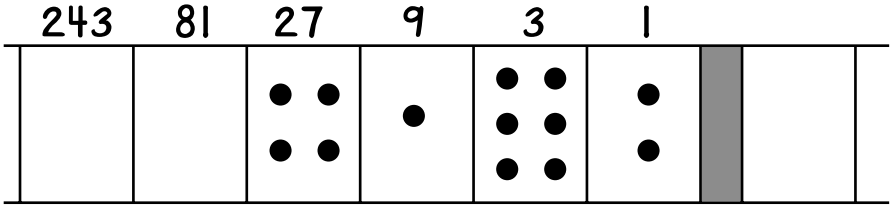
What number is on the base three abacus?



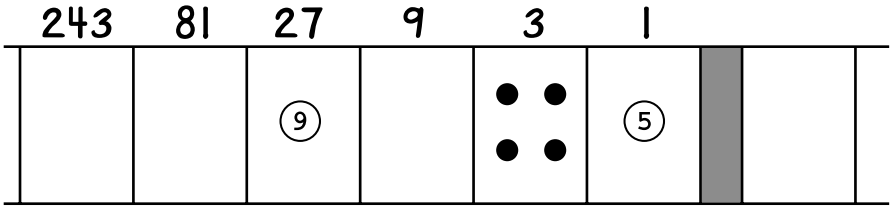
= _____



= _____

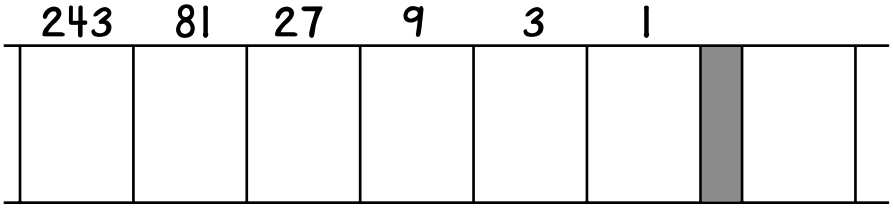


= _____

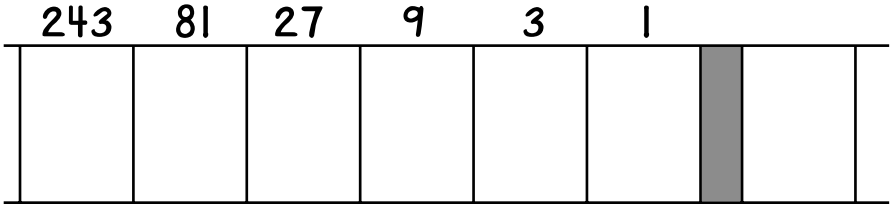


= _____

Put each number on the base three abacus.



= 178

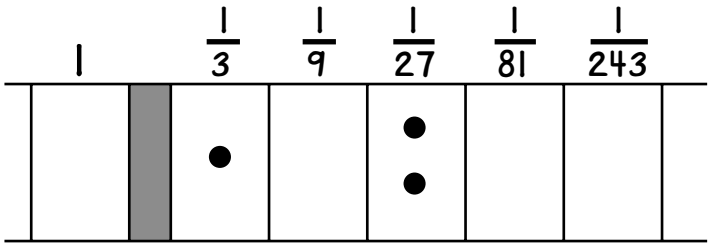


= 268

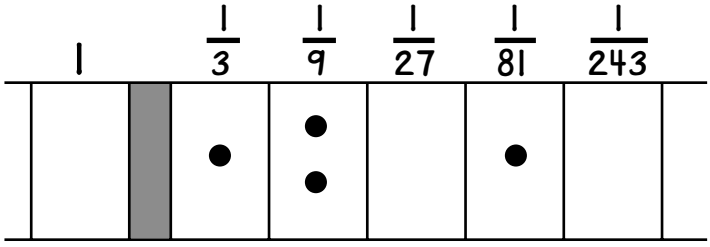
Name _____

N30 *

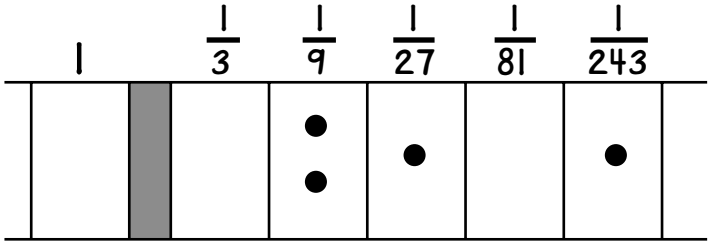
Do the calculations by making backward trades until all of the checkers are on one board.

$\frac{1}{3} + \frac{2}{27} =$ 

$= \frac{\square}{27}$

$\frac{1}{3} + \frac{2}{9} + \frac{1}{81} =$ 

$= \frac{\square}{81}$

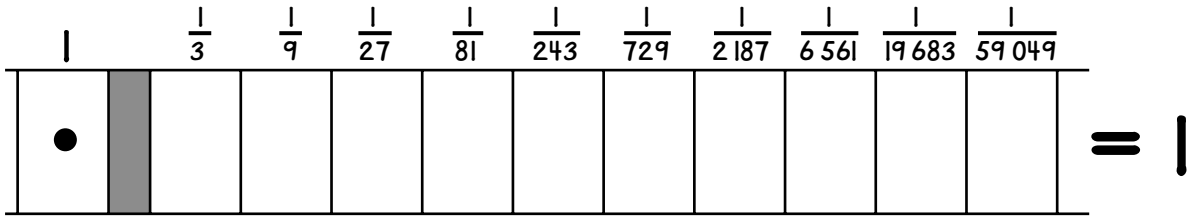
$\frac{2}{9} + \frac{1}{27} + \frac{1}{243} =$ 

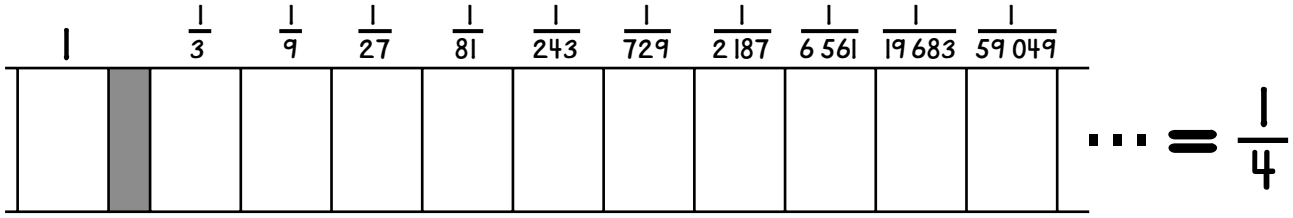
$= \frac{\square}{243}$

Name _____

N30 **

Represent $\frac{1}{4}$ on the base three abacus.





Write a name for $\frac{1}{4}$ suggested by the configuration on the base three abacus.

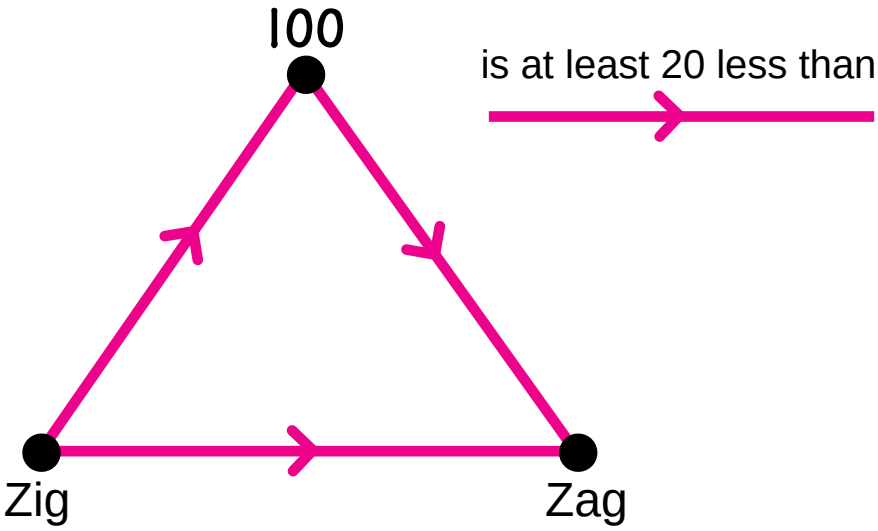
$\frac{1}{4}$ = _____

Name _____

N31(a)

Zig and Zag are secret numbers.

Clue 1



Could Zig be 82? _____ Could Zag be 80? _____

Could Zig be 75? _____ Could Zag be 115? _____

Could Zig be 0? _____ Could Zag be 120? _____

Could Zig be $\widehat{5}$? _____ Could Zag be 1 000 000? _____

What is the greatest number Zig could be? _____

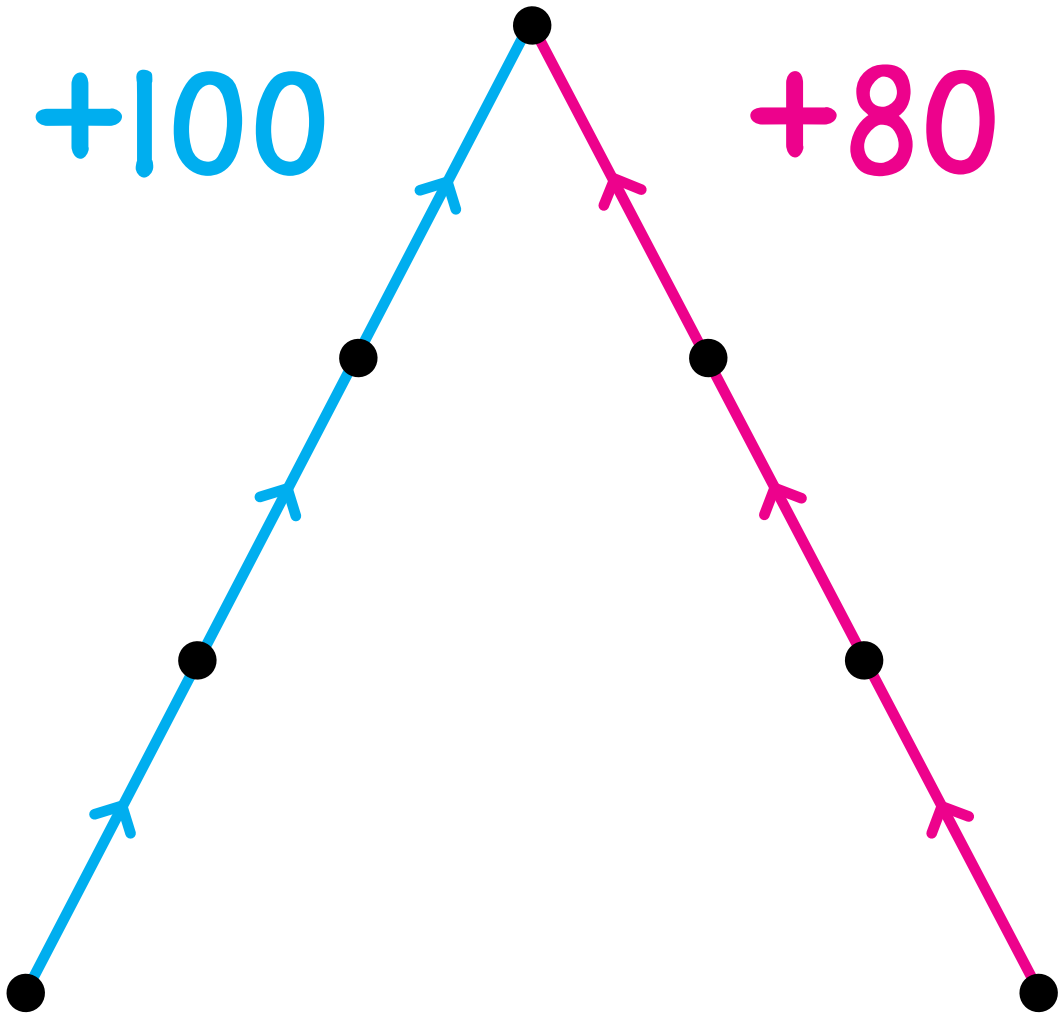
What is the least number Zag could be? _____

Name _____

N31(b)

Clue 2

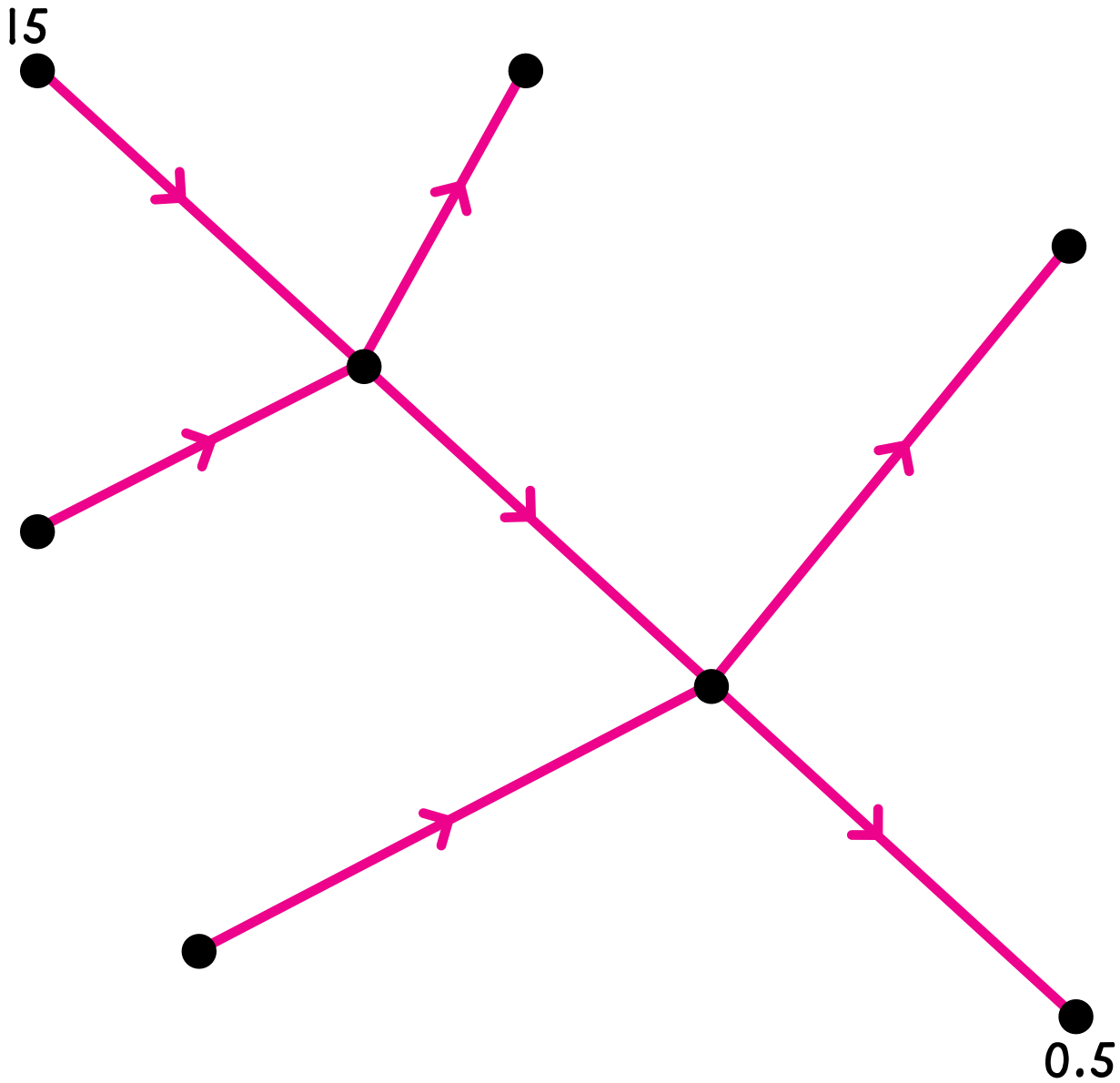
Zig and Zag are the least two numbers in this picture.
Label the dots for Zig and Zag.



Name _____

N32 *

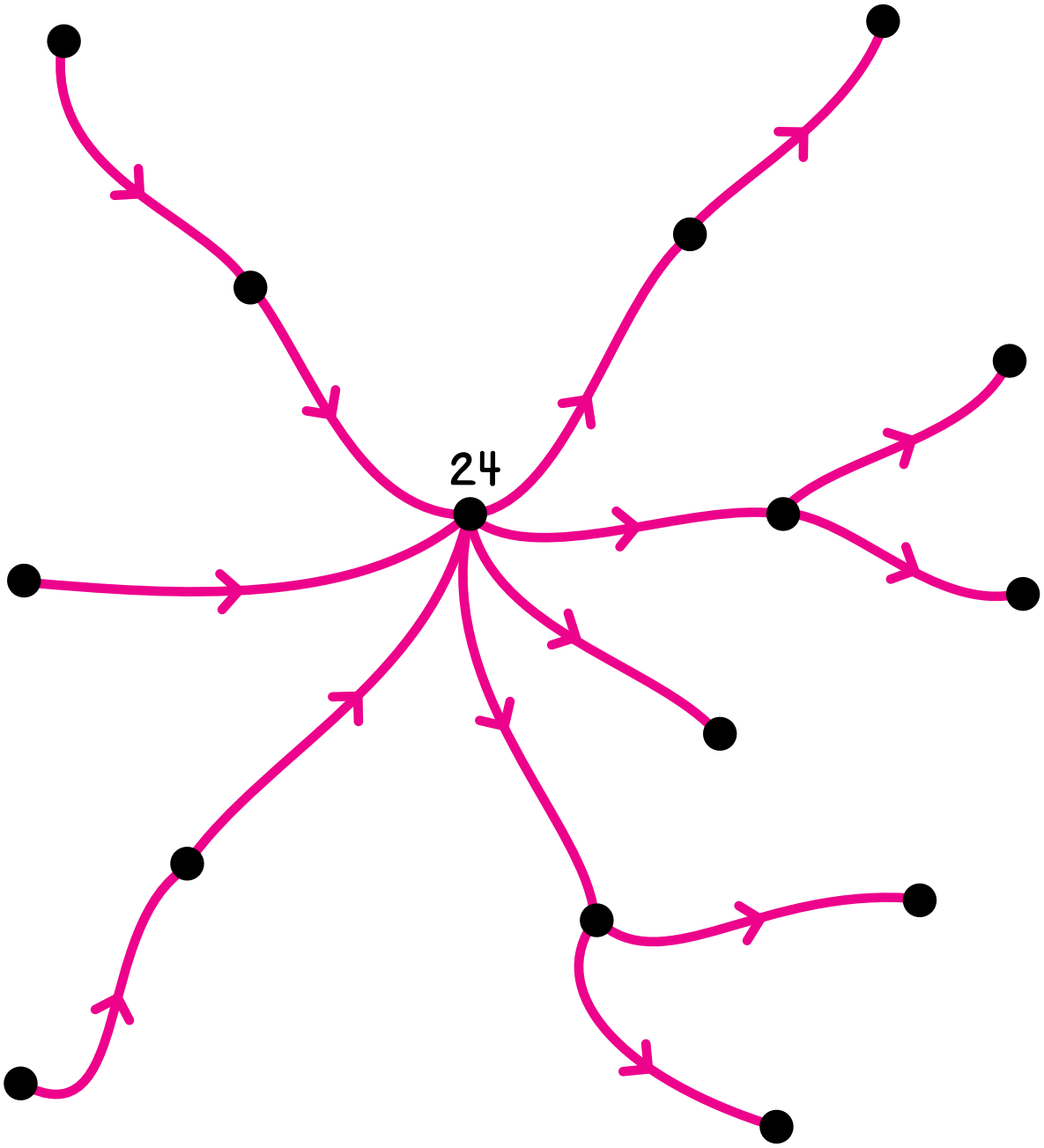
Each red arrow is for ÷ some whole number. Label the arrows and the dots. All of the dots are for different numbers. Many solutions are possible.



Name _____

N32 **

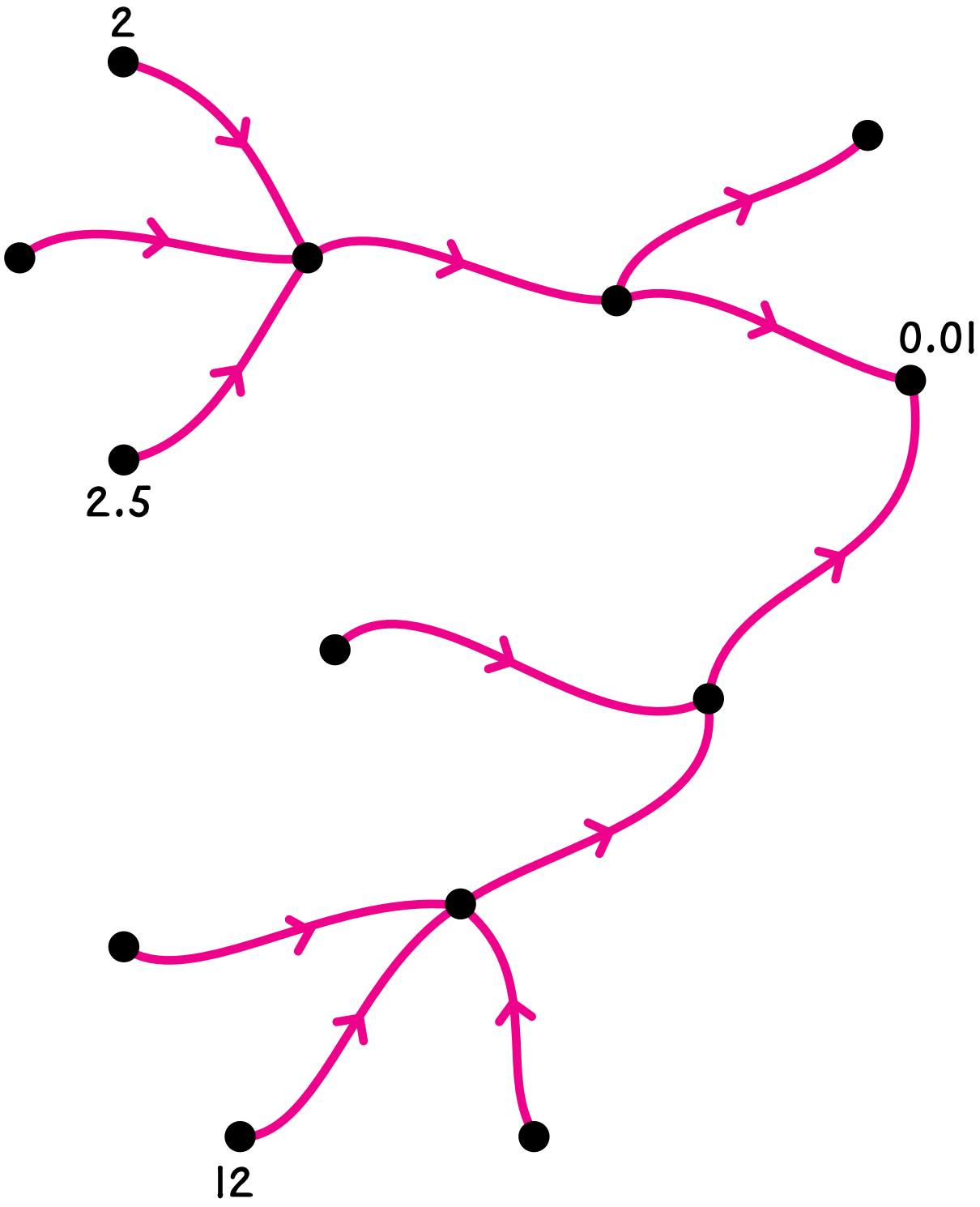
Each red arrow is for ÷ some whole number. Label the arrows and the dots. All of the dots are for different numbers. Many solutions are possible.



Name _____

N32 ***

Each red arrow is for ÷ some whole number. Label the dots and the arrows. All of the dots are for different numbers. Many solutions are possible.



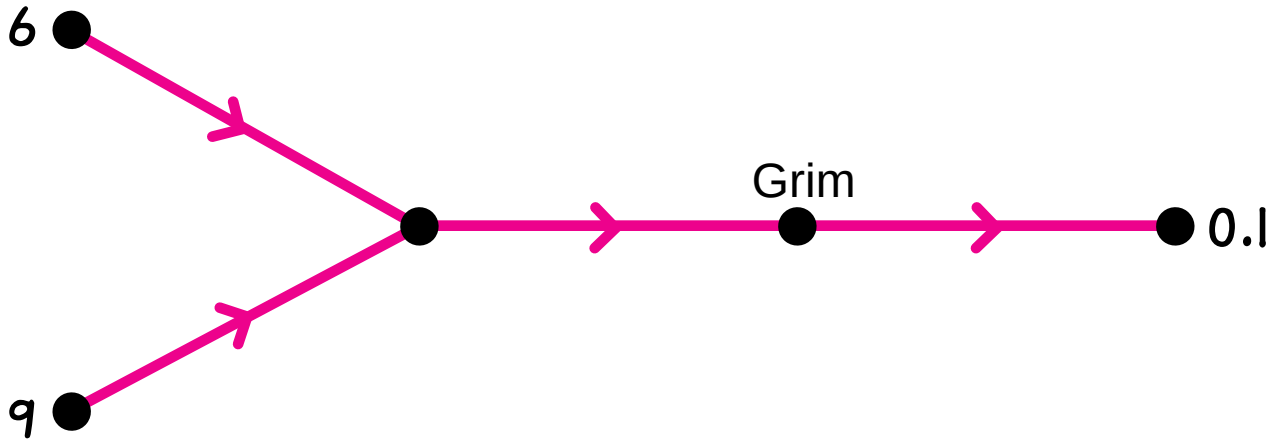
Name _____

N32 ****

Grim is a secret number.

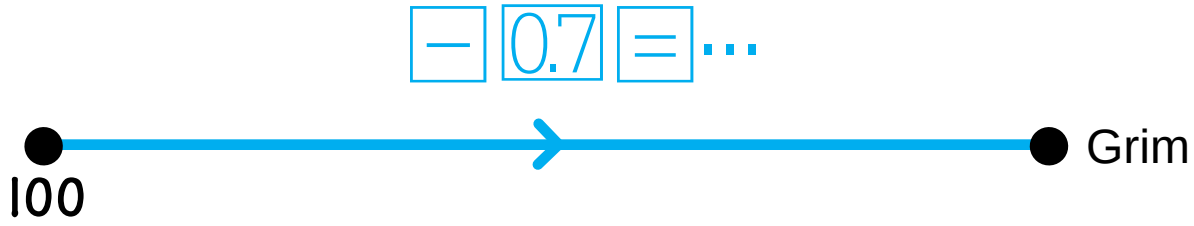
Clue 1

Each red arrow is for ÷ some whole number.



Grim could be _____, _____, _____, _____, _____, or _____.

Clue 2

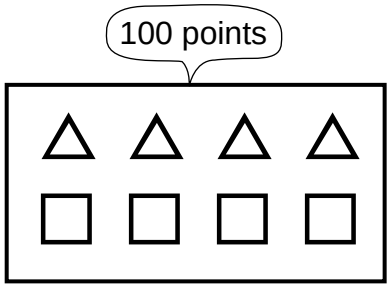


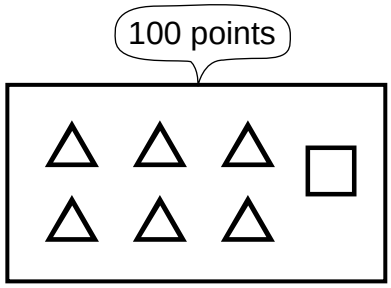
Who is Grim? _____

Name _____

N33(a)

Imagine a game in which a player gets points for triangles (△) and squares (□). Four △s and four □s give 100 points. Also, six △s and one □ give 100 points.





Which shape gives more points in this game? _____

Find the number of points for some different combinations of △s and □s.

In this game, a player gets

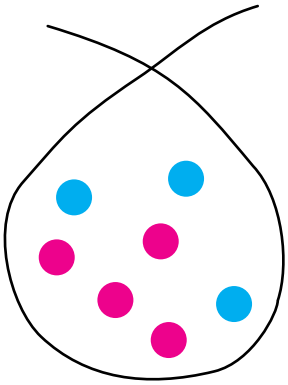
how many points for a △? _____

how many points for a □? _____

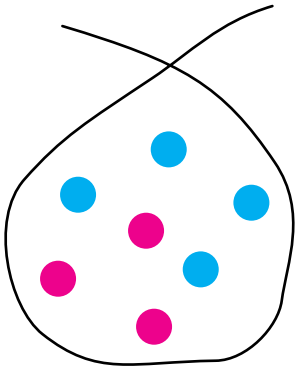
Name _____

N33(b)

Jon bought a bag with 3 blue and 4 red marbles for 68¢.
Jan bought a bag with 4 blue and 3 red marbles for 72¢.



68¢



72¢

Which costs less, a blue or a red marble? _____

Find the cost for some other combinations of marbles.

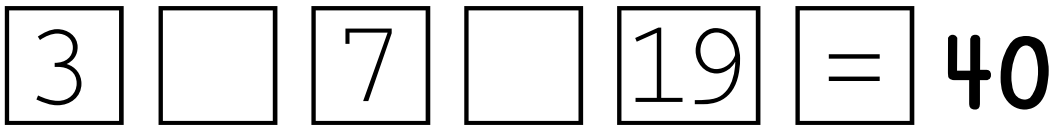
Find the cost for one blue marble. _____

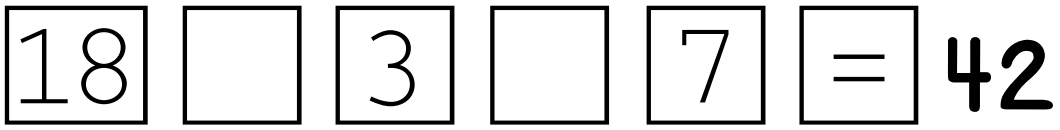
Find the cost for one red marble. _____

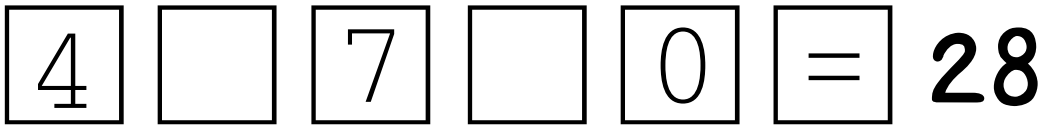
Name _____

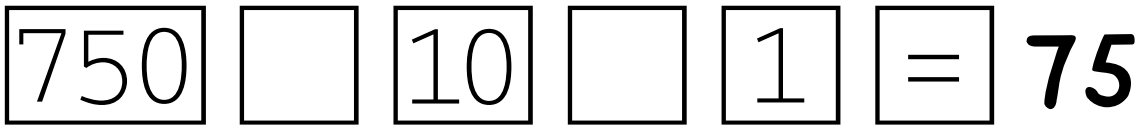
N34 *

Put one of the symbols +, ×, −, ÷ in each blank box to make the calculator sentences true. A symbol may be used twice in the same sentence.









Name _____

N34 **

Complete.

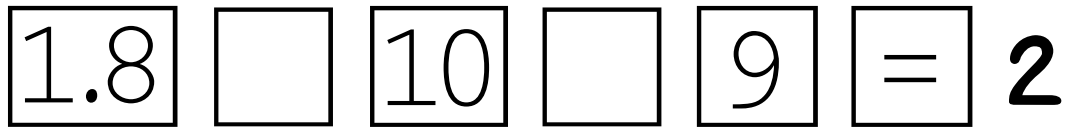
$2 \times \square = 240$	$3 \times \square = 120$
$4 \times \square = 240$	$6 \times \square = 120$
$8 \times \square = 240$	$12 \times \square = 120$
$16 \times \square = 240$	$24 \times \square = 120$
$32 \times \square = 240$	$48 \times \square = 120$
$64 \times \square = 240$	$96 \times \square = 120$

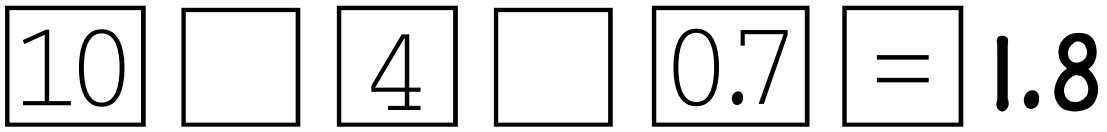
$7 \times \square = 182$	$3 \times \square = 405$
$14 \times \square = 182$	$9 \times \square = 405$
$28 \times \square = 182$	$27 \times \square = 405$
$56 \times \square = 182$	$81 \times \square = 405$

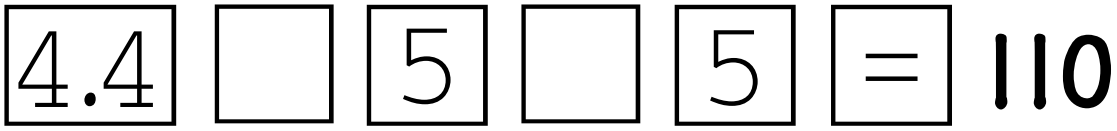
Name _____

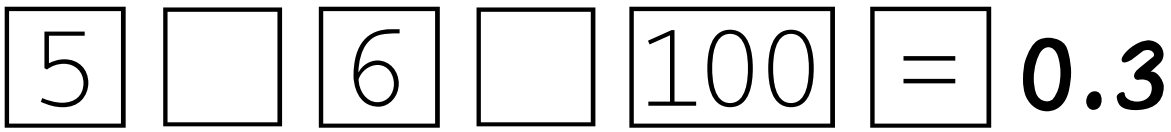
N34 ***

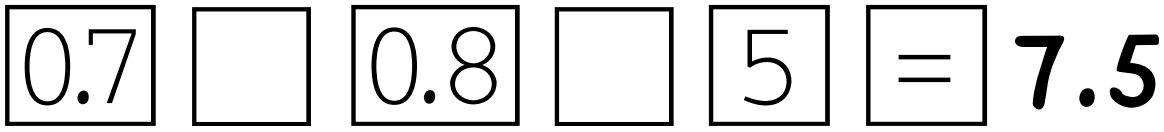
Put one of the symbols +, ×, −, ÷ in each blank box to make the calculator sentences true. A symbol may be used twice in the same sentence.







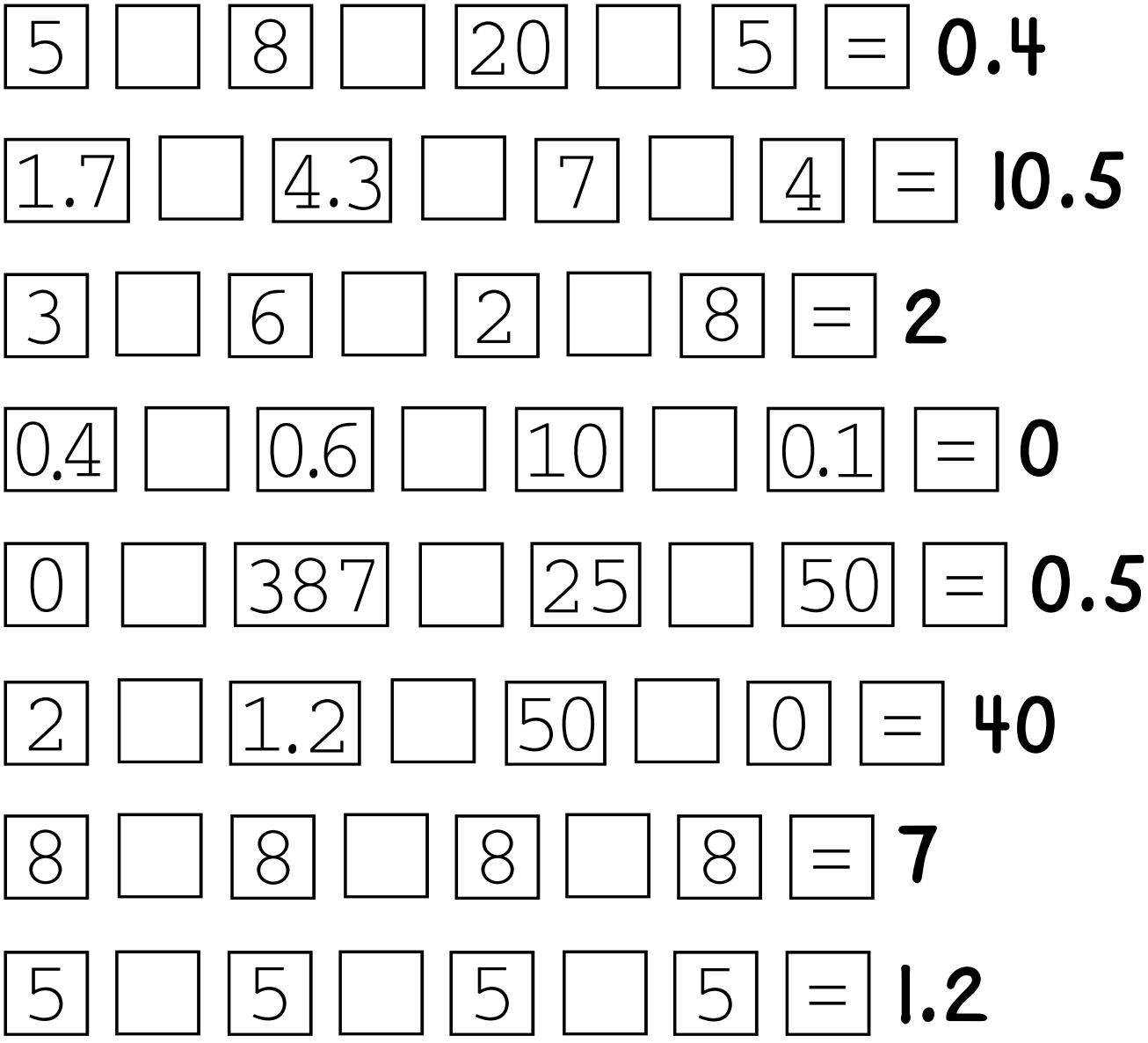




Name _____

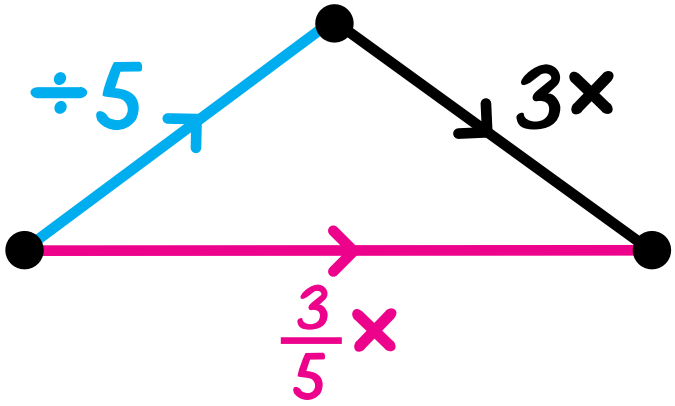
N34 ★★★★

Put one of the symbols **+**, **×**, **−**, **÷** in each blank box to make the calculator sentences true. A symbol may be used more than once in the same sentence.

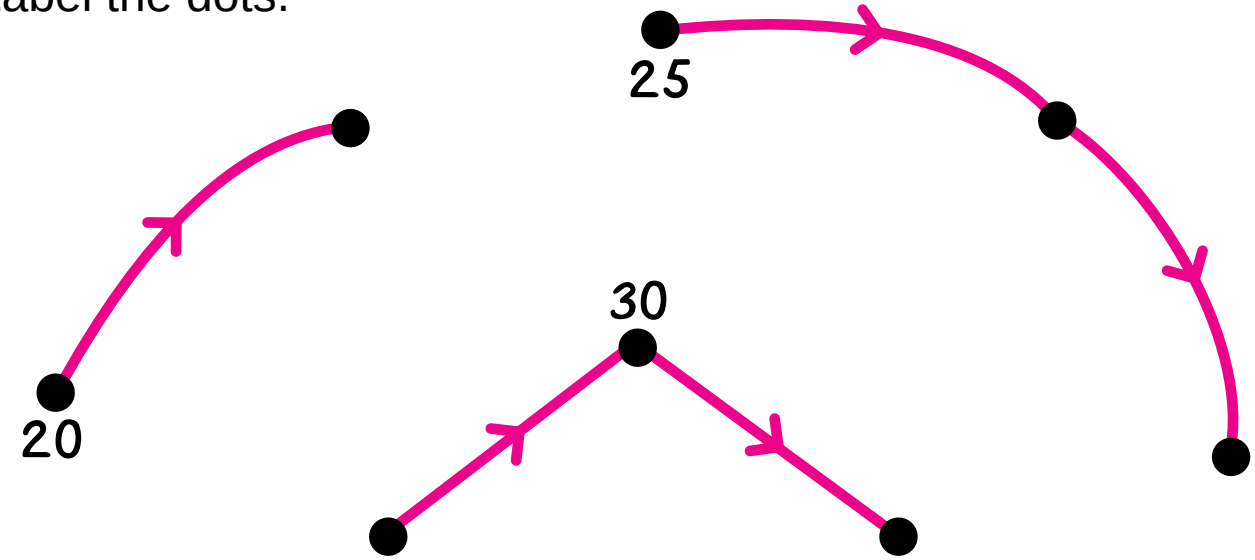


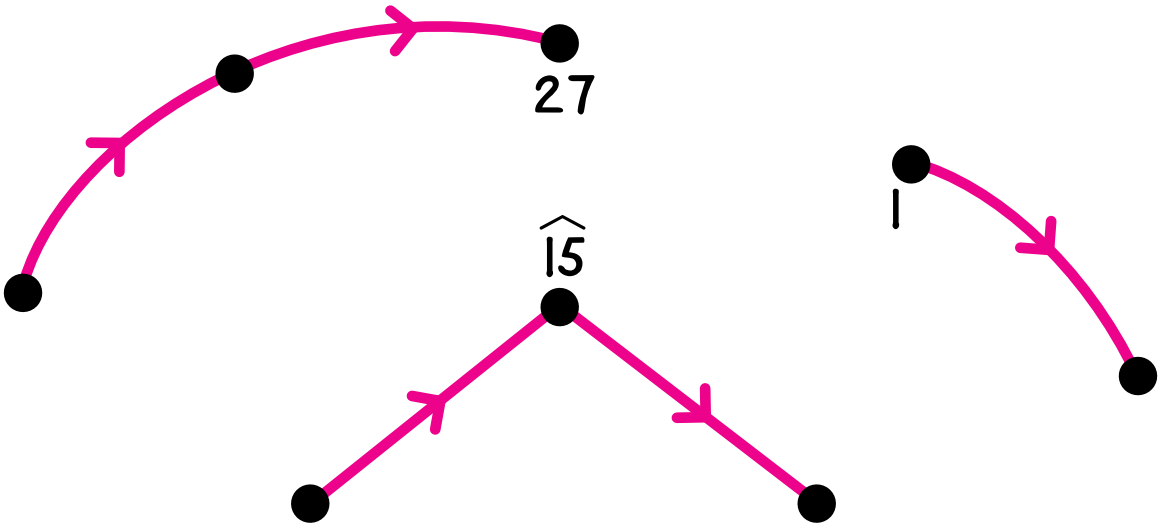
Name _____

N35 *



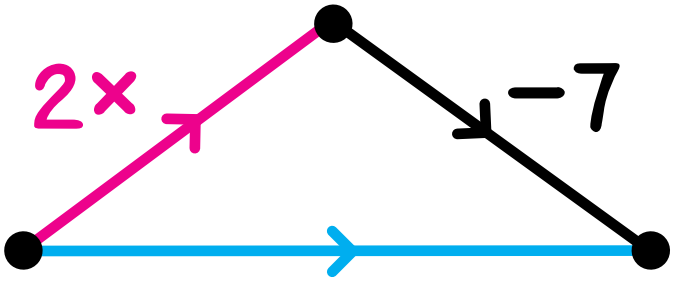
Label the dots.



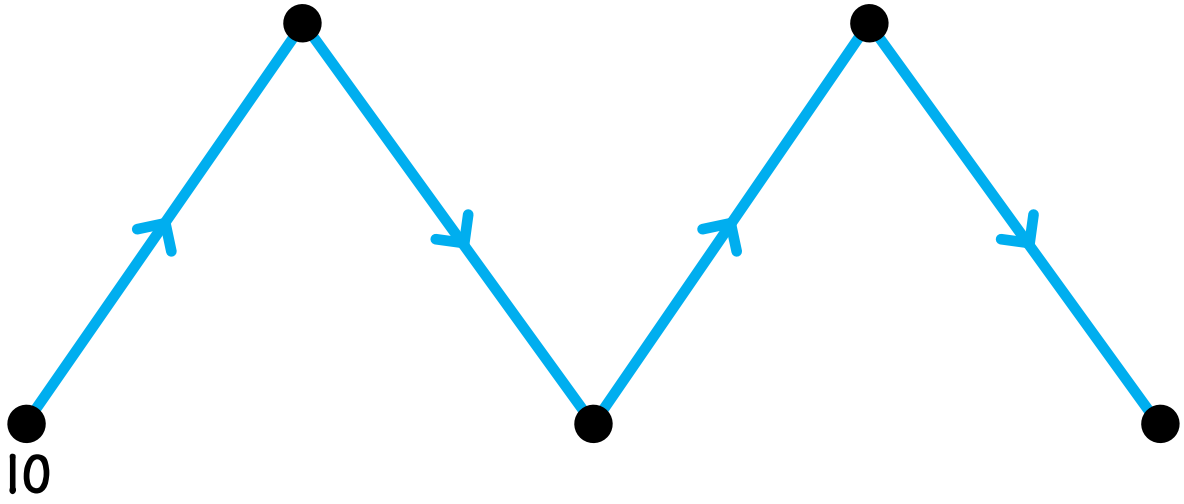


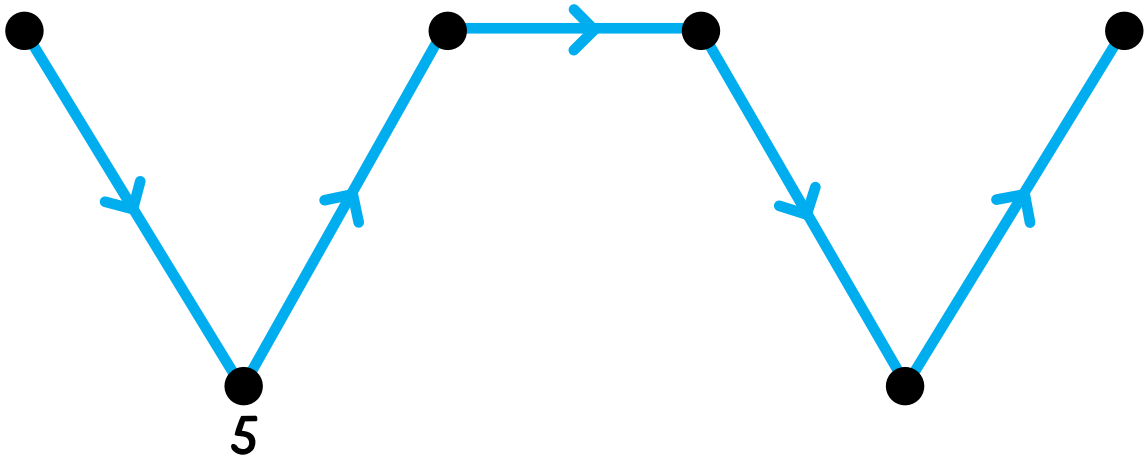
Name _____

N35 **



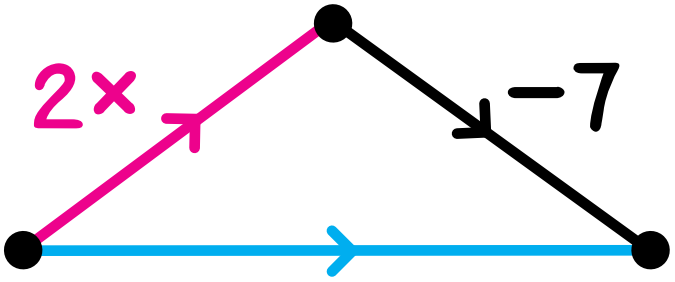
Label the dots.



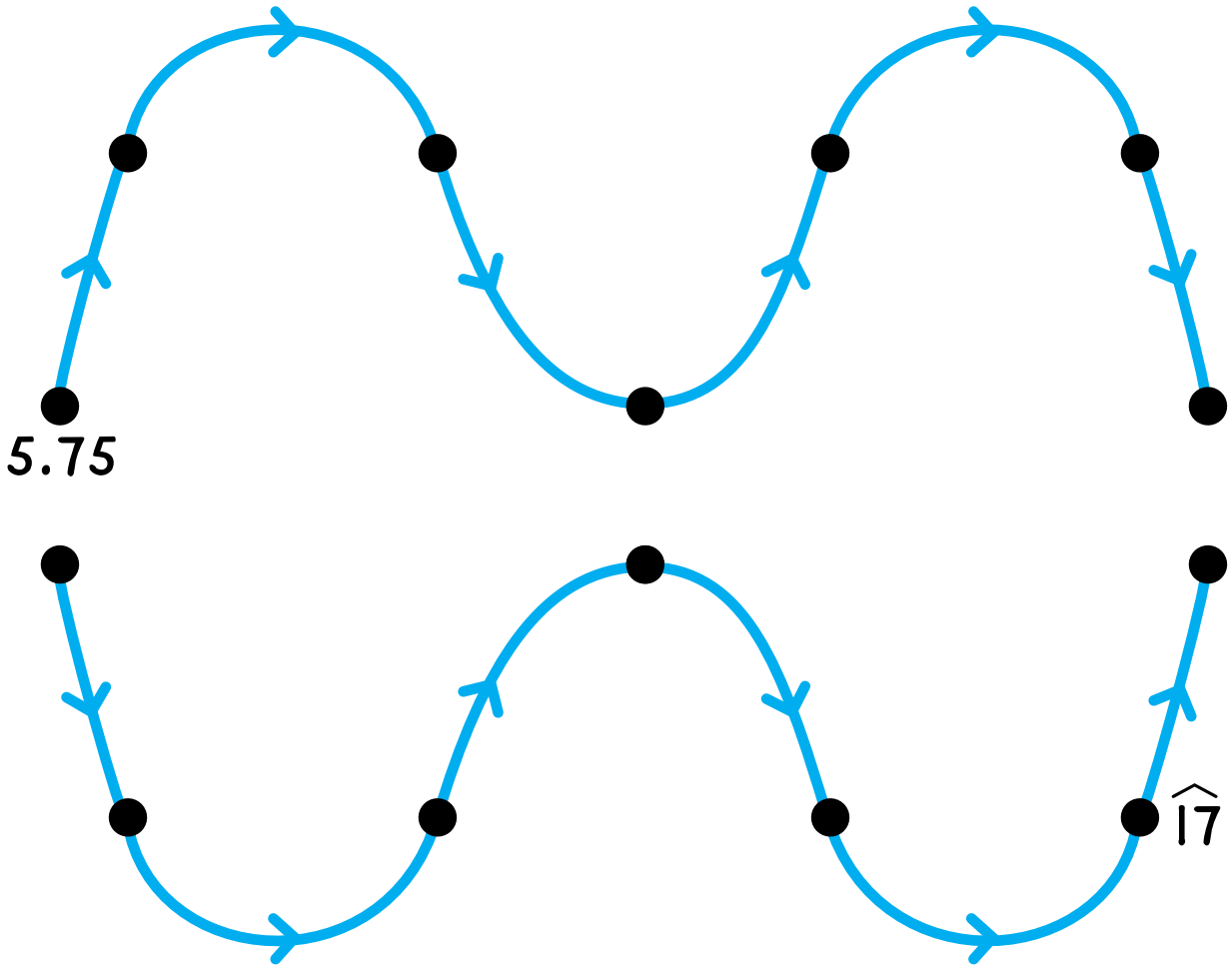


Name _____

N35 ***

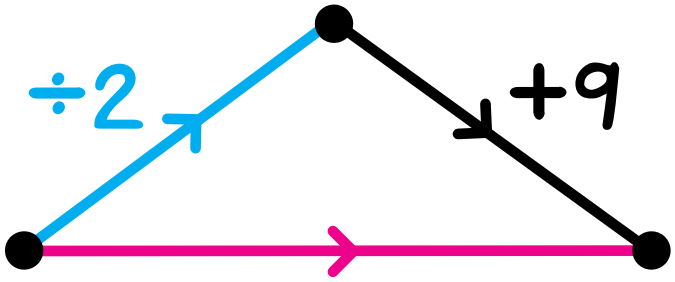


Label the dots.

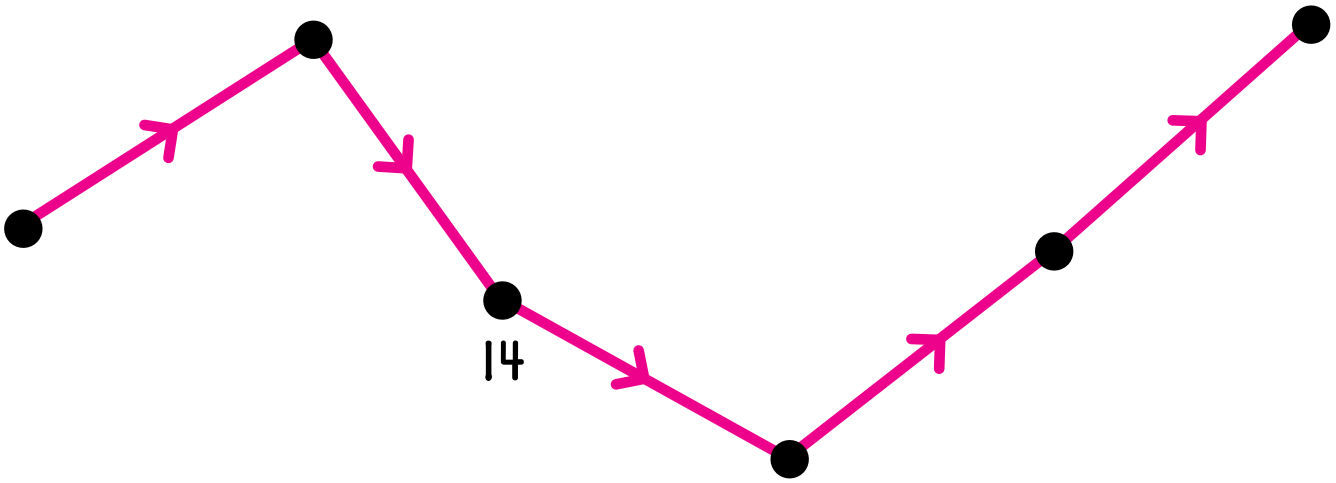


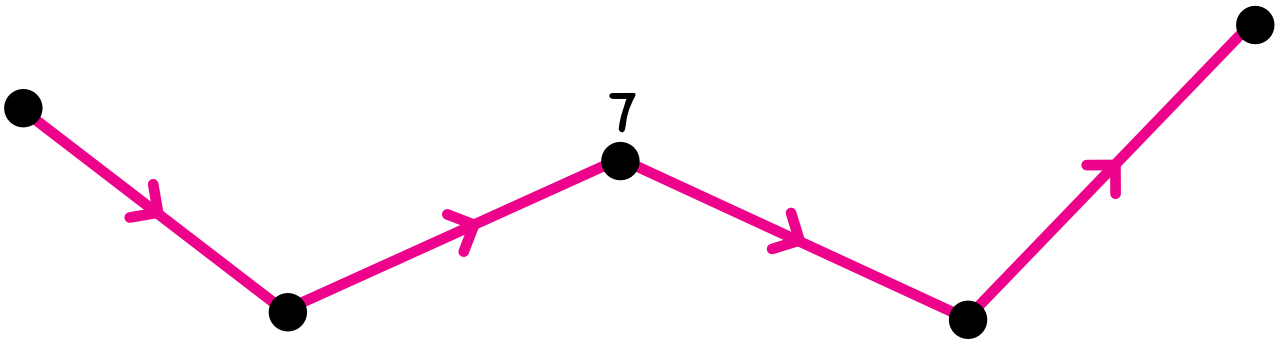
Name _____

N35 ****



Label the dots.



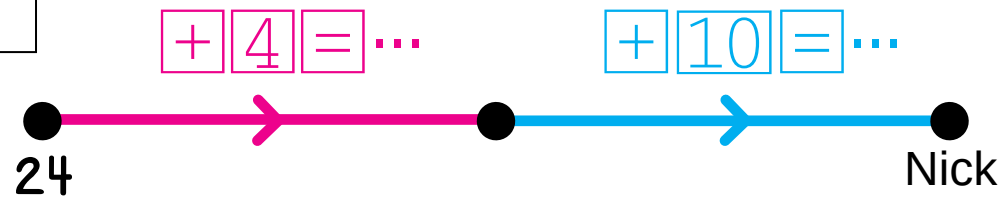


Name _____

N36 *

Nick is a secret number.

Clue 1

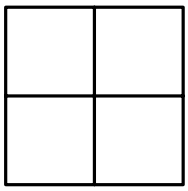


Nick could be ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, and so on.

Clue 2

Nick can be put on this Minicomputer board using exactly one of these checkers:

(2) (3) (4) (5) (6) (7) (8) (9)



Nick could be _____, _____, _____, or _____.

Clue 3

Nick is a square number.

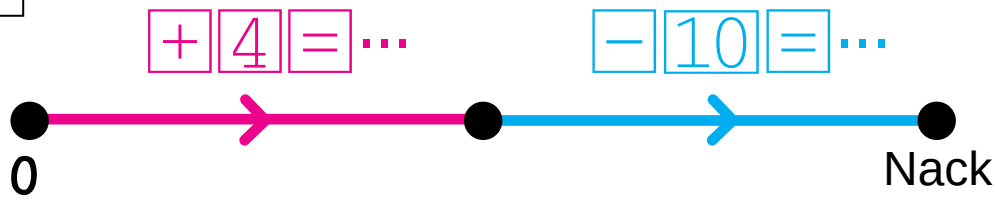
Who is Nick? _____

Name _____

N36 **

Nack is a secret number.

Clue 1

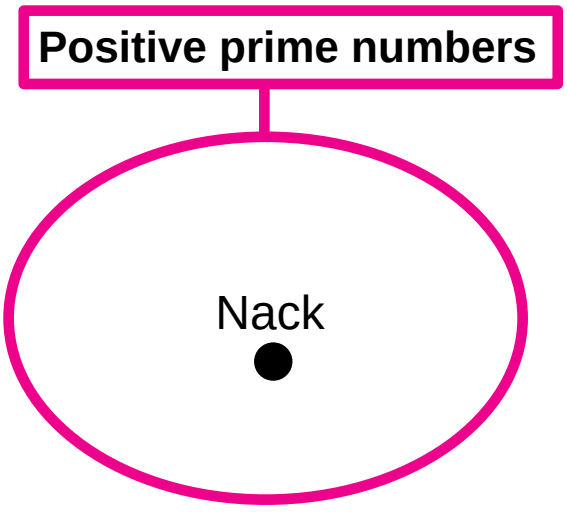


Nack could be _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, and so on.

What do you notice about the numbers that Nack could be?

_____

Clue 2



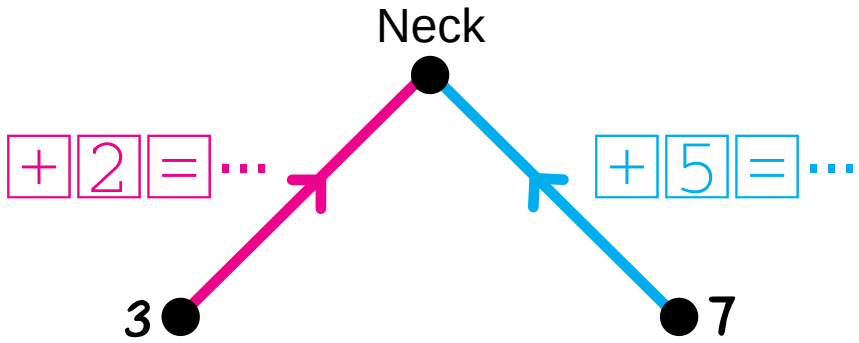
Who is Nack? _____

Name _____

N36 ***

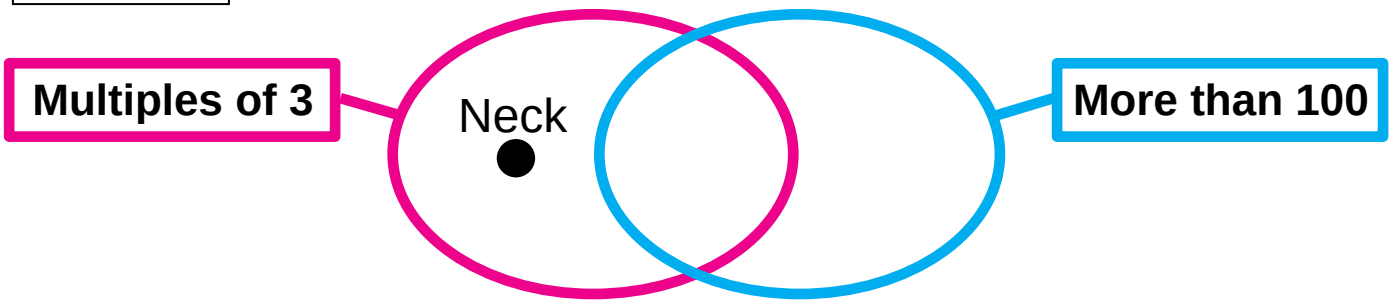
Neck is a secret number.

Clue 1



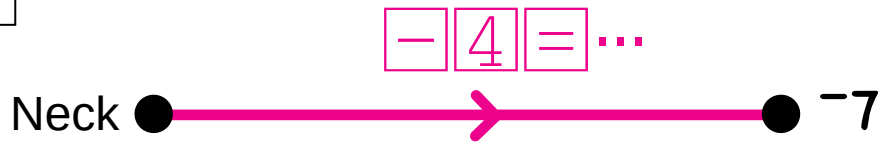
Neck could be ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, and so on.

Clue 2



Neck could be ____, ____, or ____.

Clue 3



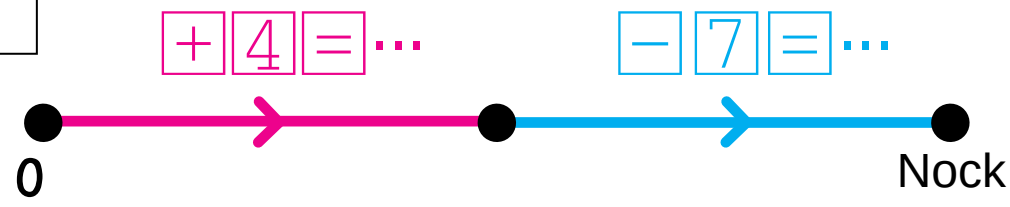
Who is Neck? _____

Name _____

N36 ****

Nock is a secret number.

Clue 1



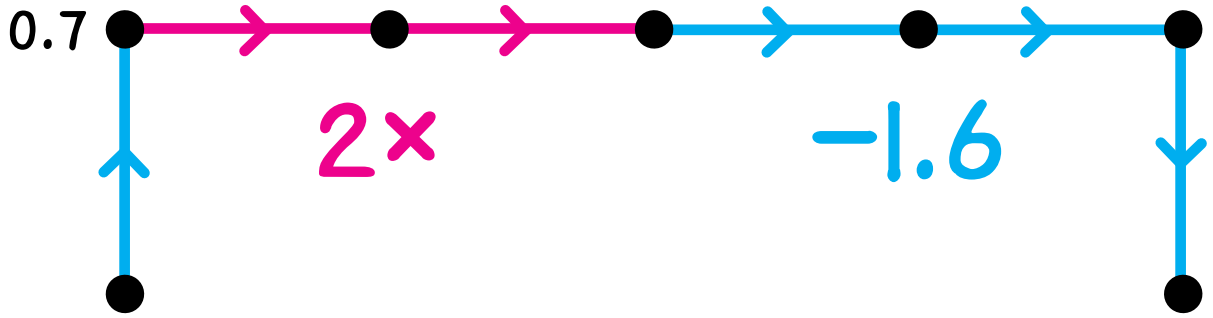
Nock could be ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, ____, and so on.

What do you notice about the numbers that Nock could be?

_____

Clue 2

Nock is in this arrow picture.

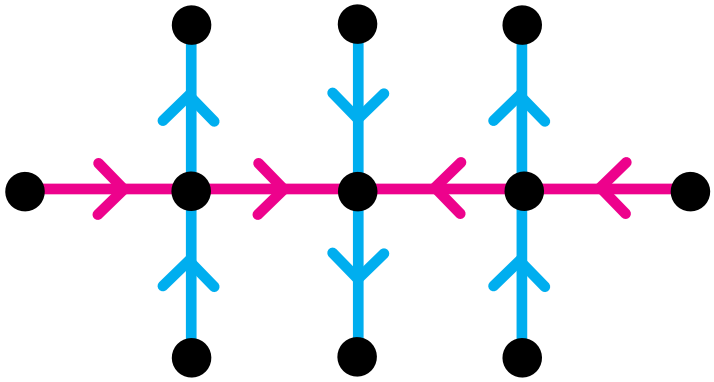


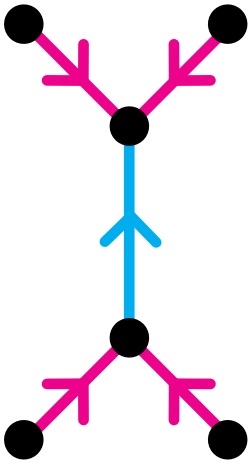
Who is Nock? _____

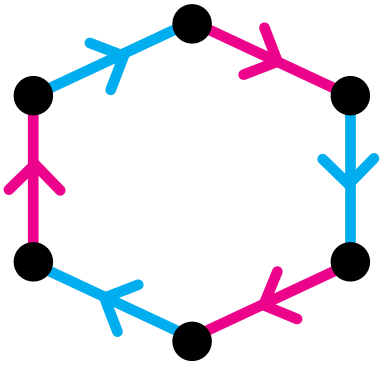
Name _____

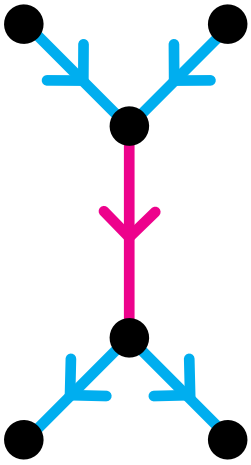
L2 *

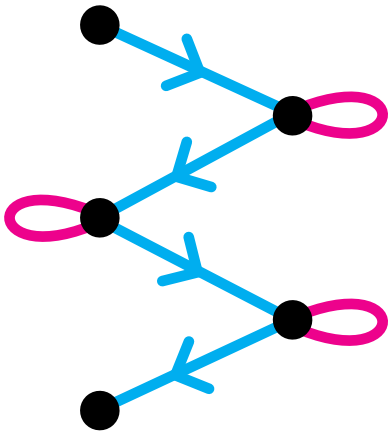
Draw all of the possible gray arrows and loops.

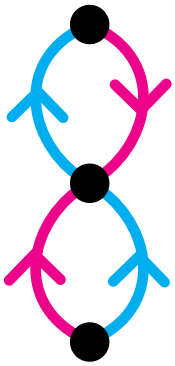


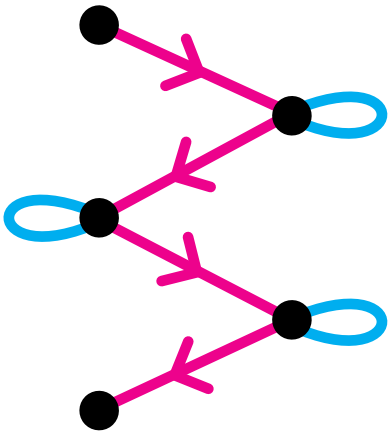








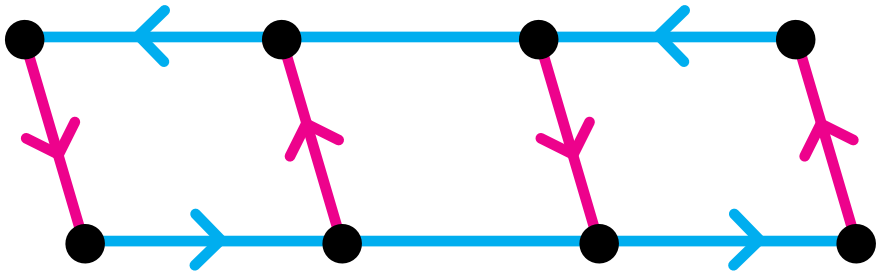


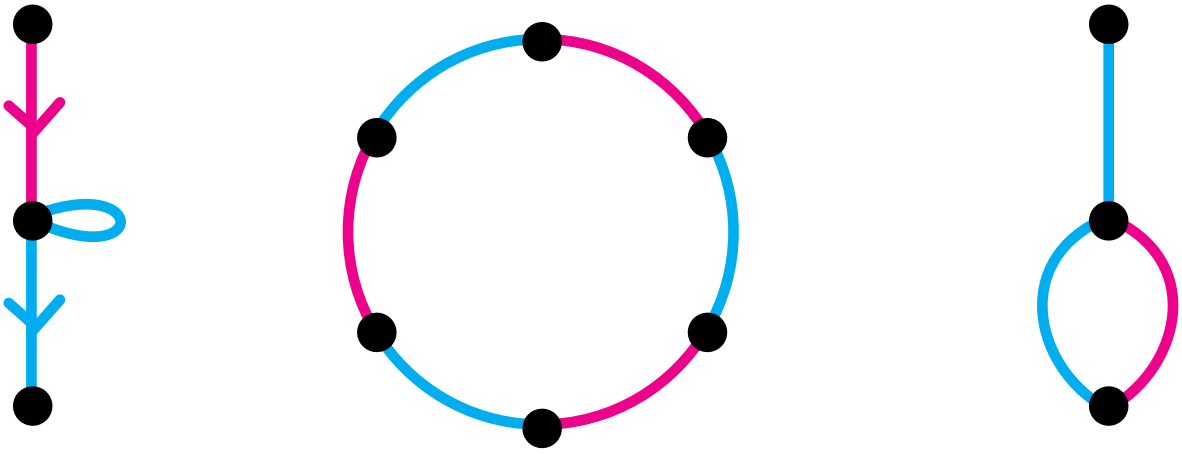


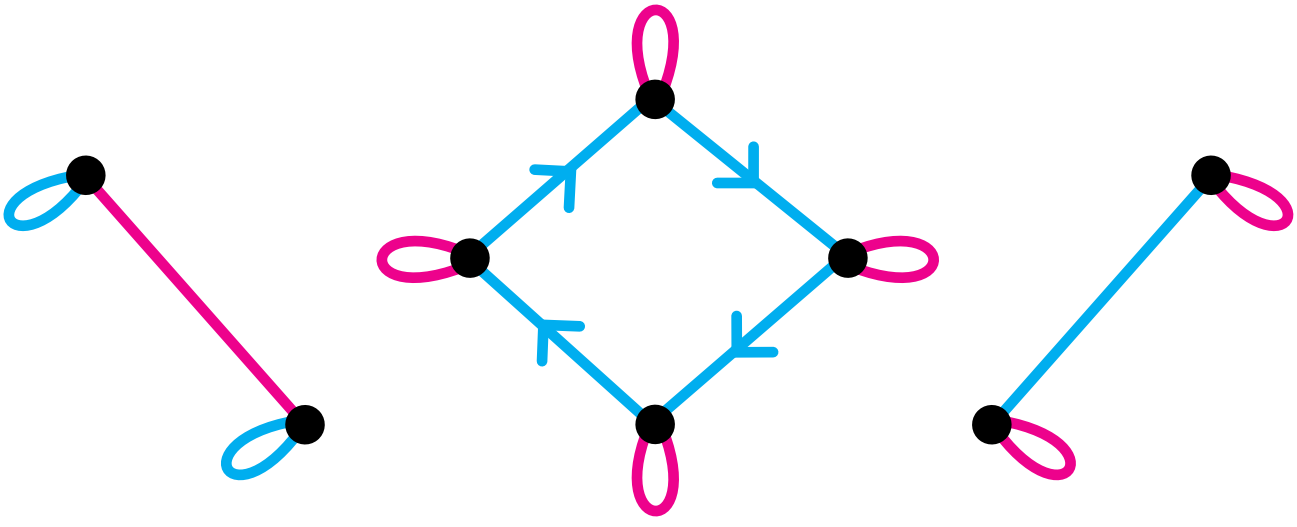
Name _____

L2 **

Draw all of the possible gray and black arrows, loops, and cords.



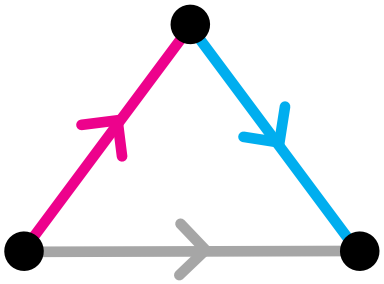


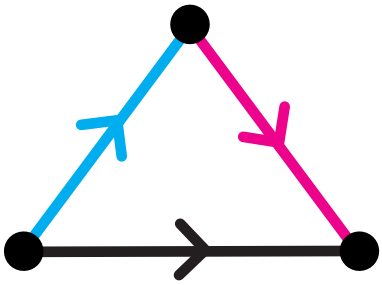


Name _____

L2 ***

Complete the table.





●	●	● ● = ●	● ● = ●
−6	−13		
5×	4×		
3×		6×	
	−7		−4
8×		4×	
you are my son	you are my sister		
		you are my maternal grandfather	
		you are my friend's brother	
you are 5 years older than I am	you are 3 years younger than I am		
you are older than I am	you are the same age as I am		

Name _____ L4 *

⊕: addition with 10-friends ⊗: multiplication with 10-friends

Complete.

2 ⊕ 4 ⊕ 6 ⊕ 8 = _____

2 ⊗ 4 ⊗ 6 ⊗ 8 = _____

1 ⊕ 3 ⊕ 5 ⊕ 7 ⊕ 9 = _____

1 ⊗ 3 ⊗ 5 ⊗ 7 ⊗ 9 = _____

3 ⊕ 4 ⊕ 5 ⊕ 6 = _____

3 ⊗ 4 ⊗ 5 ⊗ 6 = _____

What could the number in the box be?

☐ ⊗ 7 = 3 _____

4 ⊗ ☐ = 2 _____ or _____

5 ⊗ ☐ = 5 ____, ____, ____, ____, or ____

Name _____ L4 **

⊗: multiplication with 10-friends

Complete.

$3^1 = 3$

$3^2 = 3 \otimes 3 =$ _____

$3^3 = 3 \otimes 3 \otimes 3 =$ _____

$3^4 = 3 \otimes 3 \otimes 3 \otimes 3 =$ _____

$3^5 =$ _____ $3^9 =$ _____

$3^6 =$ _____ $3^{10} =$ _____

$3^7 =$ _____ $3^{11} =$ _____

$3^8 =$ _____ $3^{12} =$ _____

$3^{25} =$ _____

$3^{47} =$ _____

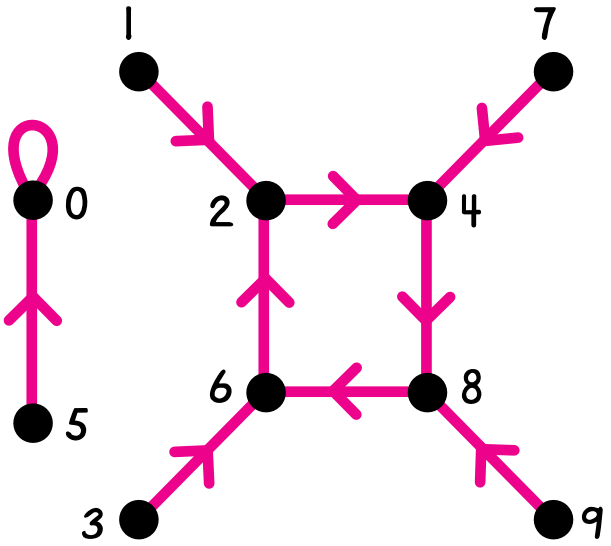
$3^{100} =$ _____

Name _____

L5(a)

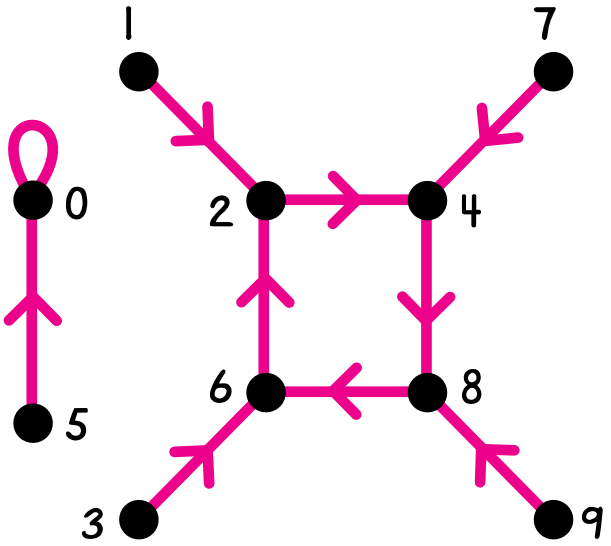
$R = 2 \otimes$

$\mathbb{R}^2 = \square \otimes$



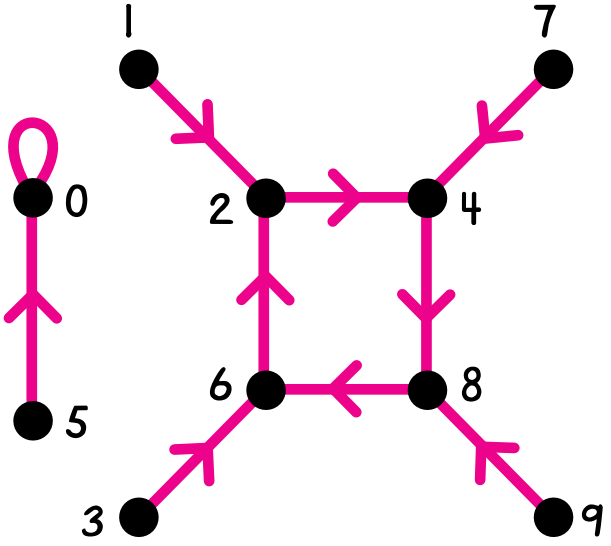
$R = 2 \otimes$

$\mathbb{R}^3 = \square \otimes$



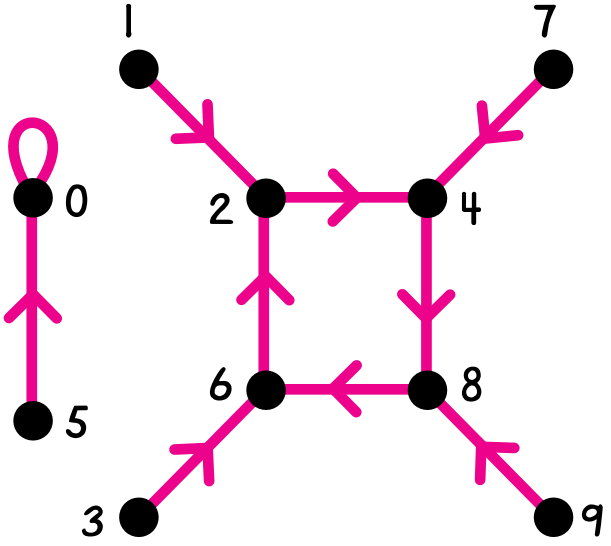
$R = 2 \otimes$

$\mathbb{R}^4 = \square \otimes$



$R = 2 \otimes$

$\mathbb{R}^5 = \square \otimes$

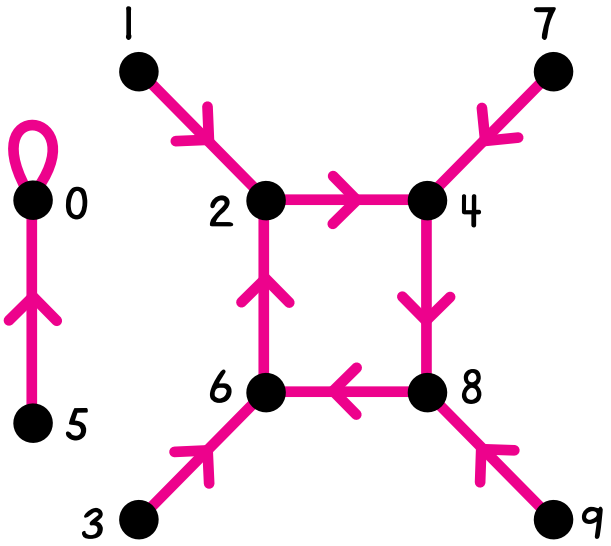


Name _____

L5(b)

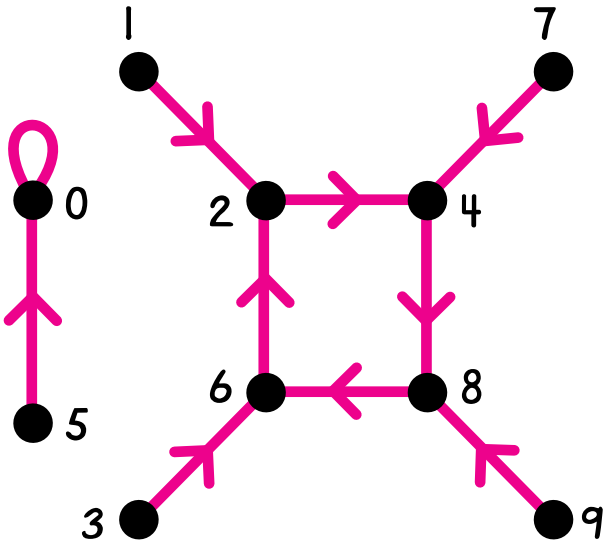
$R = 2 \otimes$

$\mathbb{R}^6 = \square \otimes$



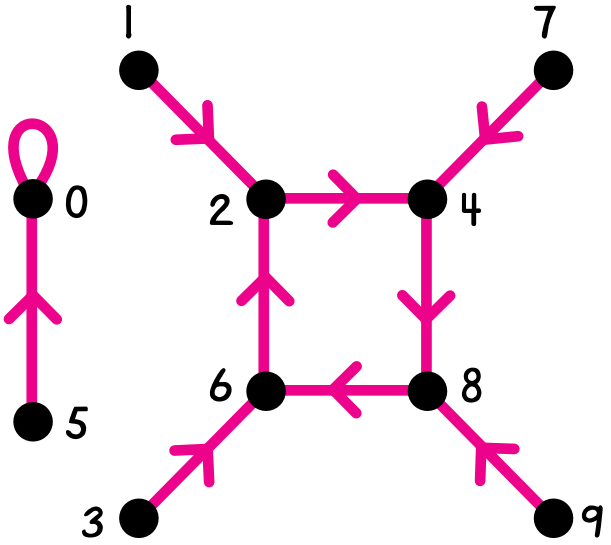
$R = 2 \otimes$

$\mathbb{R}^7 = \square \otimes$



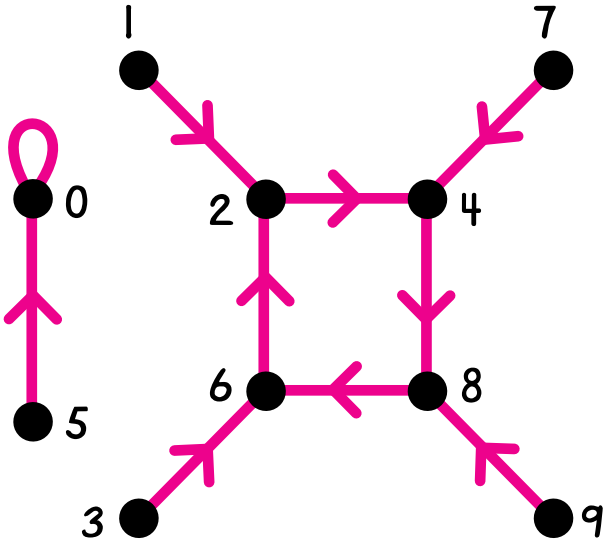
$R = 2 \otimes$

$\mathbb{R}^8 = \square \otimes$



$R = 2 \otimes$

$\mathbb{R}^9 = \square \otimes$

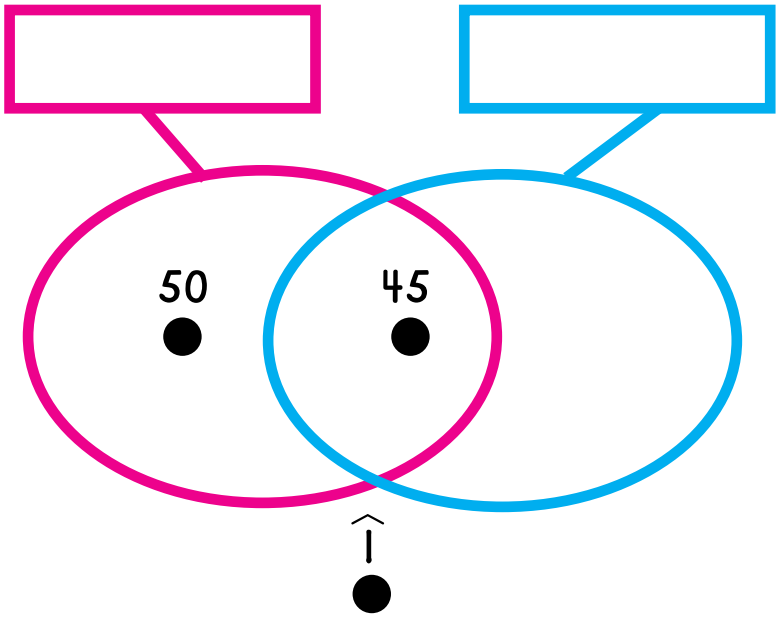


Name _____

L8 *

Cross out the labels that the strings cannot have. Some are done for you.

Label the strings.



Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
~~Odd Numbers~~	~~Odd Numbers~~
Positive Prime Numbers	Positive Prime Numbers
~~Greater than 50~~	~~Greater than 50~~
~~Less than 50~~	~~Less than 50~~
~~Greater than $\widehat{10}$~~	~~Greater than $\widehat{10}$~~
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
~~Positive Divisors of 18~~	~~Positive Divisors of 18~~
~~Positive Divisors of 20~~	~~Positive Divisors of 20~~
~~Positive Divisors of 24~~	~~Positive Divisors of 24~~
~~Positive Divisors of 27~~	~~Positive Divisors of 27~~

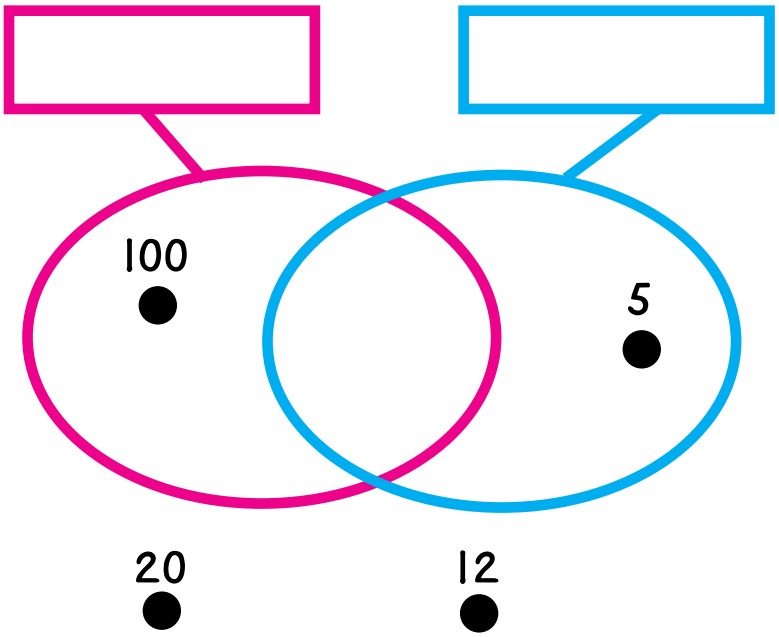
Put these numbers in the string picture.

$\widehat{55}$ $\widehat{15}$ 0 6 7 8 20 27 99 105

Name _____

L8 **

Cross out the labels that the strings cannot have.



Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

The label for the red string is _____ .

The label for the blue string could be _____ or _____ .

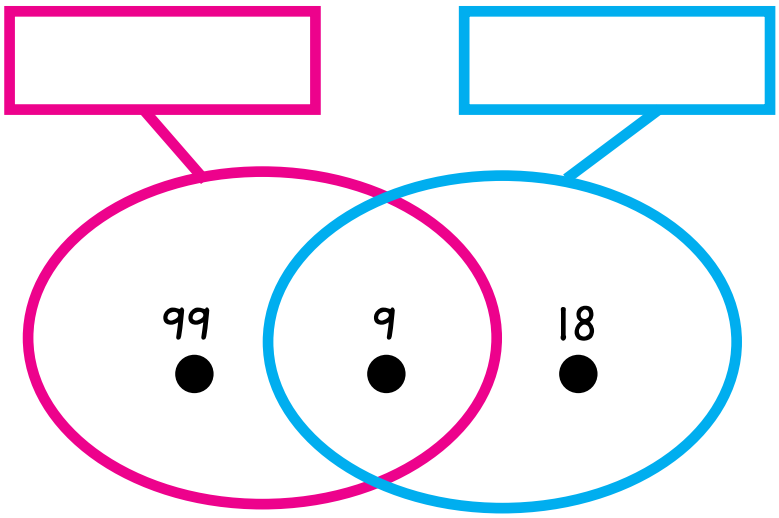
Exactly four of the numbers below cannot be put in the string picture because the label of the blue string is not known. Circle these four numbers. Put all of the other numbers in the string picture.

$\widehat{80}$ $\widehat{15}$ 2 3 7 24 50 60 99 105

Name _____

L8 ***

Cross out the labels that the strings cannot have.



Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

The label for the red string is _____ .

The label for the blue string could be _____ or _____ .

It is your turn in The String Game. You want to find the label of the blue string.

1) You can find the label for the blue string by playing exactly one of these numbers, even if you get a NO answer. Circle the number that you should play.

3 105 60 7 2

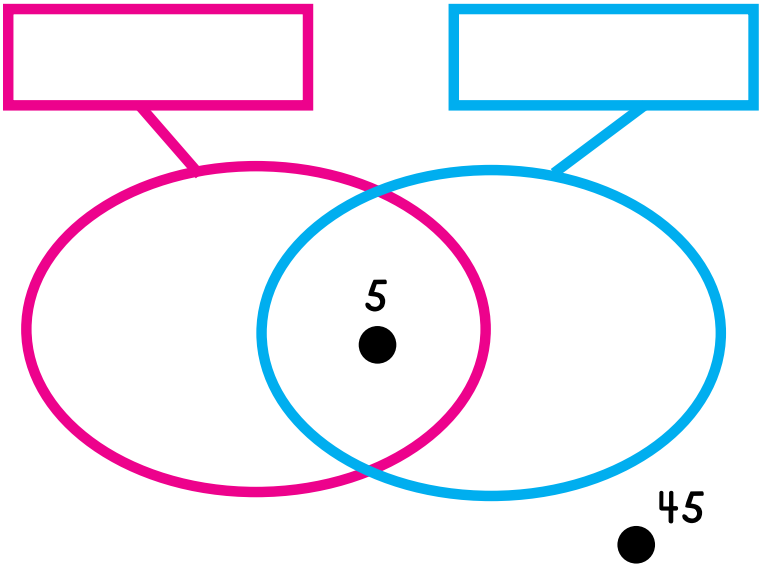
2) Repeat problem (1) but with these numbers.

20 100 6 55 1

Name _____

L8 ****

Cross out the labels that the strings cannot have.



Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

The label for the red string could be

_____ or _____ .

The label for the blue string could be

_____ or _____ .

Some of these numbers cannot be put in the string picture because the string labels are not known. Circle them. Put the others in the string picture.

$\widehat{55}$ $\widehat{15}$ 2 3 4 8 9 10 24 105

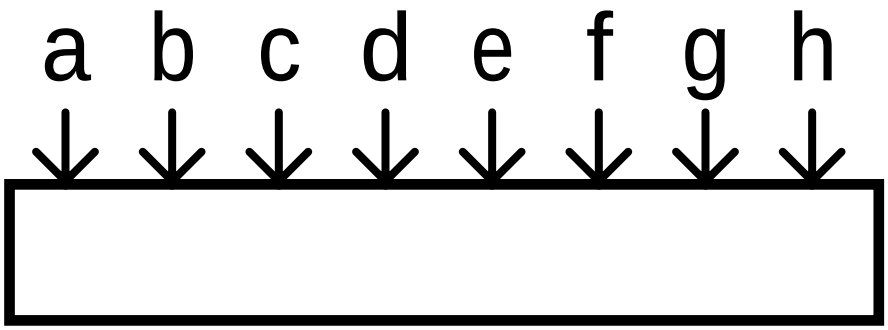
It is your turn in The String Game. Assume the strings have different labels. By playing exactly one of these numbers you can find both of the string labels, even if you get a NO answer. Circle the number you should play.

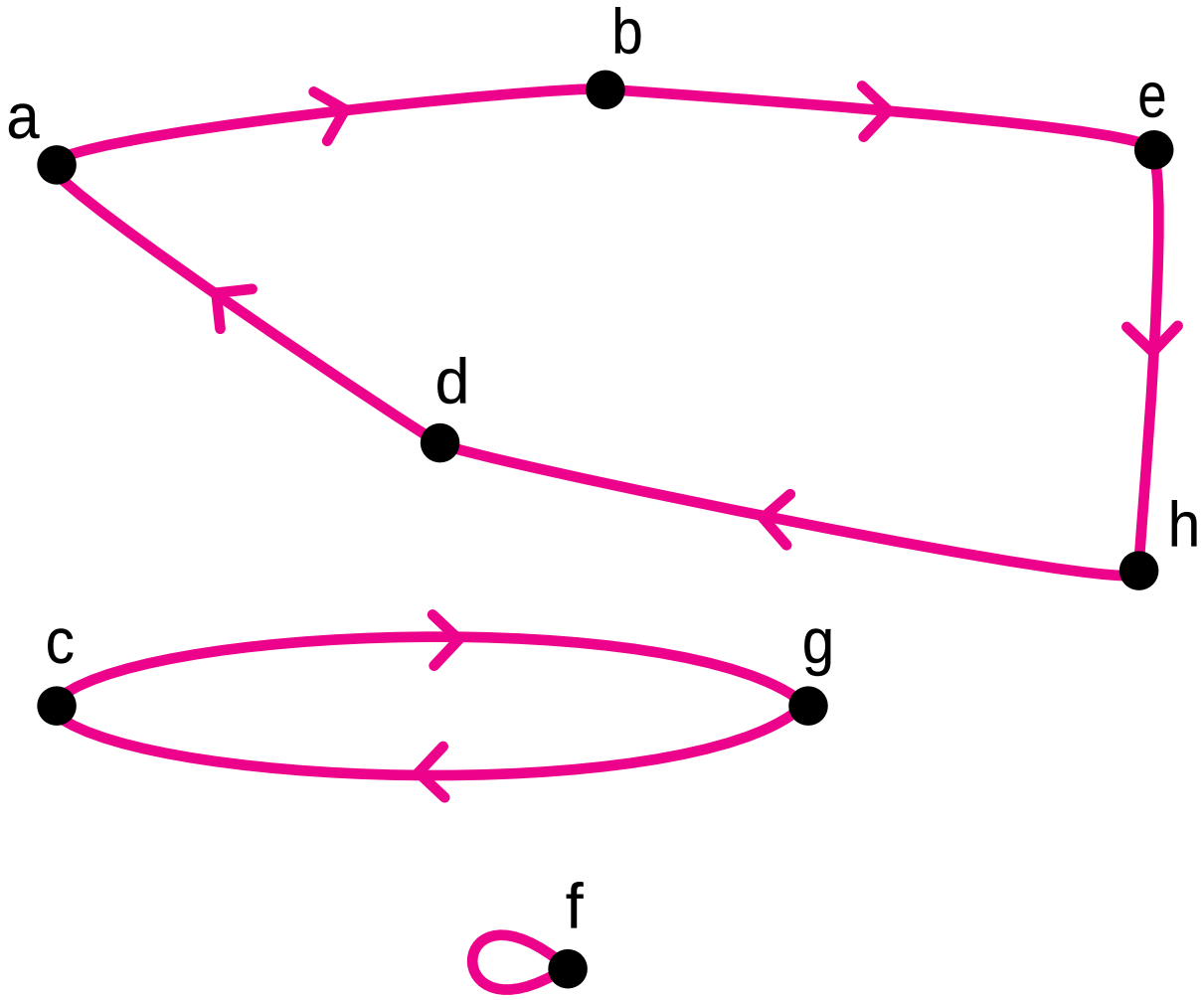
20 100 6 55 $\widehat{1}$

Name _____

L9(a)

Write the code word for this arrow picture.



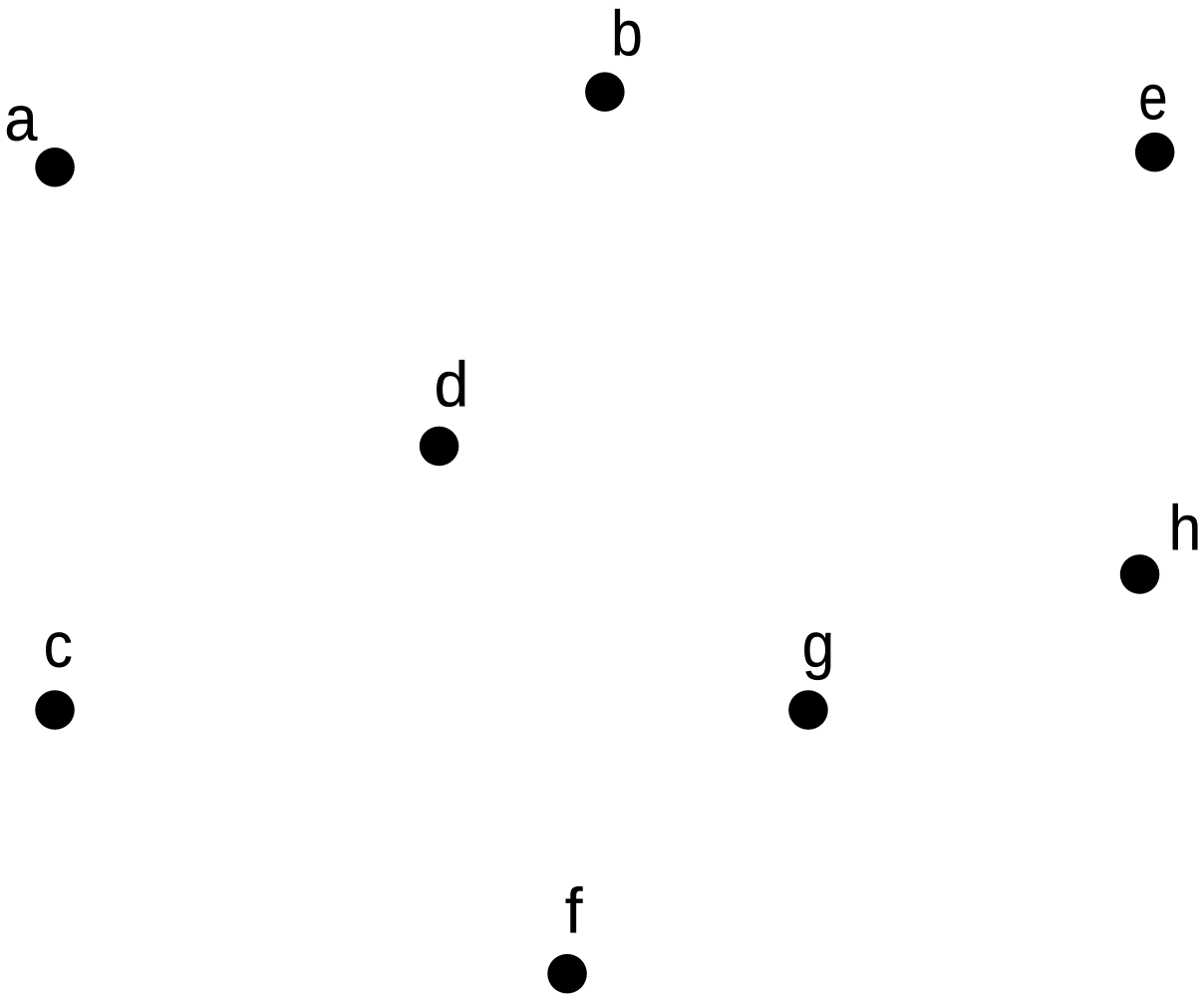


Name _____

L9(b)

d b a f h c g e

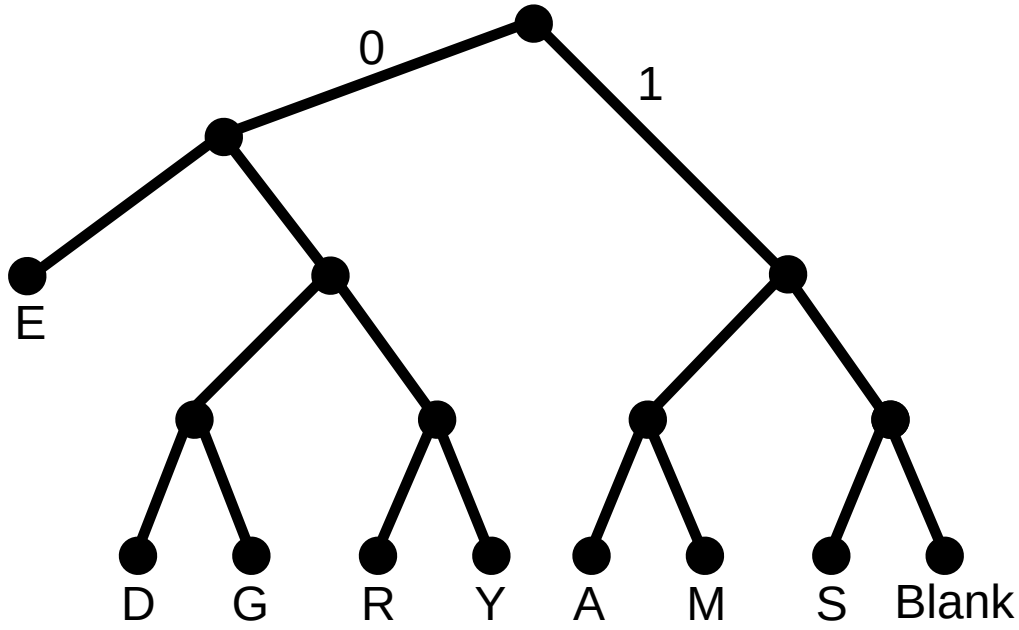
Draw the arrow picture for this code word.



Name _____

L11 *

Decode this message from Mr. Huffman.

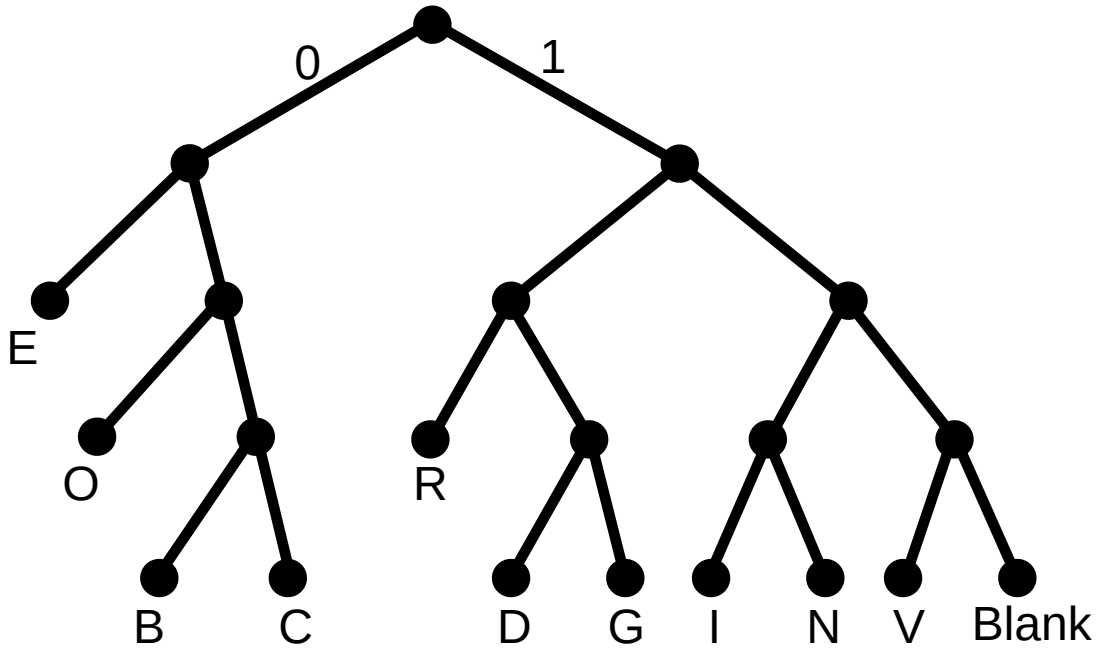


*0*11*000*1*000*1*00*1111*0*1*0*1111111*0*1*00*11*0*11*0*1*000*1*0*1*00*

Name _____

L11 **

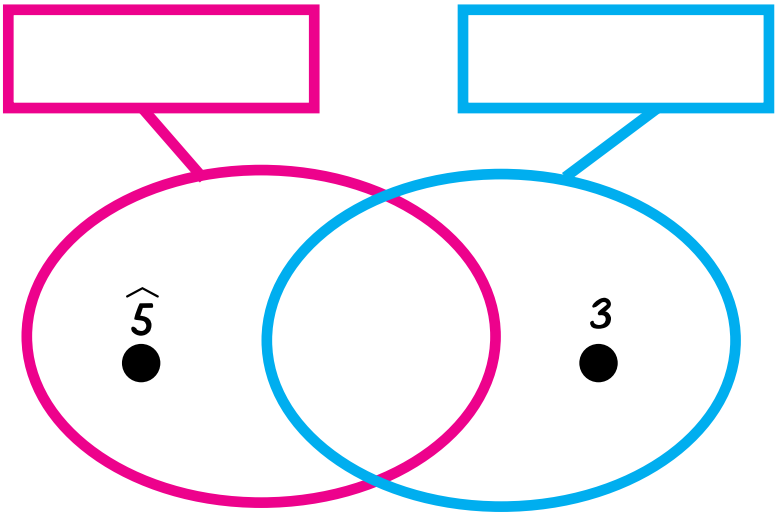
Use this tree to write a 0-1 message for Boris to send to Mr. Huffman.



COVER BRIDGE ONE

Name _____ L12 *

Cross out the labels that the strings cannot have. Some are done for you.



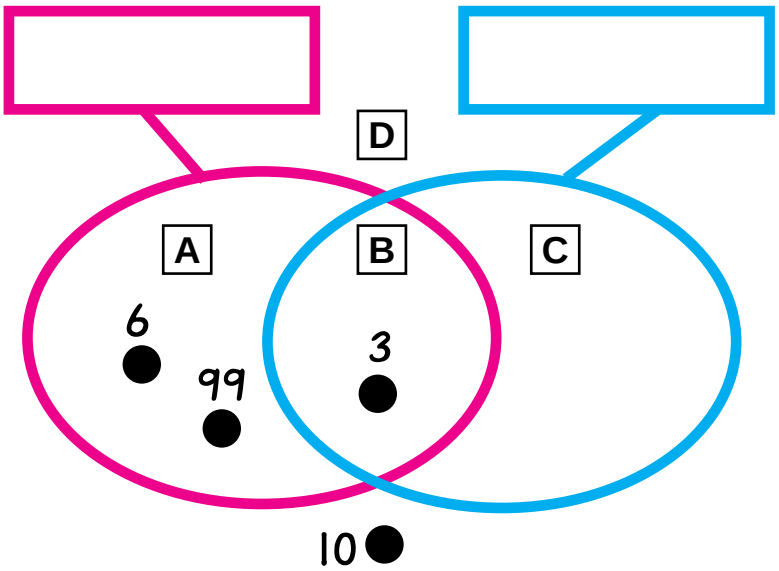
Red	Blue
~~Multiples of 2~~	~~Multiples of 2~~
Multiples of 3	Multiples of 3
~~Multiples of 4~~	~~Multiples of 4~~
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
~~Greater than 50~~	~~Greater than 50~~
~~Less than 50~~	~~Less than 50~~
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
~~Positive Divisors of 20~~	~~Positive Divisors of 20~~
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

For each statement, circle one of the following: T (True)
F (False)
CT (Can't Tell)

1. The red string is for **Less than $\widehat{10}$**. T F CT
2. The blue string is for **Positive Prime Numbers**. T F CT
3. The red string is for **Odd Numbers**. T F CT
4. The blue string is for **Odd Numbers**. T F CT
5. The red string is for **Multiples of 5**. T F CT
6. The blue string is for **Positive Divisors of 27**. T F CT

Name _____ L12 **

Cross out the labels that the strings cannot have. Some are done for you.



Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	~~Multiples of 3~~
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
~~Odd Numbers~~	~~Odd Numbers~~
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
~~Greater than $\widehat{10}$~~	~~Greater than $\widehat{10}$~~
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
~~Positive Divisors of 18~~	~~Positive Divisors of 18~~
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
~~Positive Divisors of 27~~	Positive Divisors of 27

The label for the red string is _____ .

The label for the blue string could be _____ or _____ .

In the string picture, four regions are labeled: **A**, **B**, **C**, **D**.
For each statement, circle one of the following: T (True)
F (False)
CT (Can't Tell)

1) $\widehat{15}$ is in region **A**. T F CT

2) 1 is in region **C**. T F CT

3) 0 is in region **B**. T F CT

4) 20 is in region **A**. T F CT

5) 20 is in region **D**. T F CT

6) 9 is in region **B**. T F CT

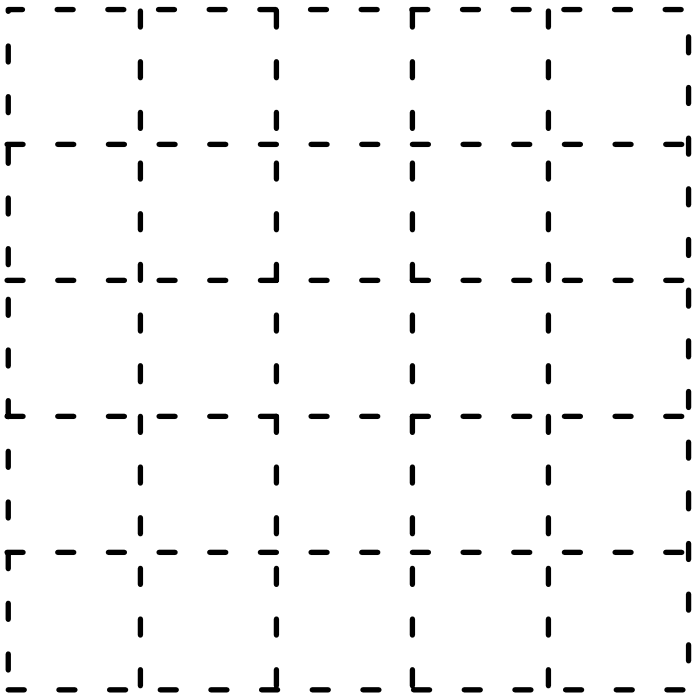
7) 105 is in region **D**. T F CT

8) 27 is in region **A**. T F CT

Name _____

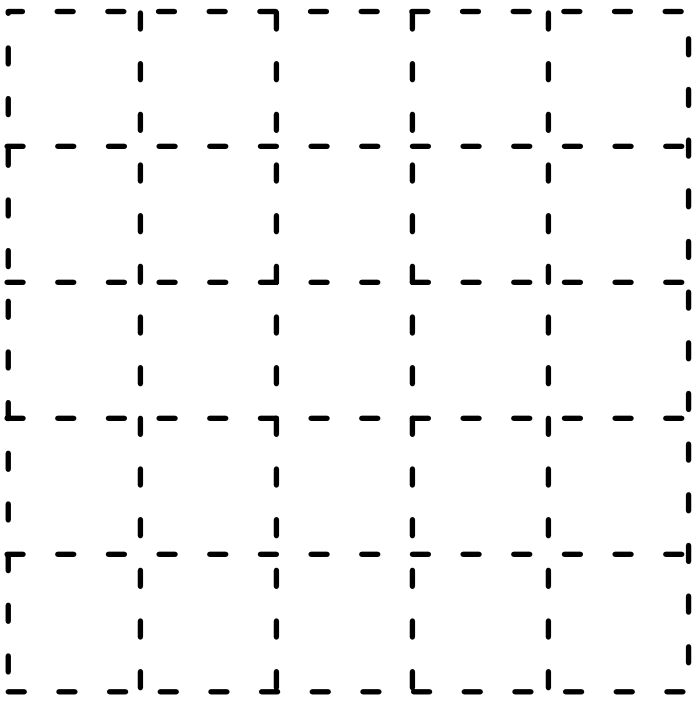
G2(a)

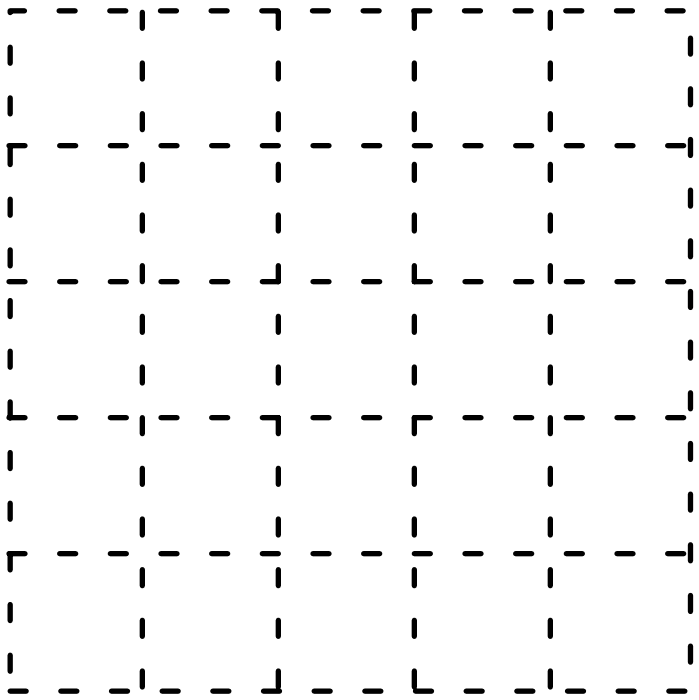
Draw two different designs for the aquarium. Try to include as many glass panels as possible.



number of panels: _____

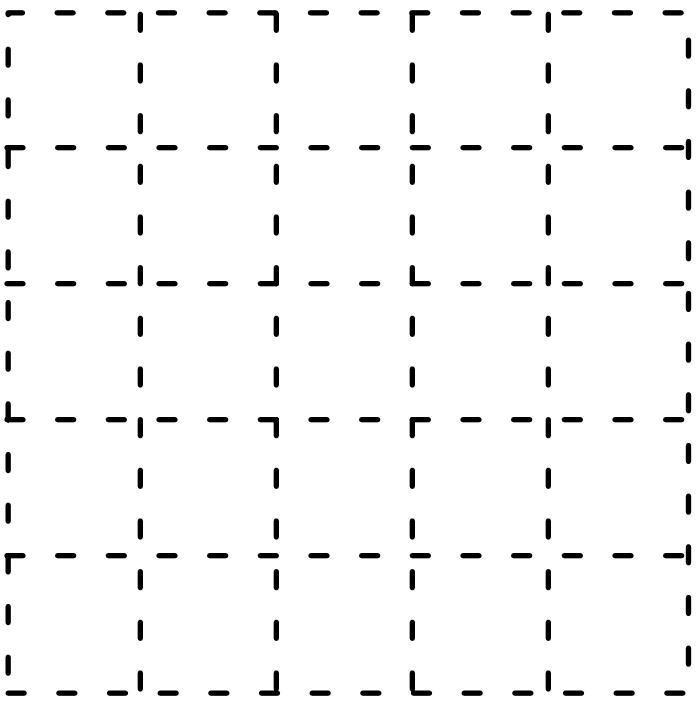
number of panels: _____





number of panels: _____

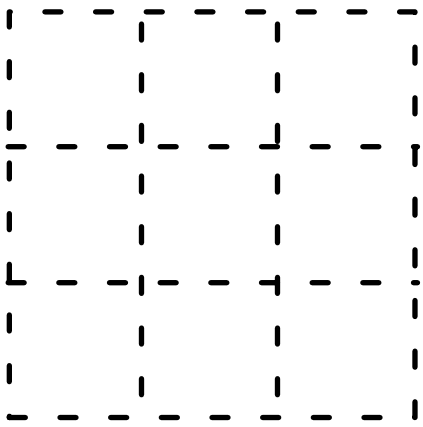
number of panels: _____



Name _____

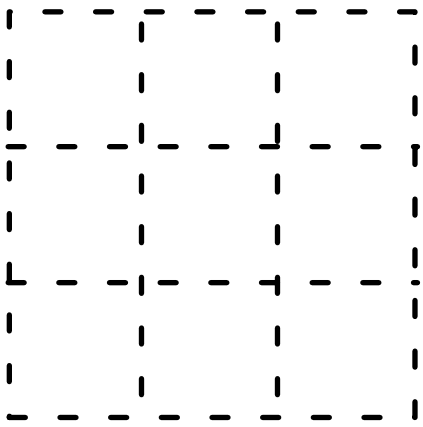
G2(b)

Draw designs for an aquarium.
Try to include as many glass panels as possible.
What is the maximum number of places that posts could be put? _____



number of panels: _____

number of posts: _____



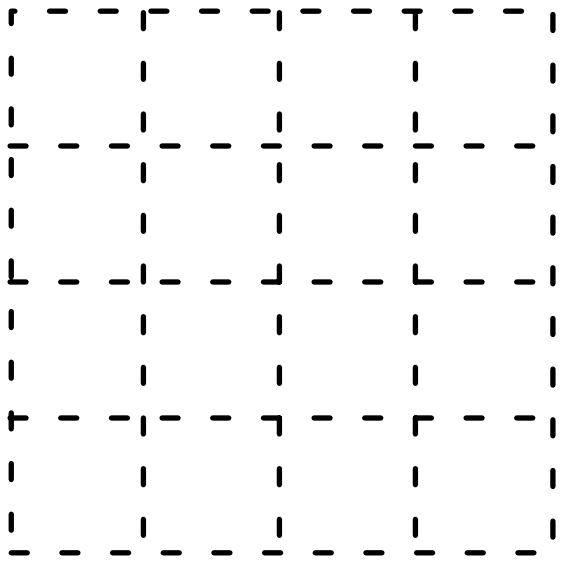
number of panels: _____

number of posts: _____

Name _____

G2(c)

Draw three different designs for an aquarium.
Try to include as many glass panels as possible.
What is the maximum number of places that posts could be put? _____

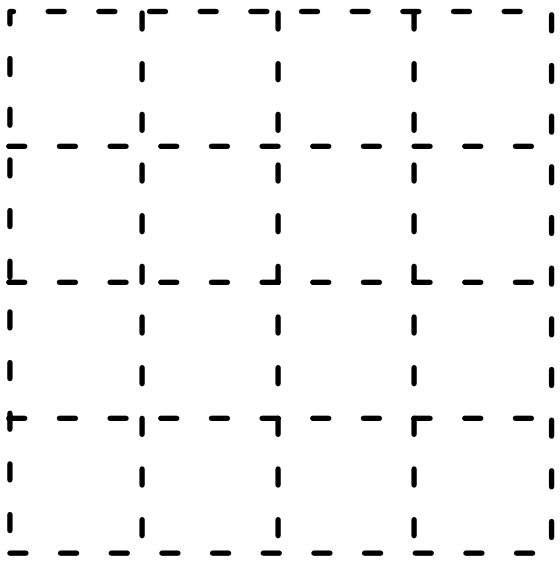


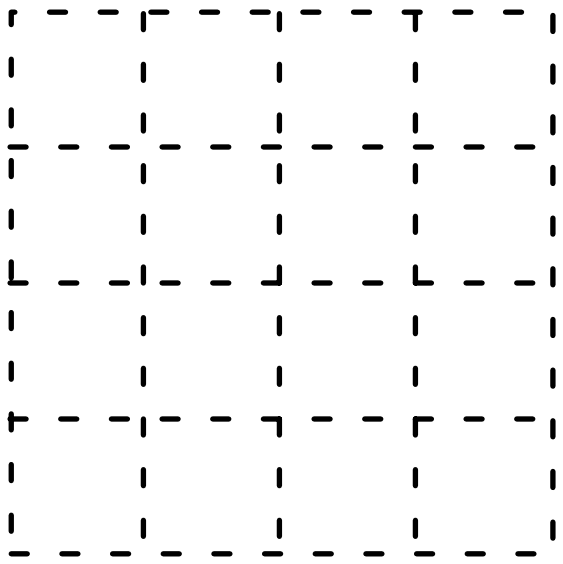
number of panels: _____

number of posts: _____

number of panels: _____

number of posts: _____





number of panels: _____

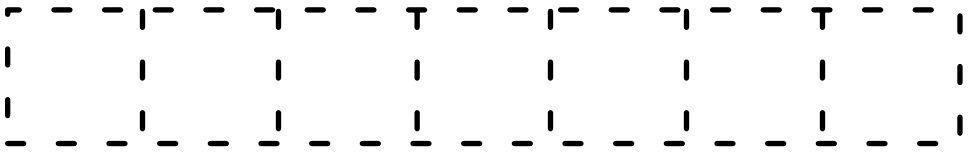
number of posts: _____

Name _____

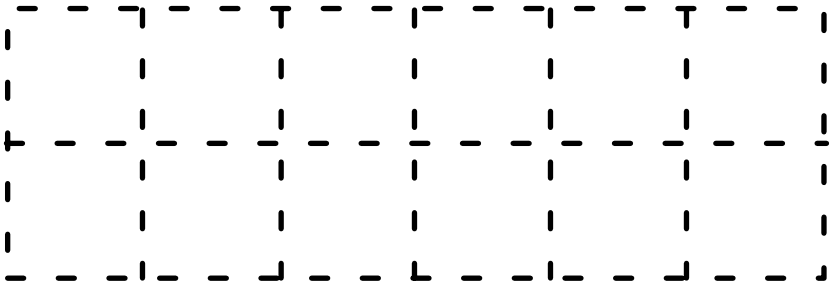
G3(a)

Draw designs for these aquariums.
Try to include as many glass panels as possible.

A



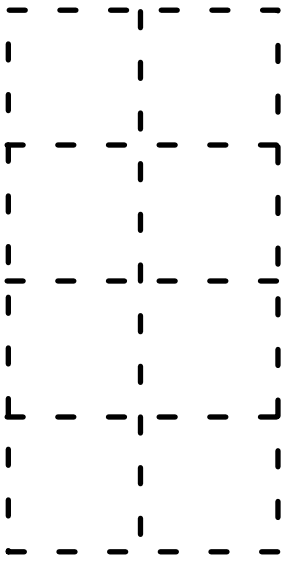
number of panels: _____ number of posts: _____



B

number of panels: _____

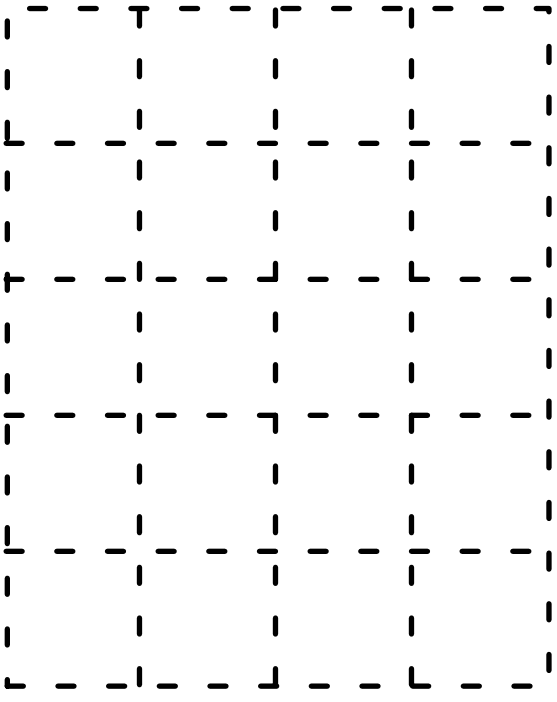
number of posts: _____



C

number of panels: _____

number of posts: _____



D

number of panels: _____

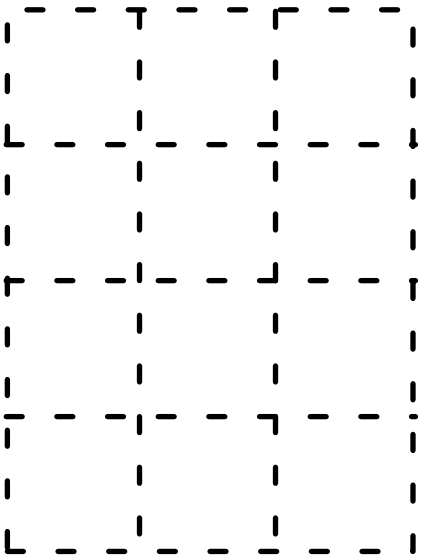
number of posts: _____

Name _____

G3(b)

Draw designs for these aquariums.
Try to include as many glass panels as possible.

E



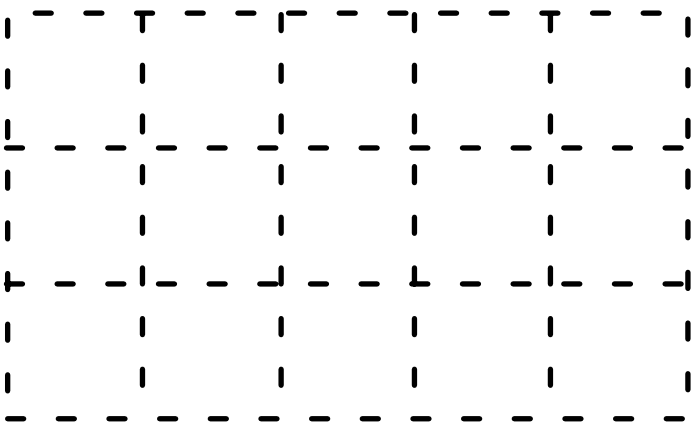
number of panels: _____

number of posts: _____

number of panels: _____

number of posts: _____

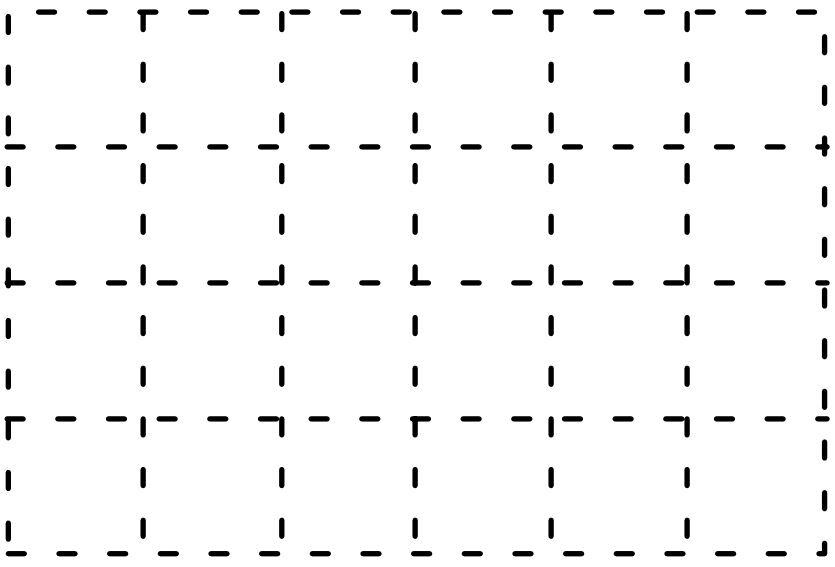
F



G

number of panels: _____

number of posts: _____

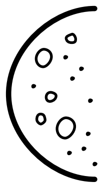


Name ________________

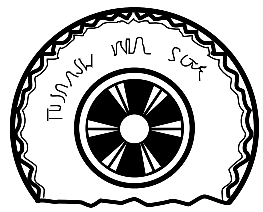
G4(a)

Use a mirror to solve these problems.

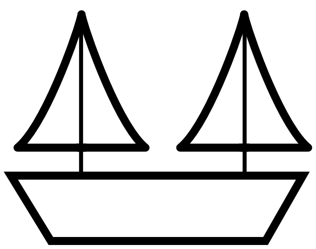
Can you see a full moon? _____



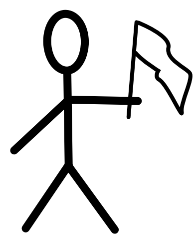
Can you fix the flat tire? _____



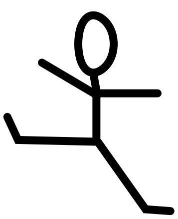
Can you see a boat with three sails? _____



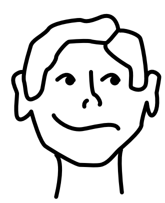
Can you see a stick-figure holding two flags? _____



Can you see the dancer jump? _____



Can you see the boy smile? _____



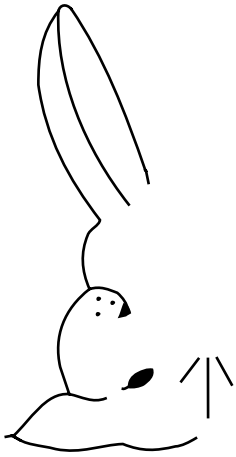
Can you read Boris’s message? _____

Name _____

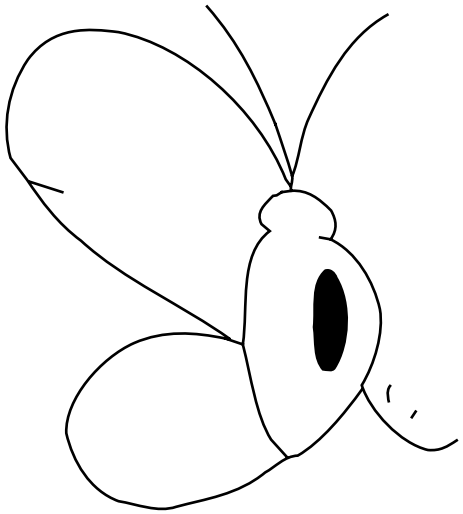
G4(b)

Use these patterns and a mirror to see each of the designs on Worksheet G4(c)

1



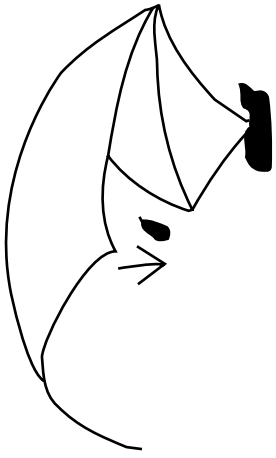
2



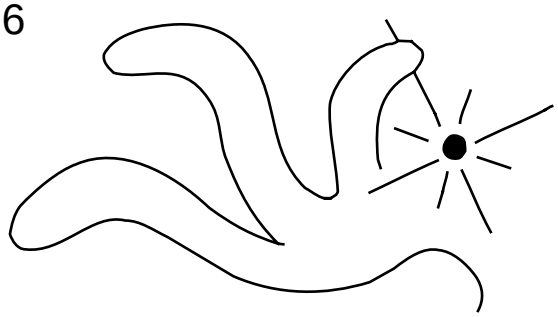
3

4

5



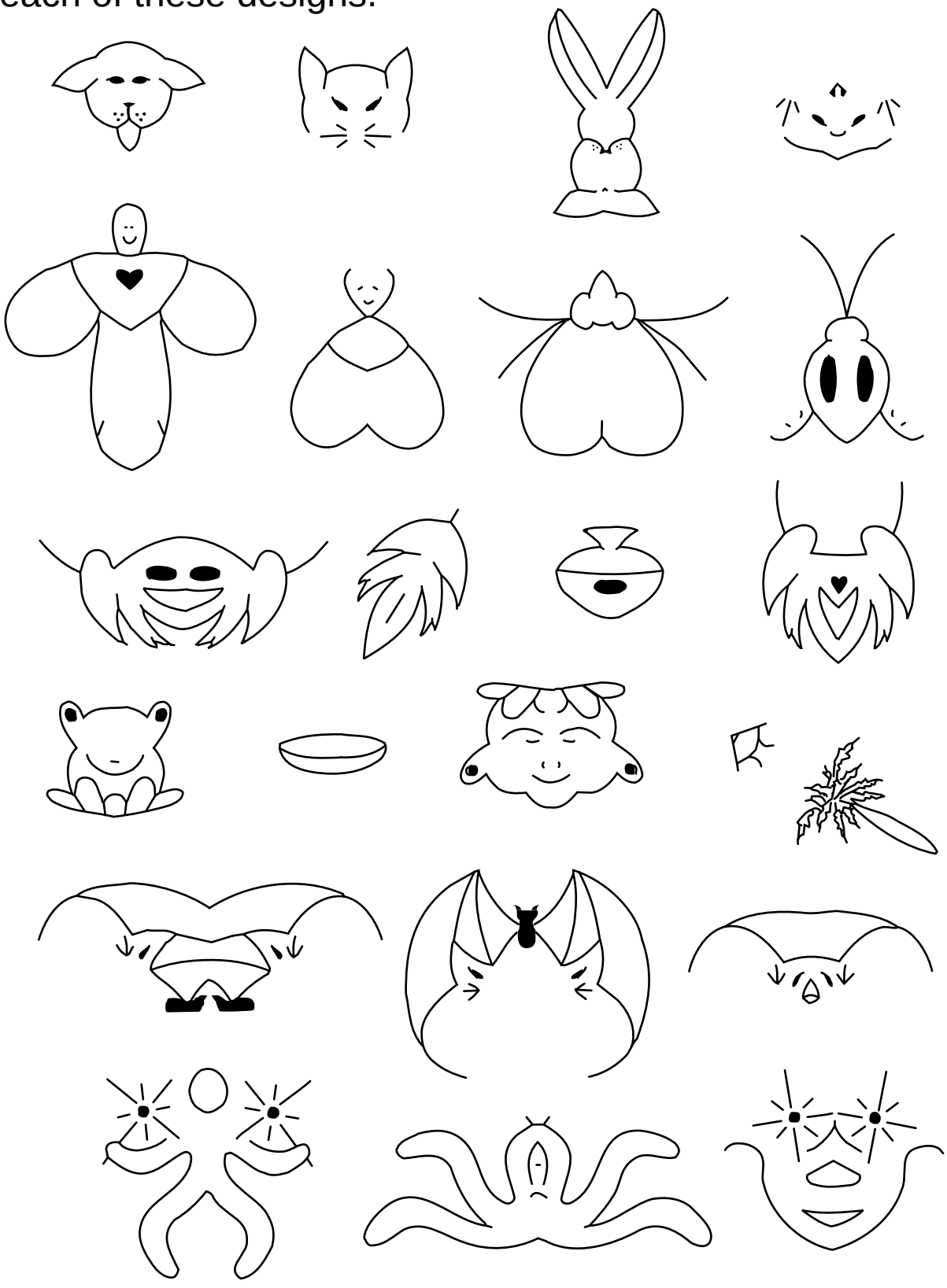
6



Name _____

G4(c)

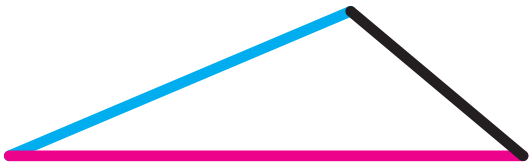
Use the patterns on Worksheet G4(b) and a mirror to see each of these designs.



Name _____

G4(d)

Use this triangle and a mirror to see the designs on Worksheets G4(e), (f), and (g).

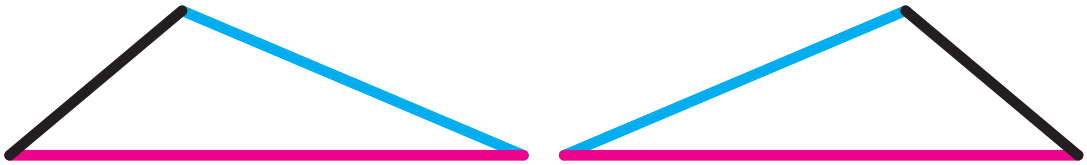


Name _____

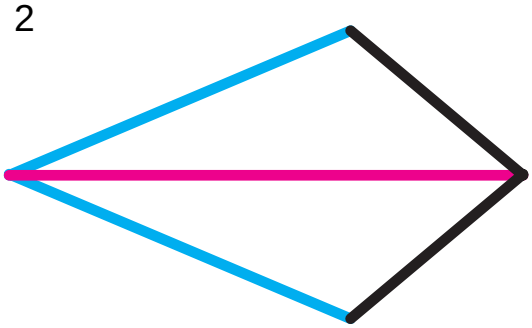
G4(e)

Which of these designs can be seen using a mirror and the triangle on Worksheet G4(d)?

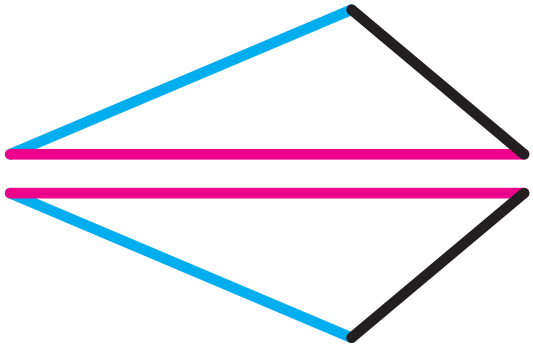
1



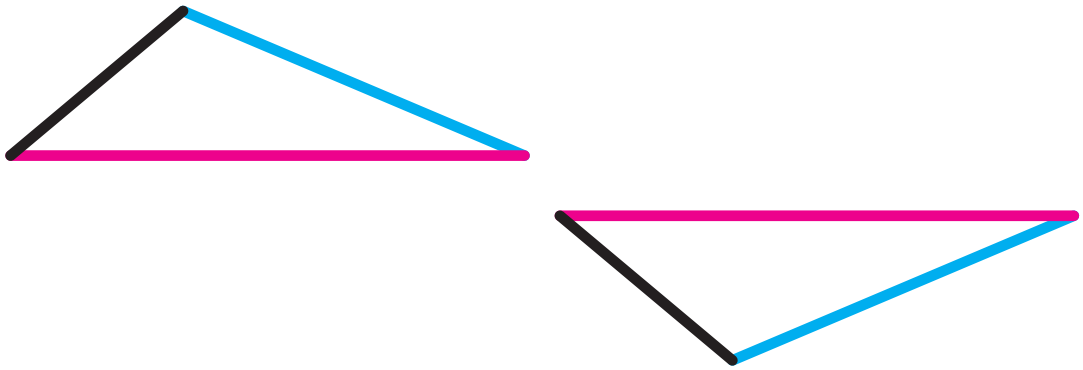
2



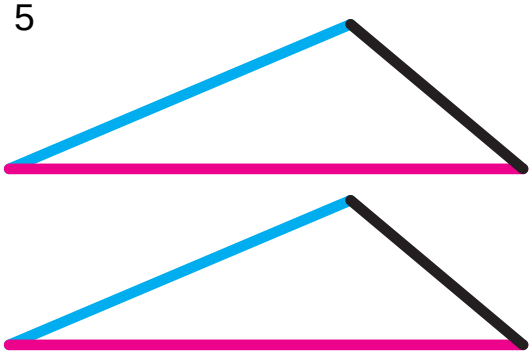
3



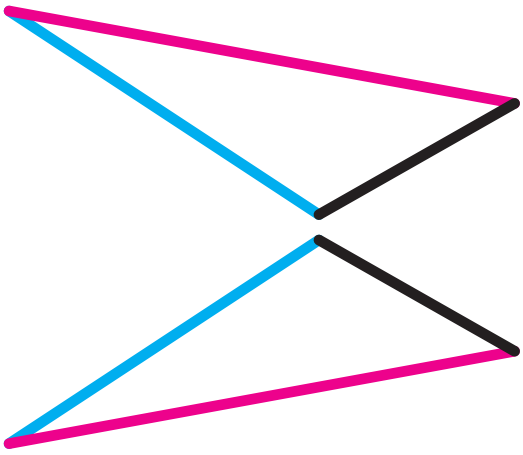
4



5



6

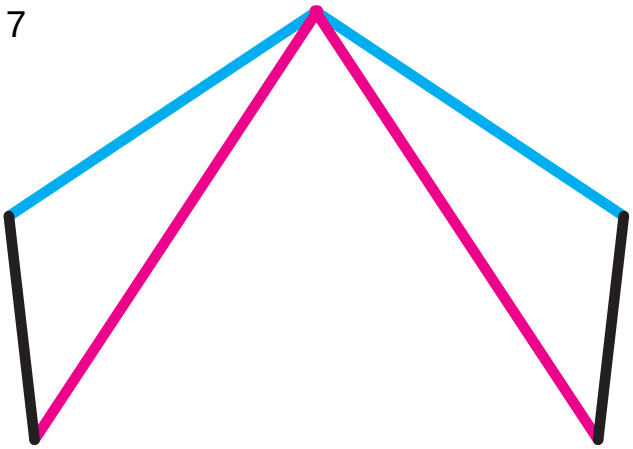


Name _____

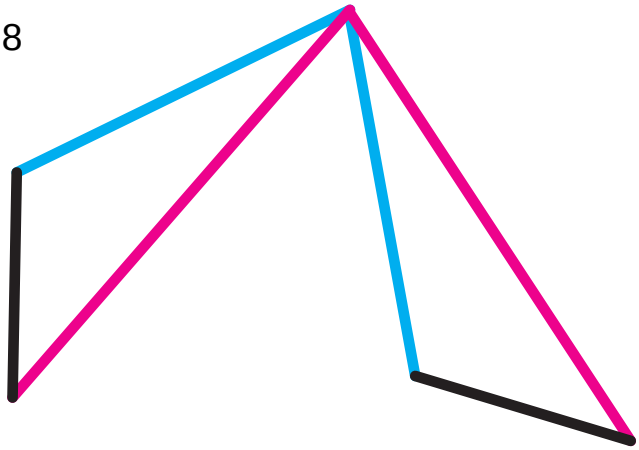
G4(f)

Which of these designs can be seen using a mirror and the triangle on Worksheet G4(d)?

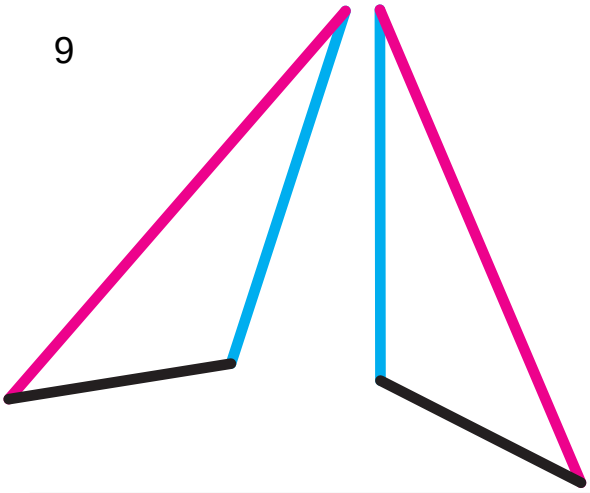
7



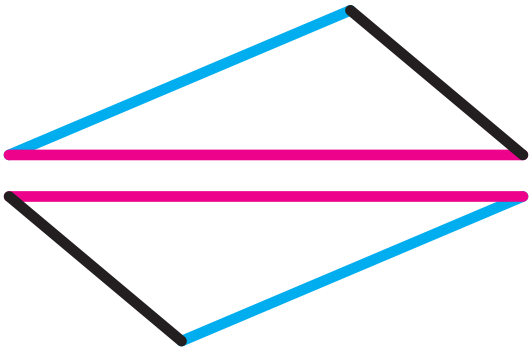
8



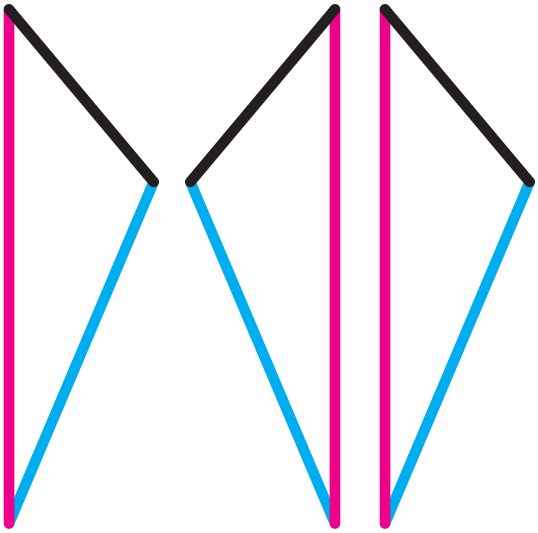
9



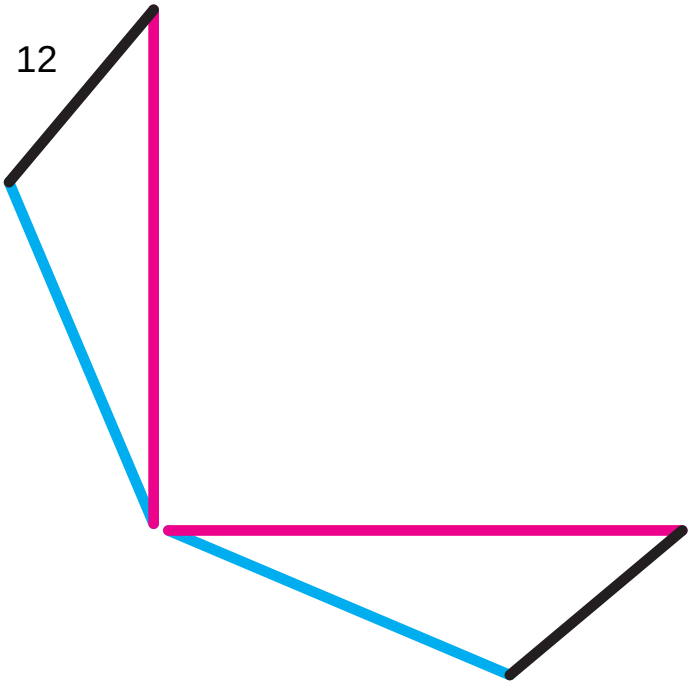
10



11



12



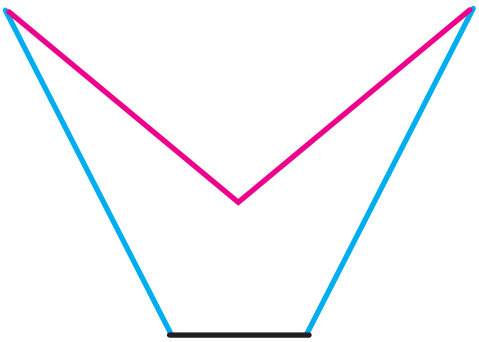
Name _____

G4(g)

Which of these designs can be seen using a mirror and the triangle on Worksheet G4(d)?

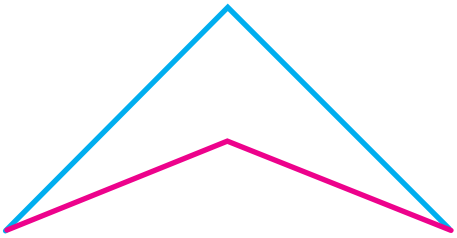
13

14



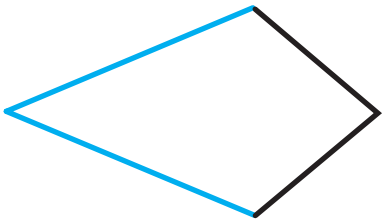
15

16

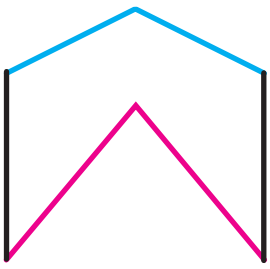


17

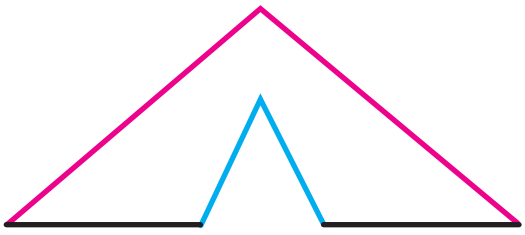
18



19



20

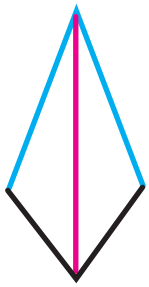


Name _____

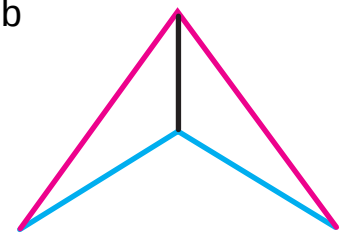
G5 *

These designs can be seen using a triangle and a mirror. Draw a line segment to show where the mirror would be in each of these designs. Use a mirror to check your work.

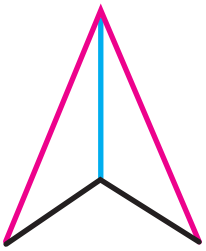
a



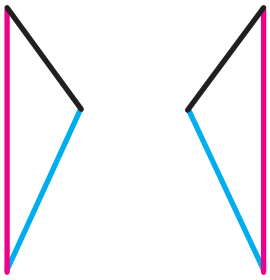
b



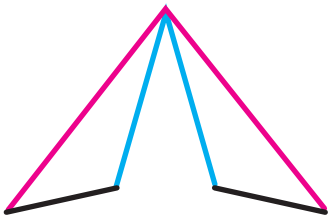
c



d

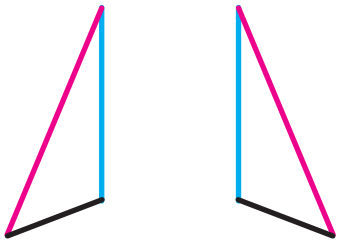


e

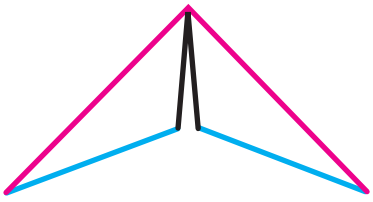


f

g



h

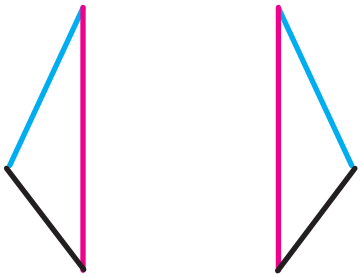


Name _____

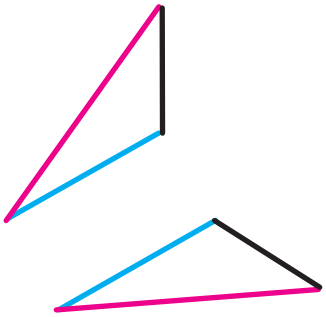
G5 **

These designs can be seen using a triangle and a mirror. Draw a line segment to show where the mirror would be in each of these designs. Use a mirror to check your work.

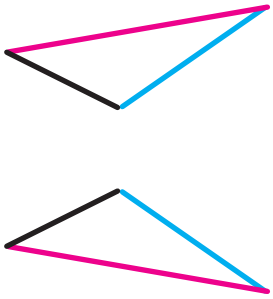
a



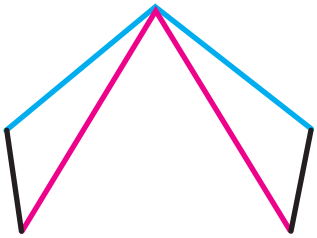
b



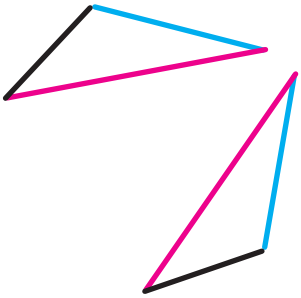
c



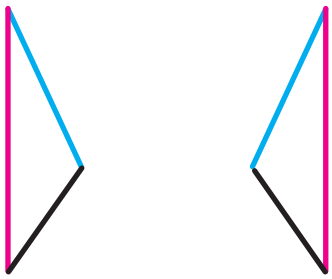
d



e

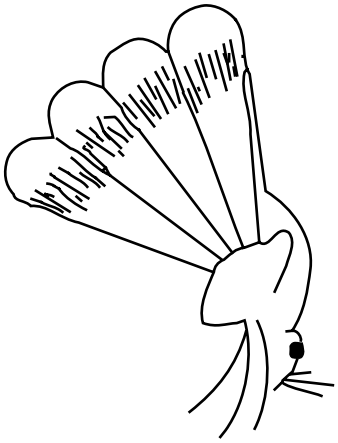


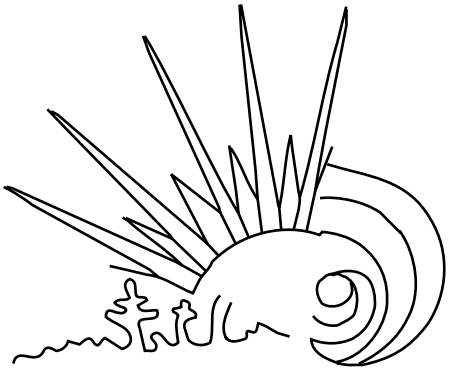
f



Name _____

G5 ***





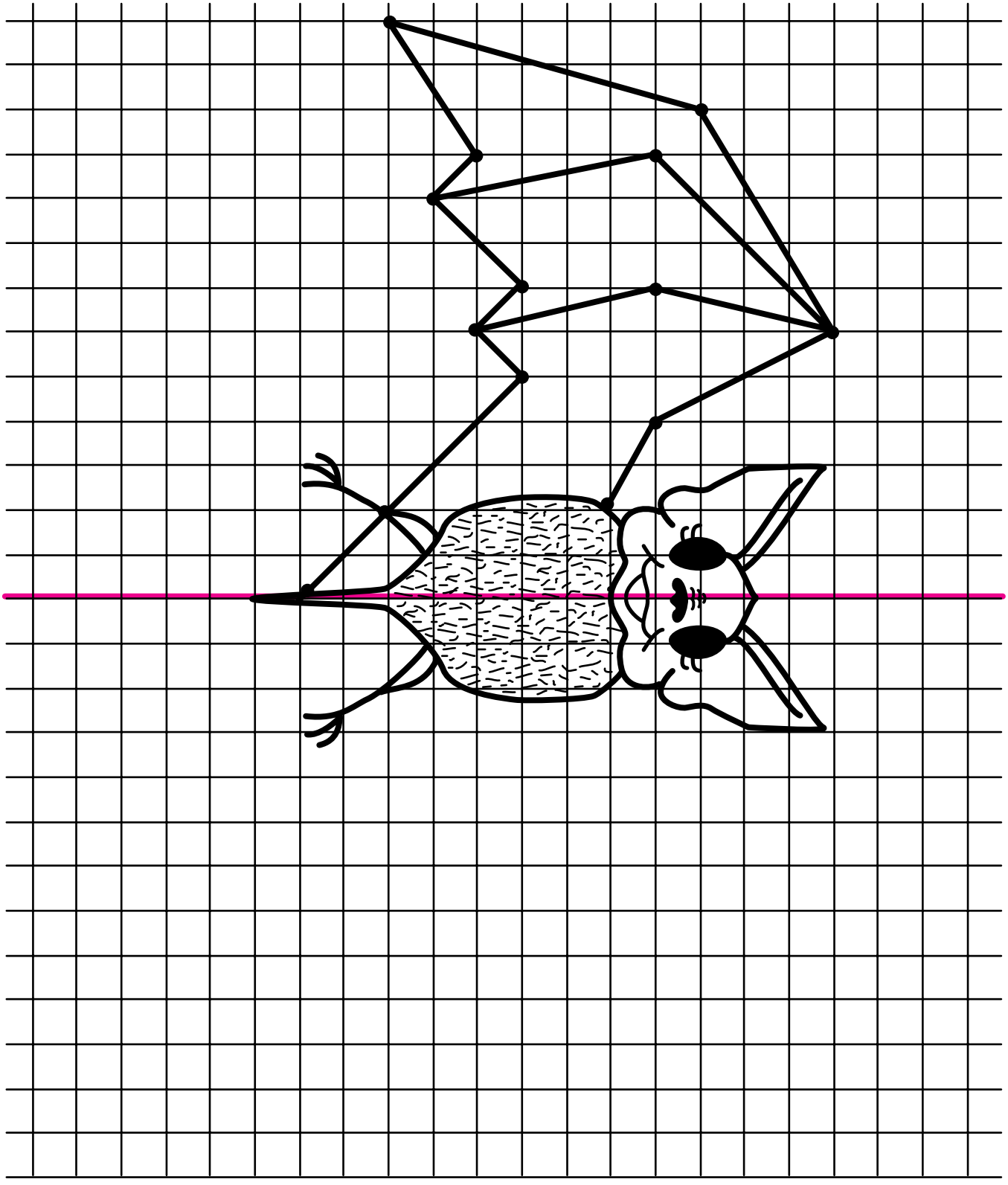
Which of these designs can be seen using a mirror and one of the patterns above?

1. Clamshell _____
2. Daisy _____
3. Mouse _____
4. Snowman _____
5. Hand Fan _____
6. Spiral _____
7. Full Sun _____
8. Snowflake _____
9. Sunset _____
10. Joker's Face _____

Name _____

G6 *

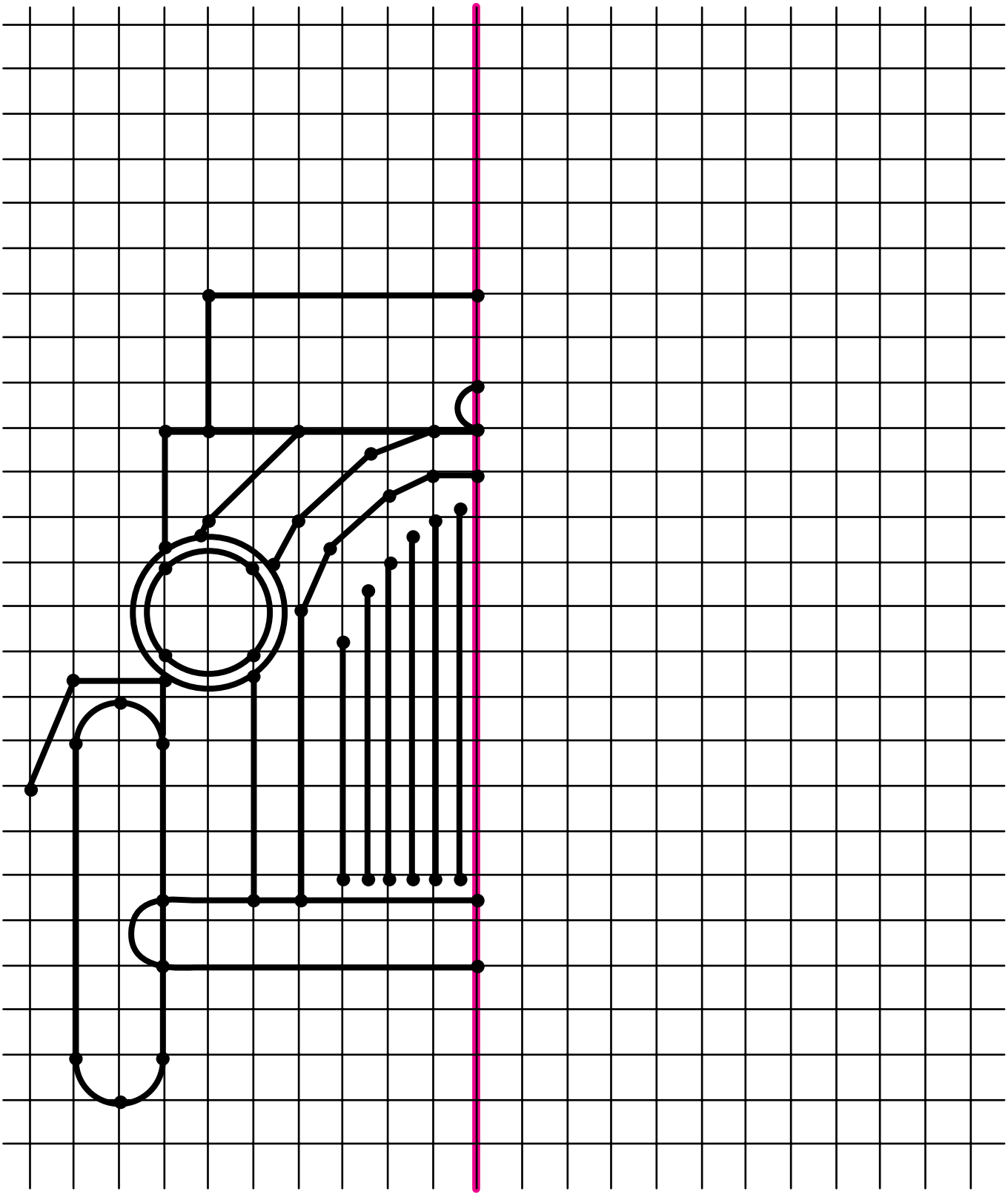
Use a mirror placed on the red line to reflect; then draw the bat's other wing.



Name _____

G6 **

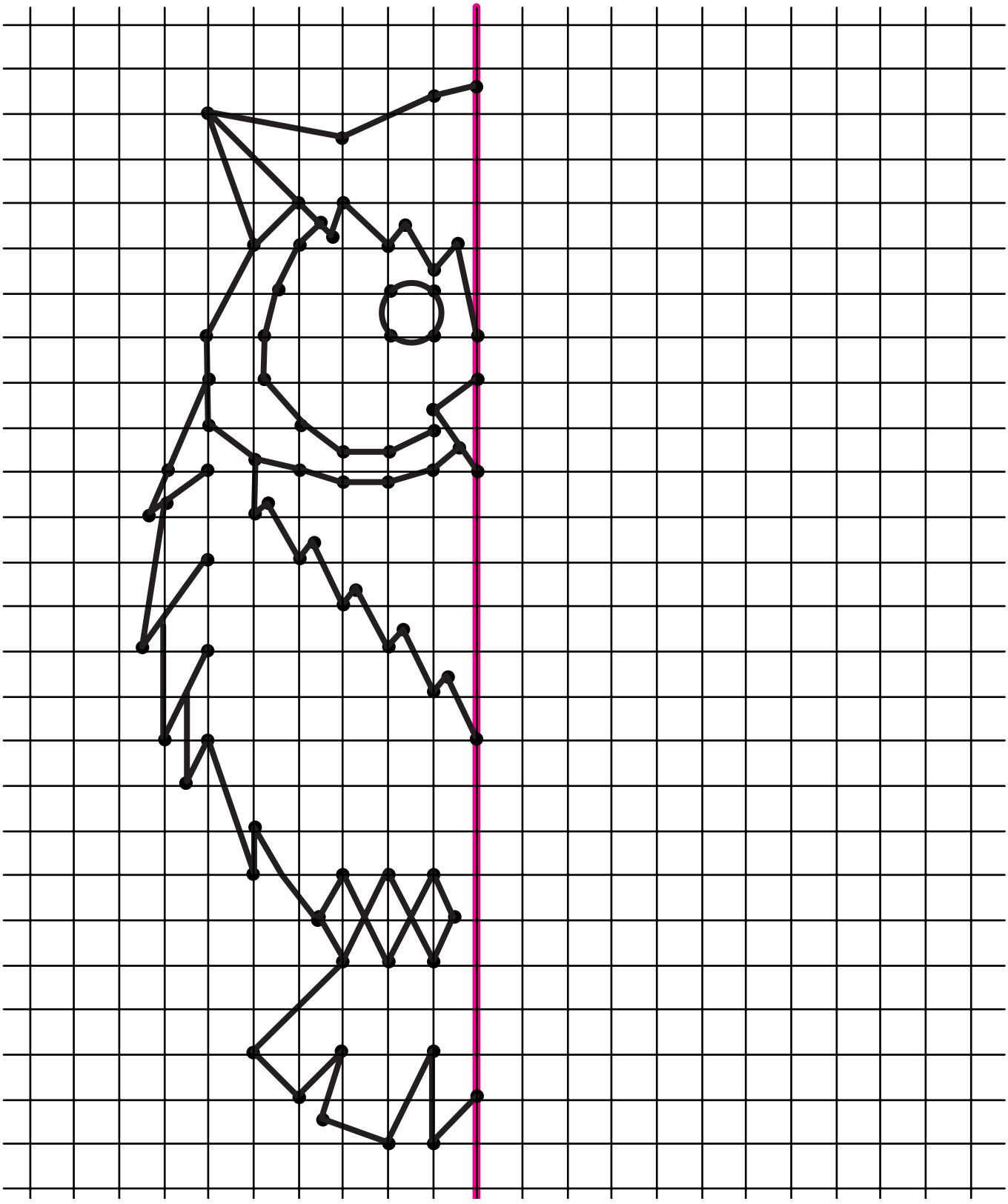
Use a mirror placed on the red line to reflect; then draw the car.



Name _____

G6 ***

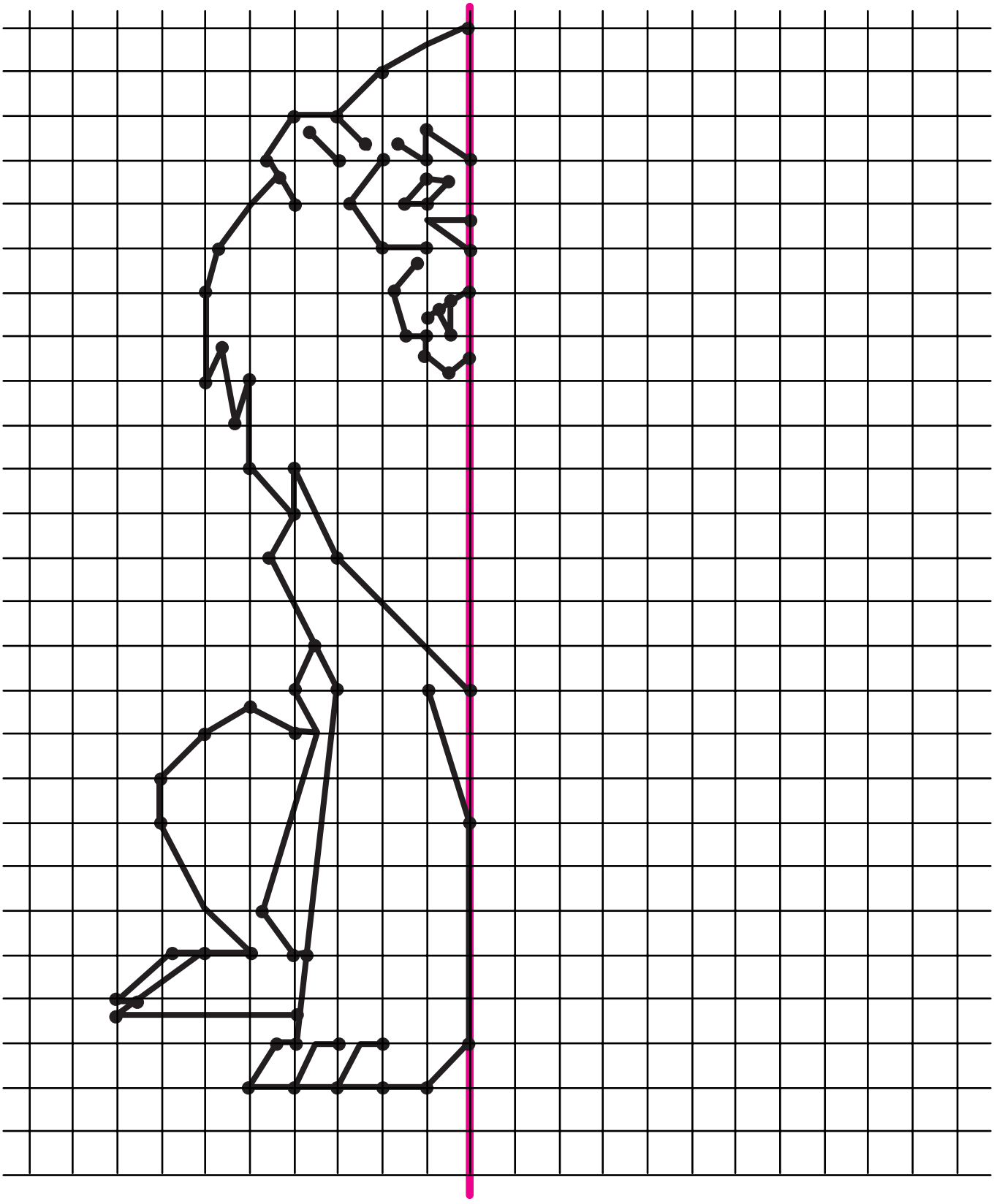
Use a mirror placed on the red line to reflect; then draw the owl.



Name _____

G6 ****

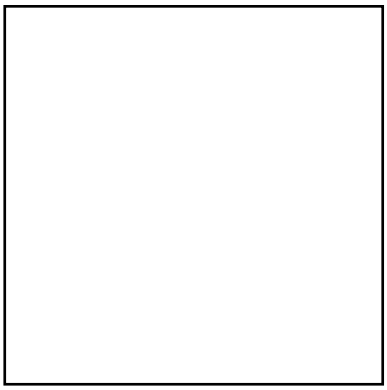
Use a mirror placed on the red line to reflect; then draw the lion.

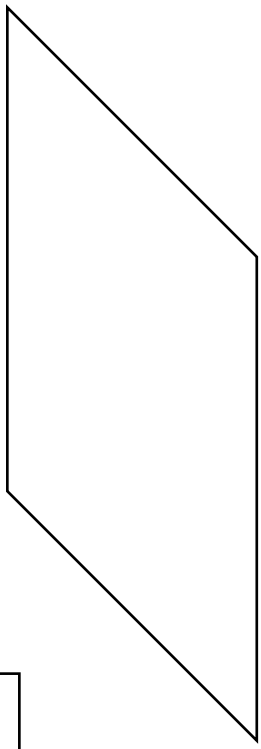


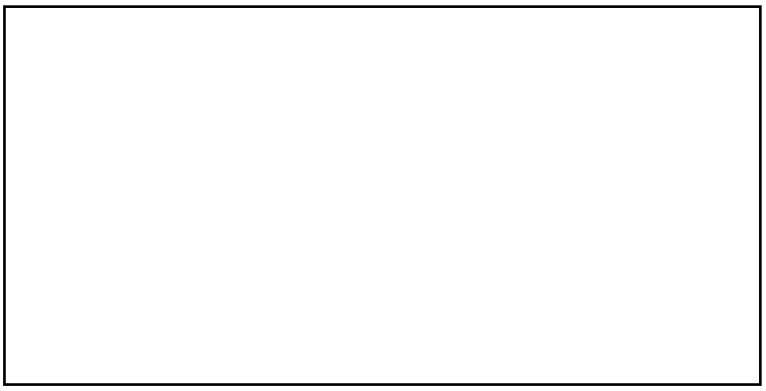
Name _____

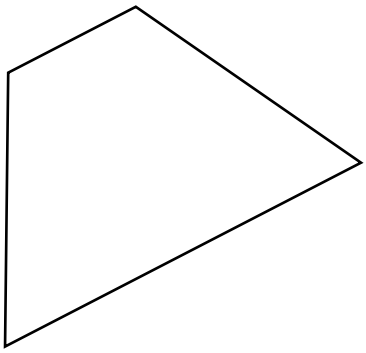
G7

Draw the lines of symmetry of each shape. Check your work with a mirror.



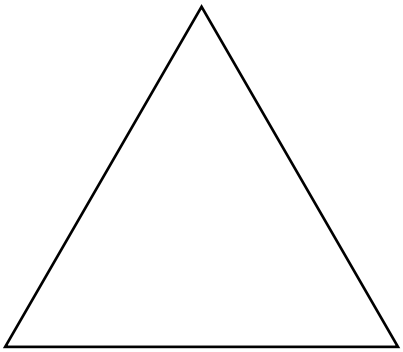


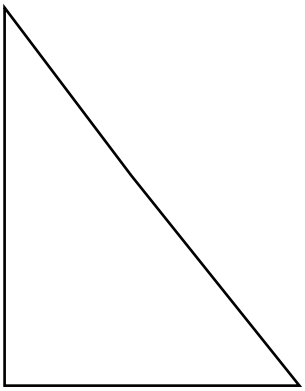


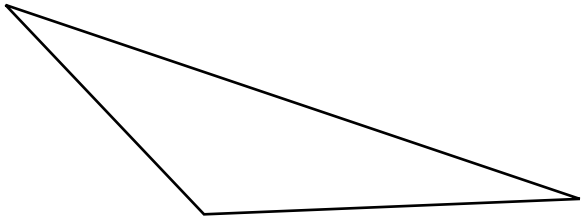


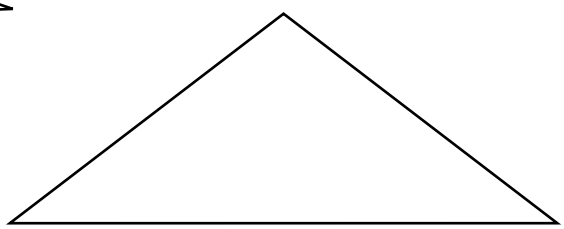
-over-

Draw the lines of symmetry of each shape. Check your work with a mirror.





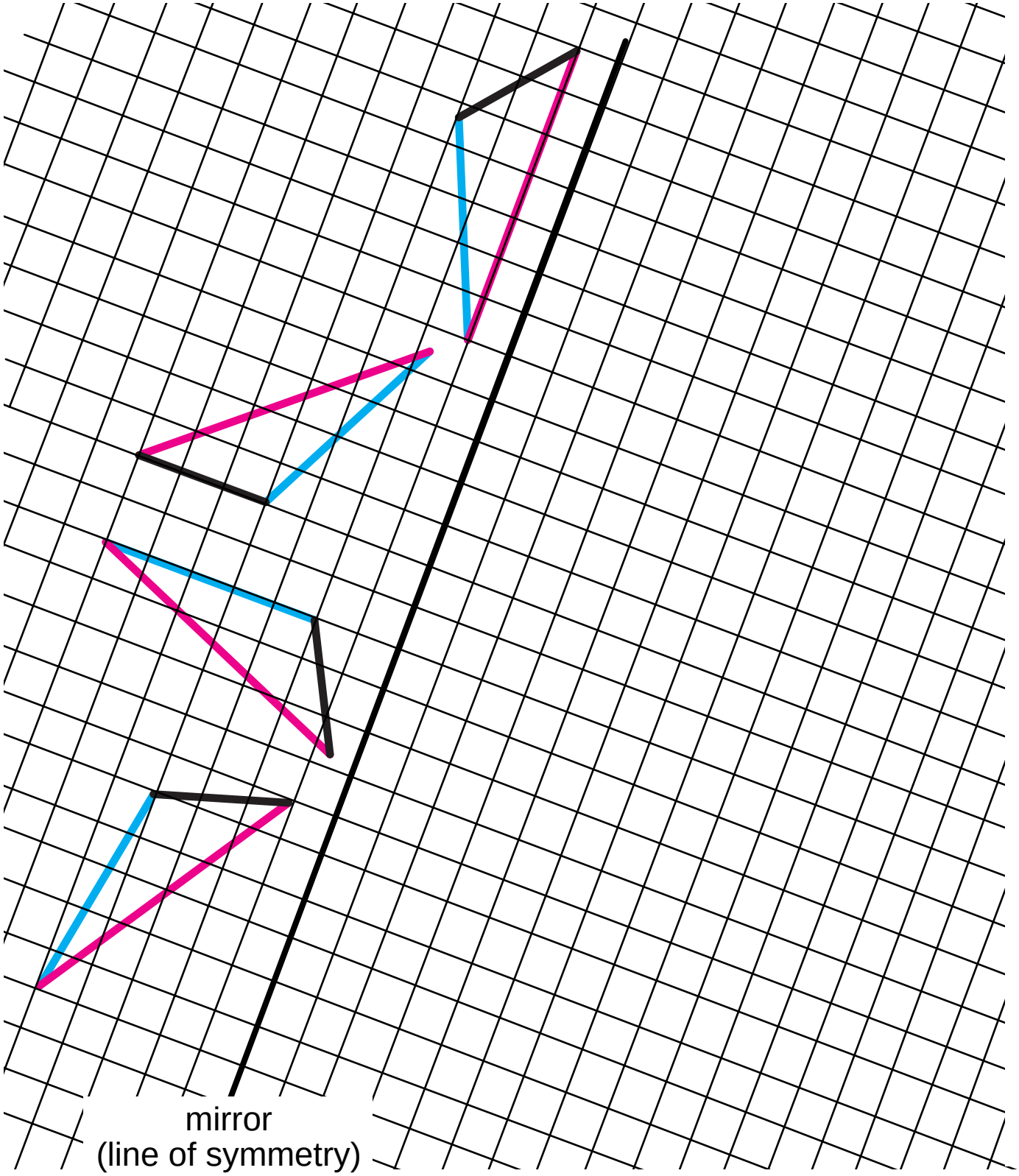




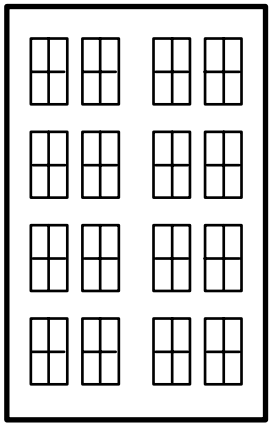
Name _____

G7 *

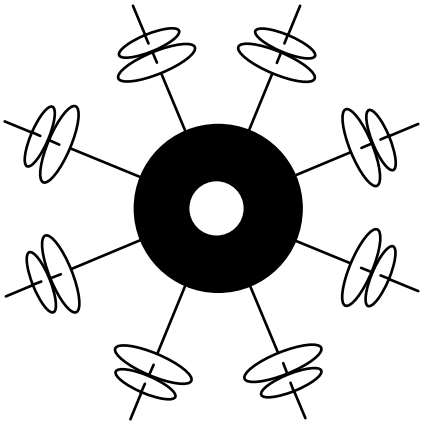
Draw the reflection of each of the triangles below. Check your work with a mirror.



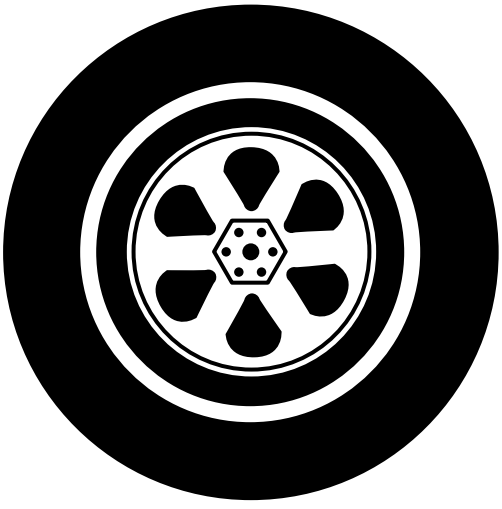
Draw the lines of symmetry of each picture. Check your work with a mirror.



There is more than 1.



There are more than 2.

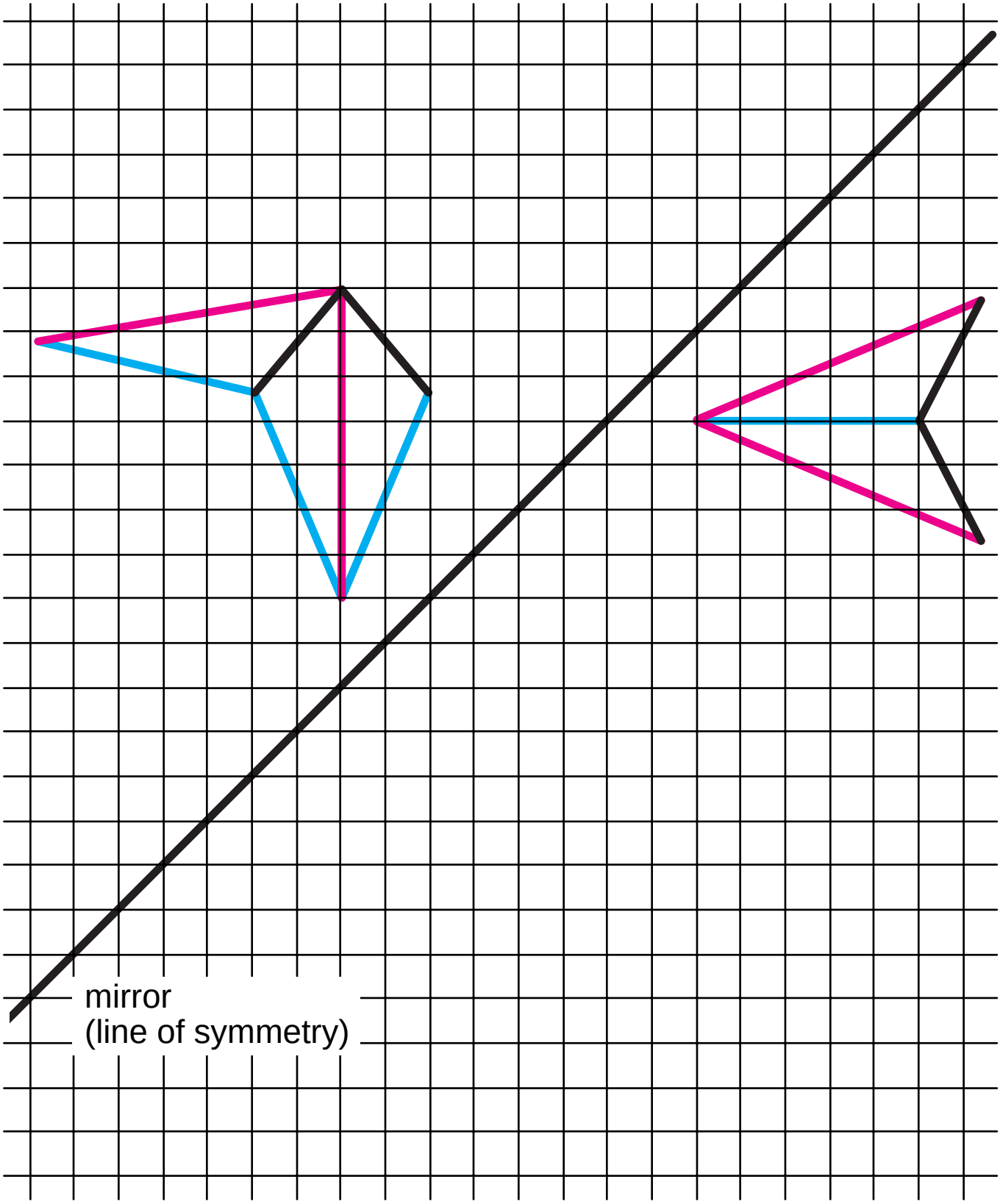


There are more than 3.

Name _____

G7 **

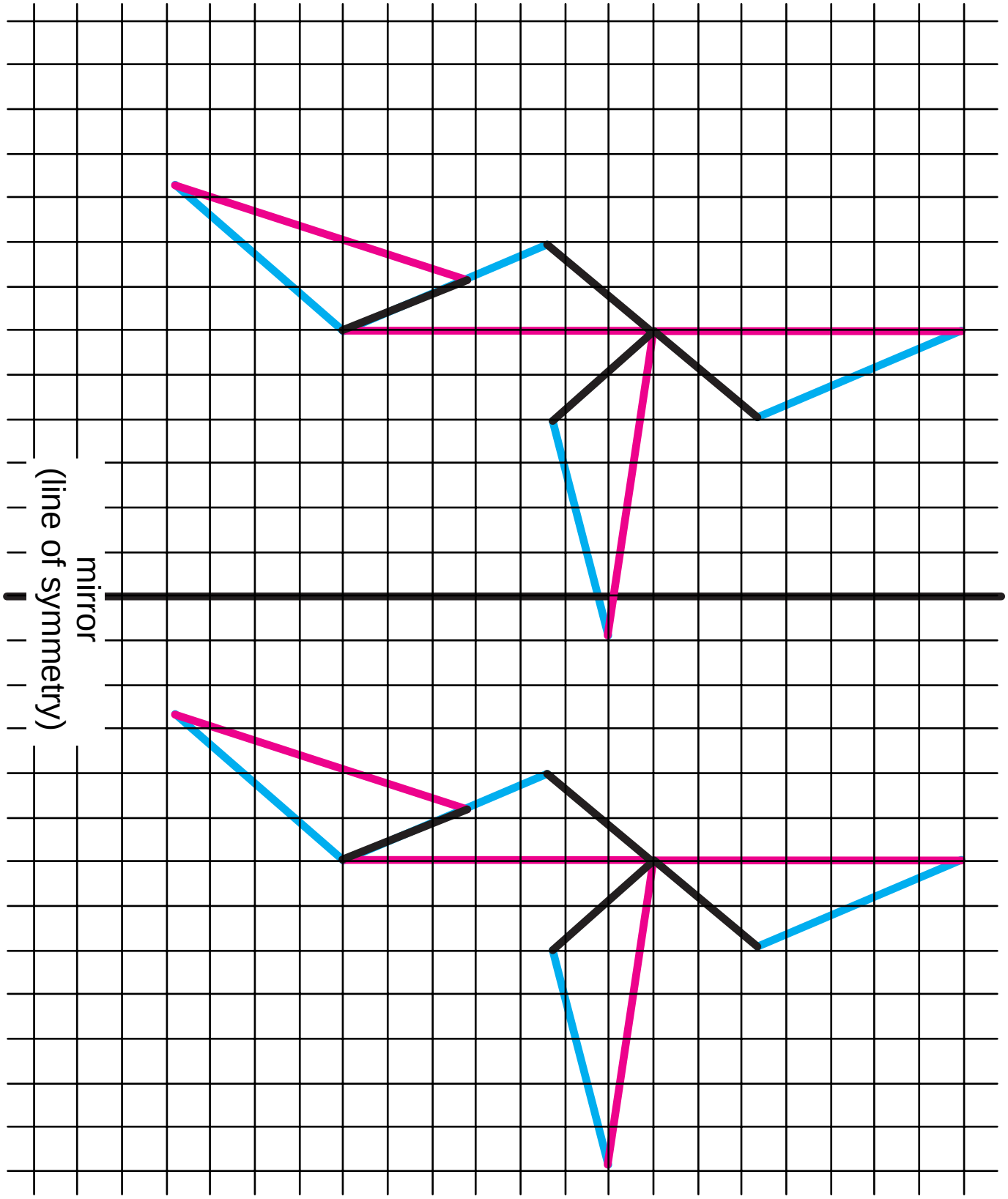
Draw the reflection of each of the triangles below. Check your work with a mirror.



Name _____

G7 ***

Draw the reflection of each of the triangles below. Check your work with a mirror.



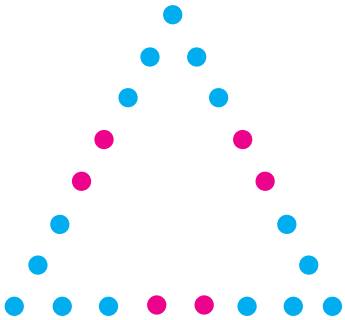
Name _____ G8(a)

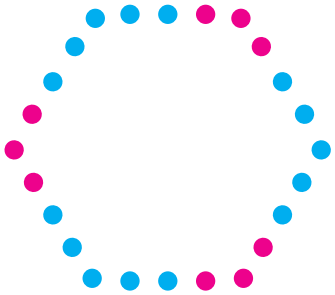
Use these dots and a double mirror to answer these questions.

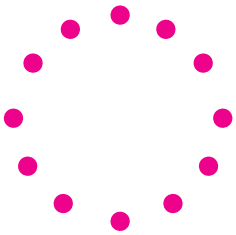
- Can you make a design with 5 red dots? _____
- Can you make a design with 5 blue dots? _____
- Can you make a design with 4 red dots and 4 blue dots? _____
- Can you make a design with 3 red dots? _____
- Can you make a design with 7 blue dots? _____

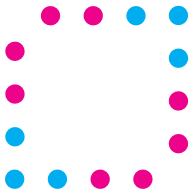
Name _____

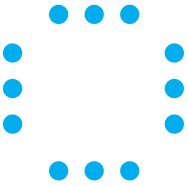
G8(b)

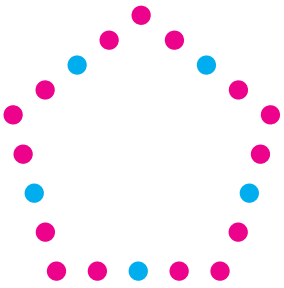


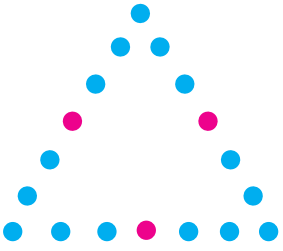






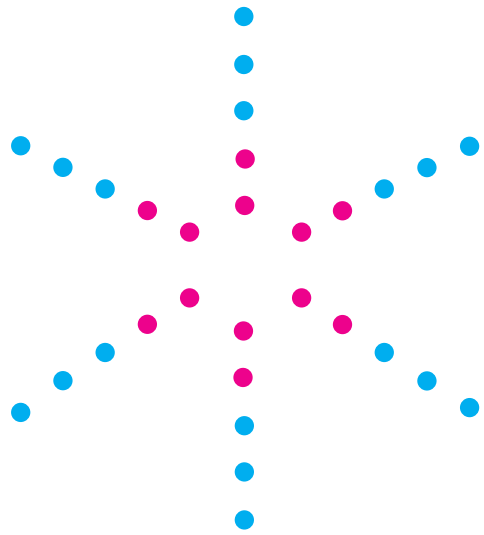


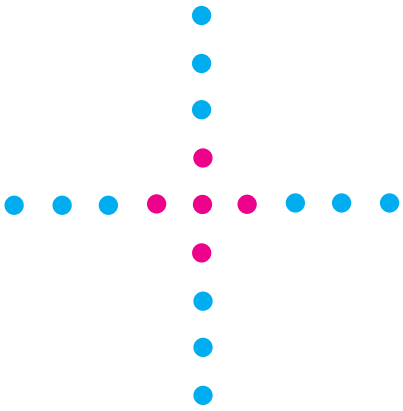


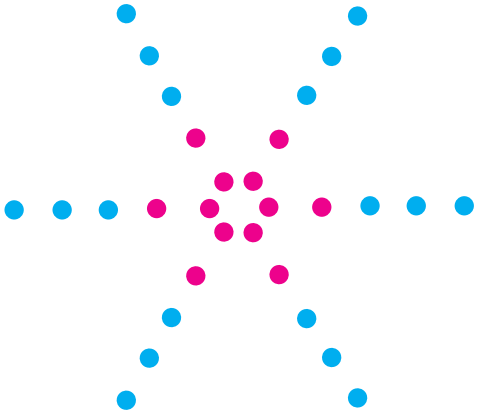


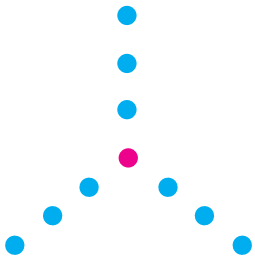
Name _____

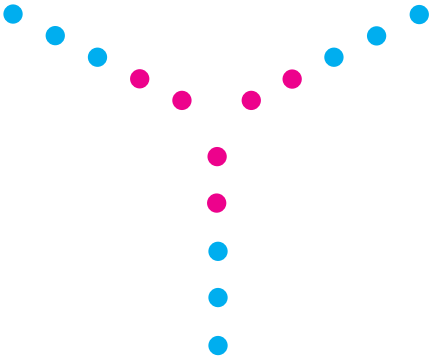
G8(c)





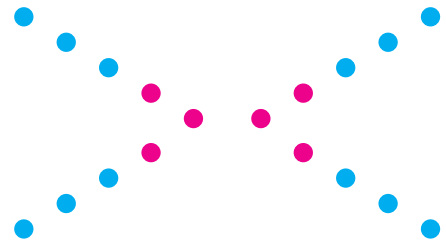


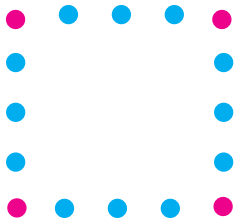


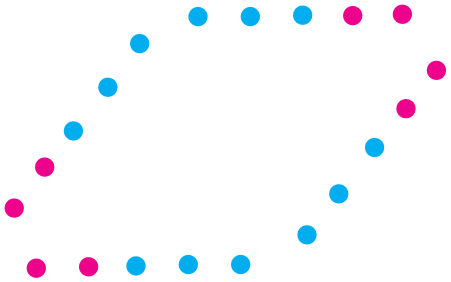


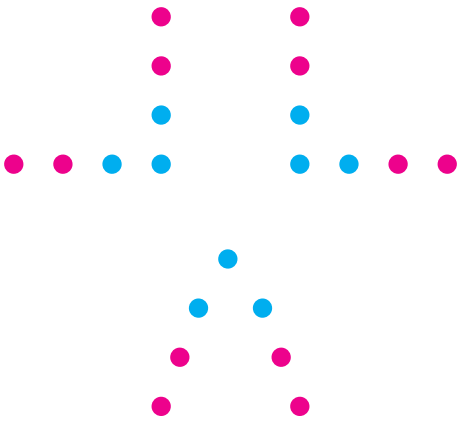
Name _____

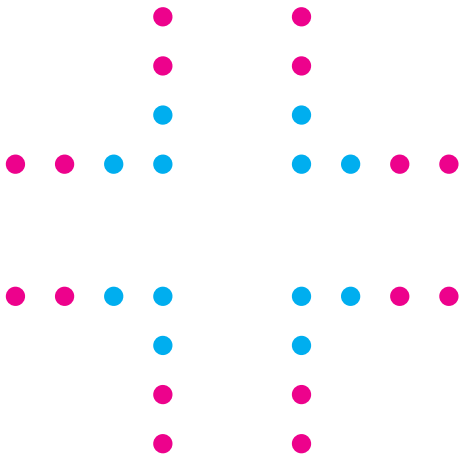
G8(d)







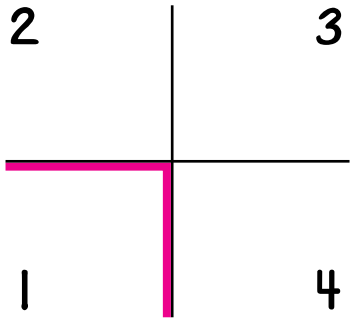




Name _____

G8(e)

A B C D E F G H I J K L M N
O P Q R S T U V W X Y Z



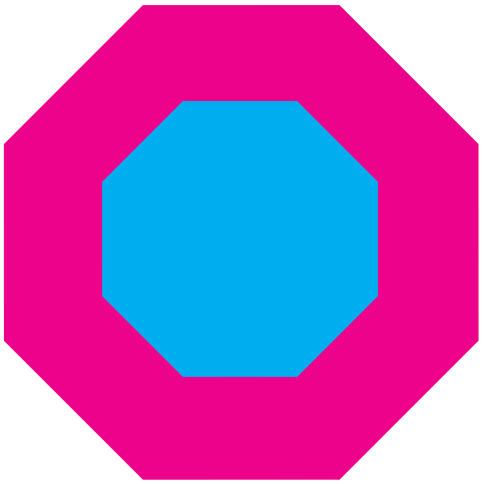
Classify each letter.

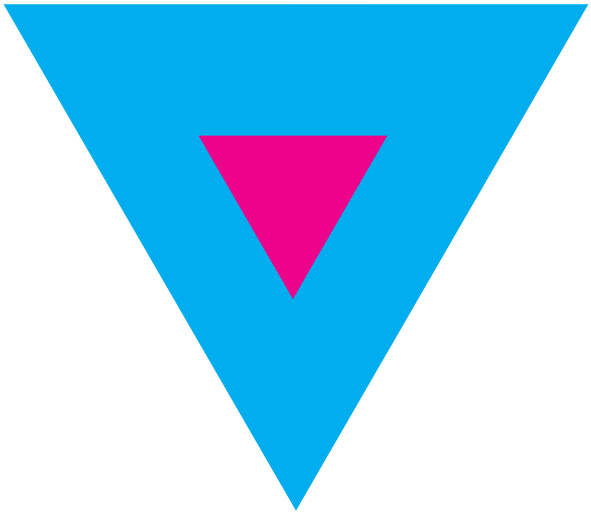
Different images in all four regions	Same images in regions 1 and 2	Same images in regions 1 and 3	Same images in regions 1 and 4	Same images in regions 1, 2, 3, and 4

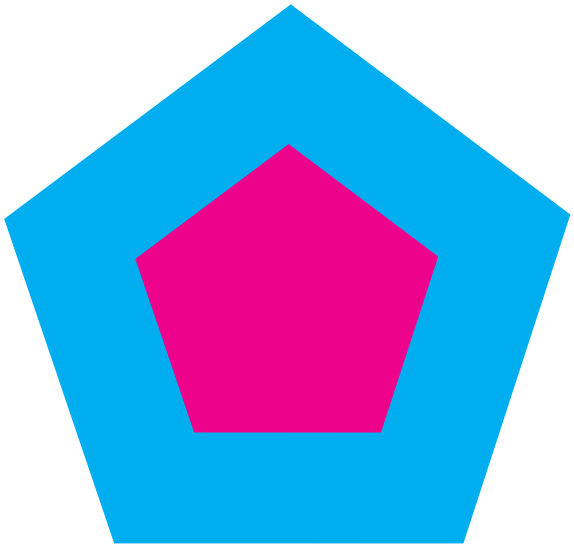
Name _____

G9(a)

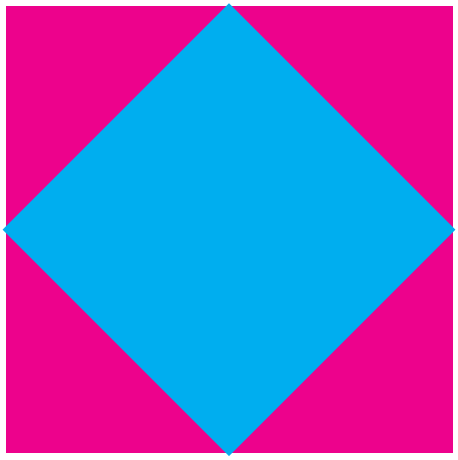
Use blue paper, red paper, and a double mirror to see each of these designs.







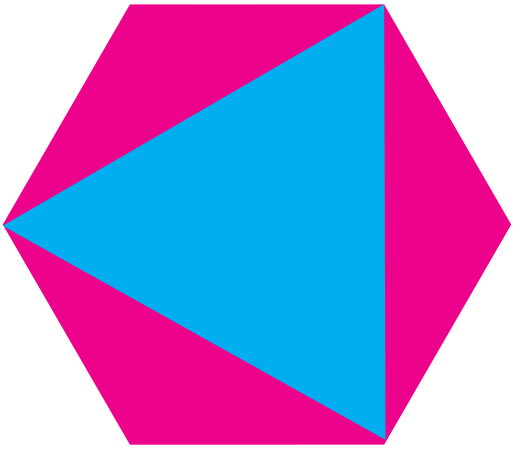
Use blue paper, red paper, and a double mirror to see each of these designs.

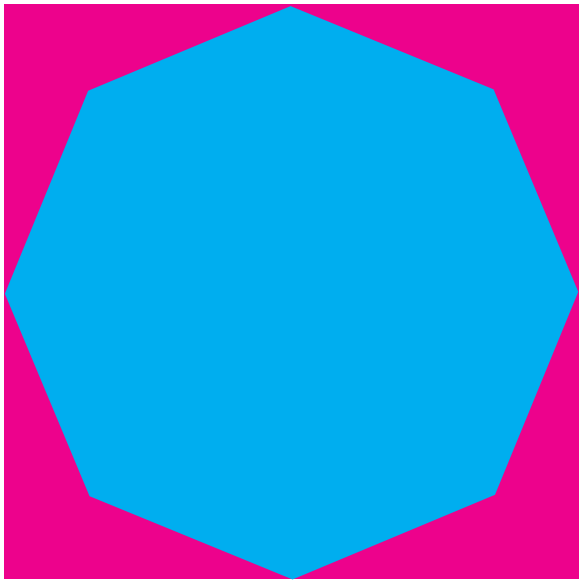


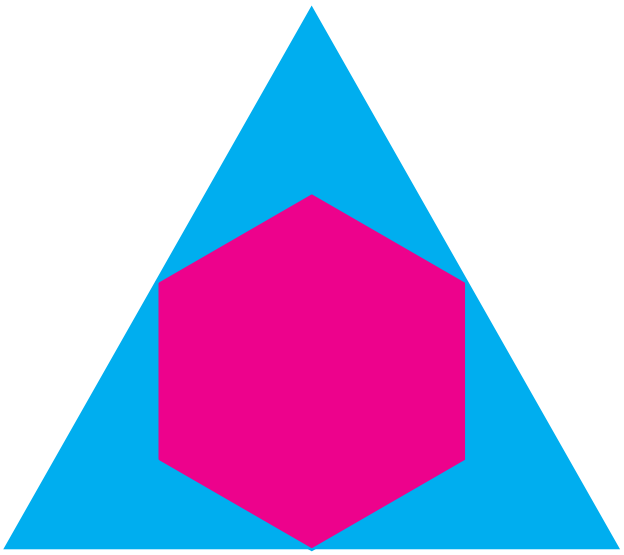
Name _____

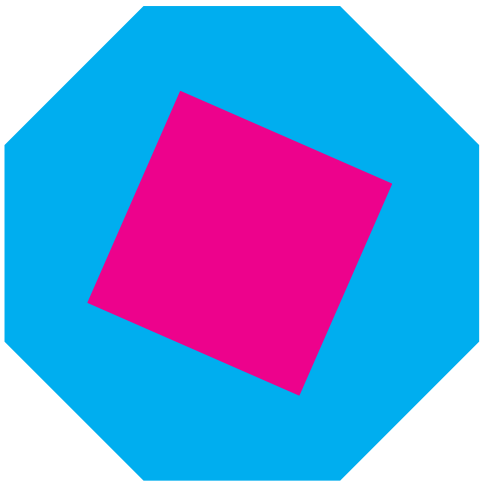
G9(b)

Use blue paper, red paper, and a double mirror to see each of these designs.

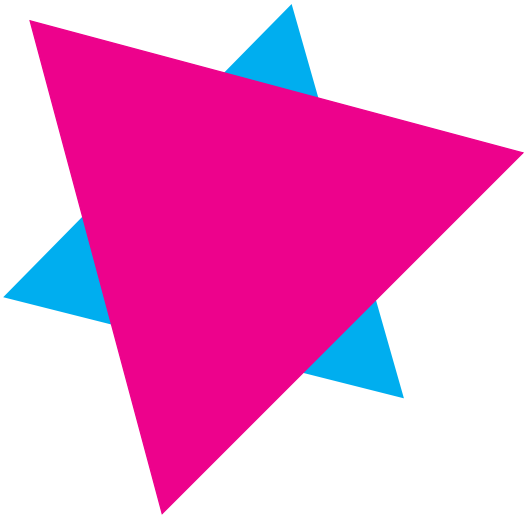


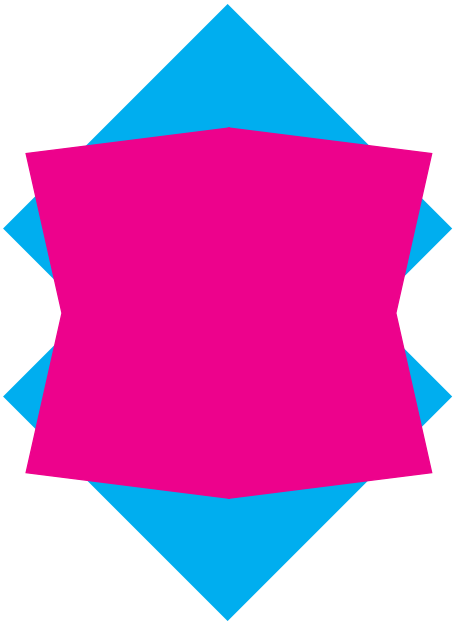


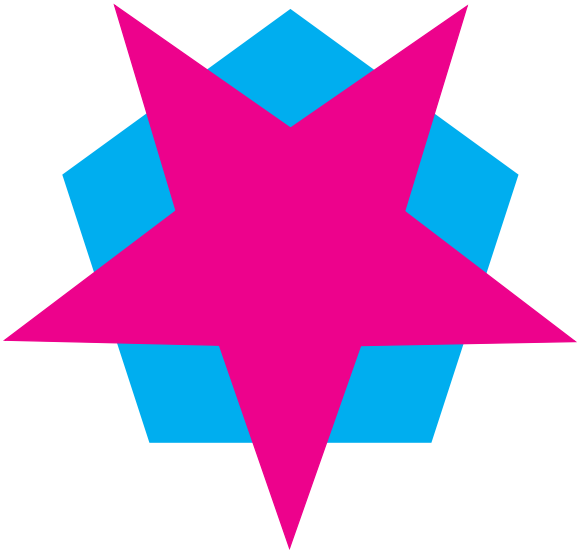




Use blue paper, red paper, and a double mirror to see each of these designs.



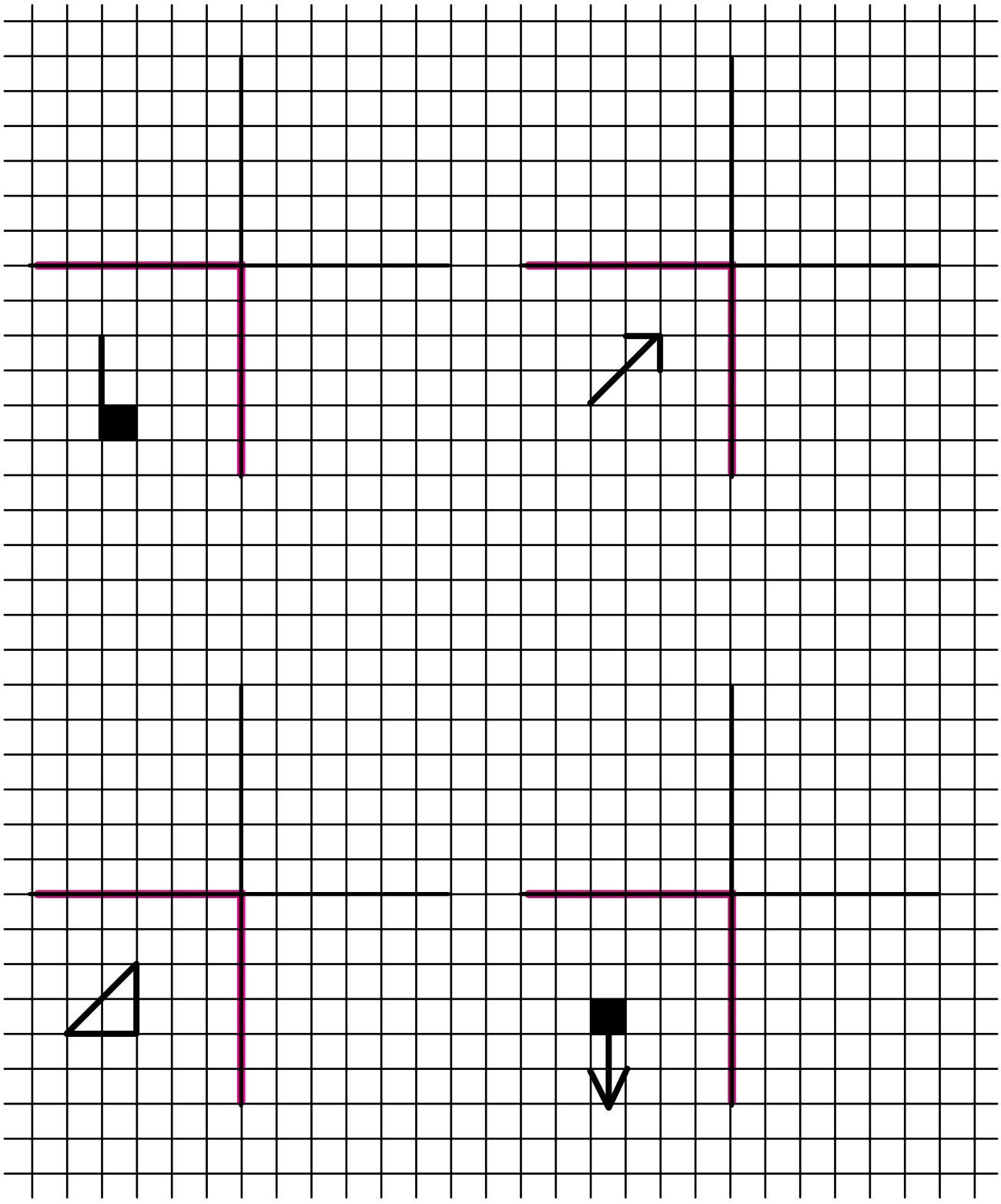




Name _____

G9 *

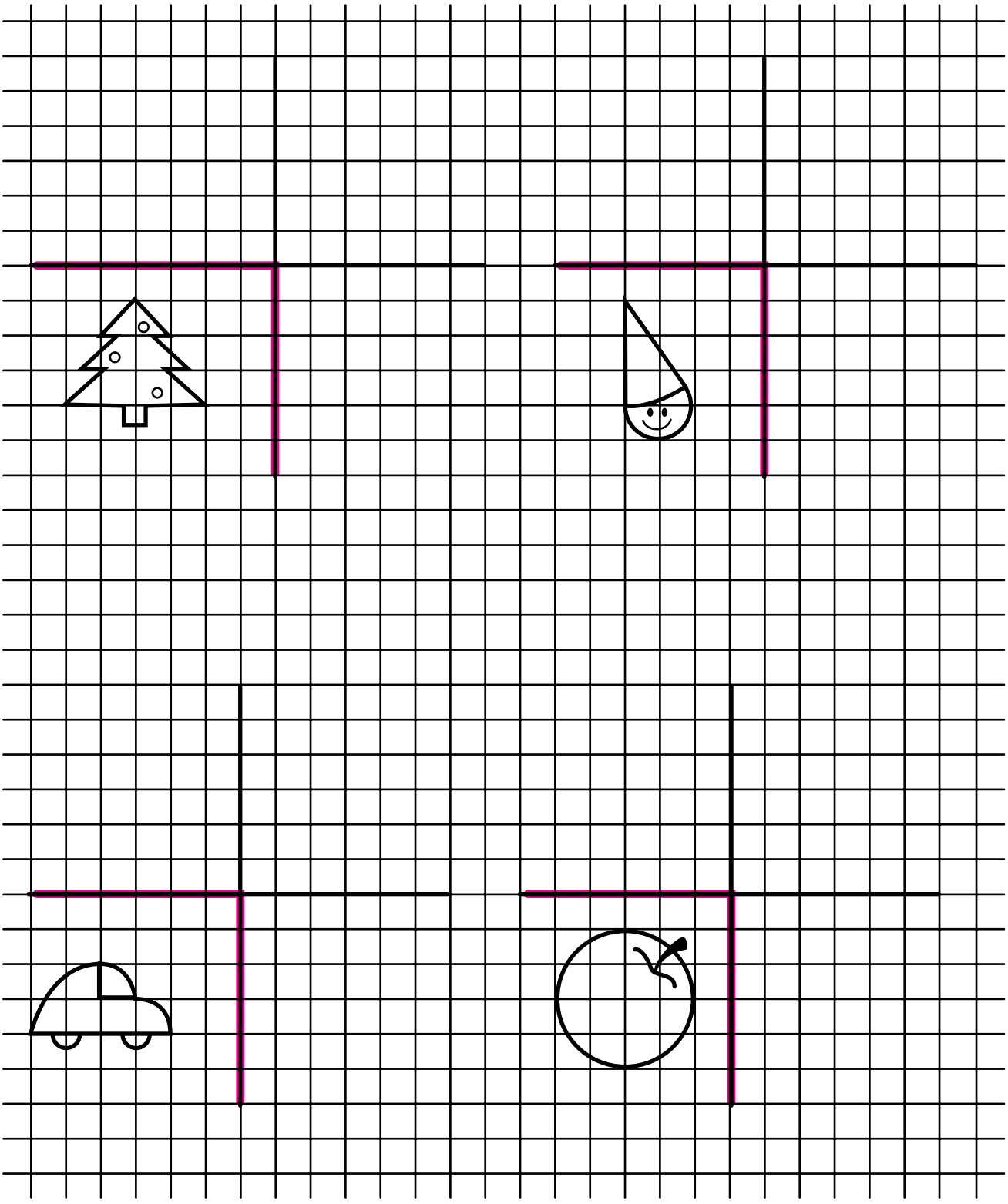
Place the double mirror on the red lines. Draw on this worksheet exactly what you see in the mirrors.



Name _____

G9 **

Place the double mirror on the red lines. Draw on this worksheet exactly what you see in the mirrors.



Name _____

G10

What is the largest possible area? _____

perimeter
100 m

● ●	● ●	Area
20 m	30 m	600 m^2

Use the other side to record other solutions.

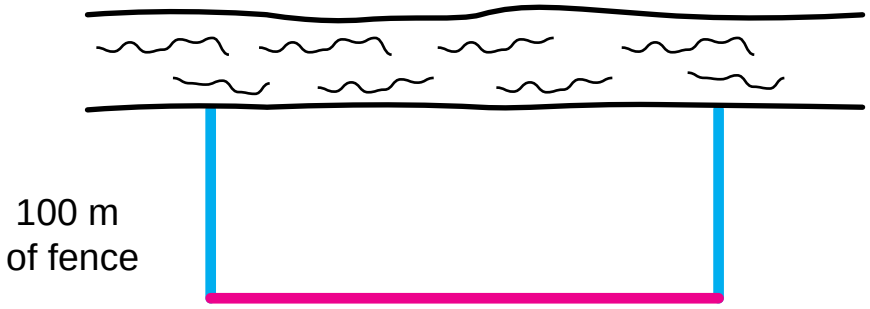
perimeter
100 m

		Area

Name _____

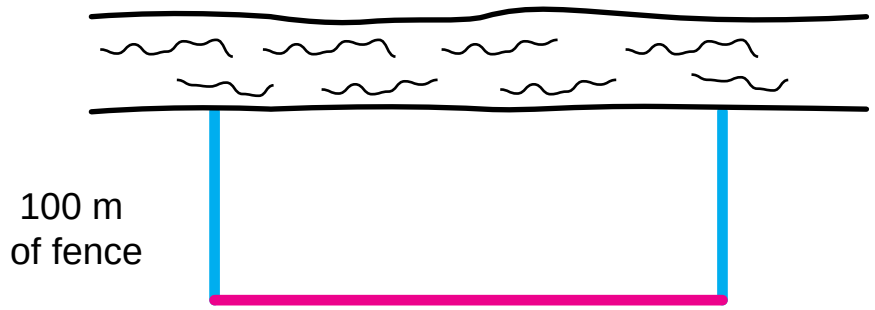
G11

What is the largest possible area? _____



● ●	●	Area
20 m	60 m	1 200 m^2

Use the other side to record other solutions.

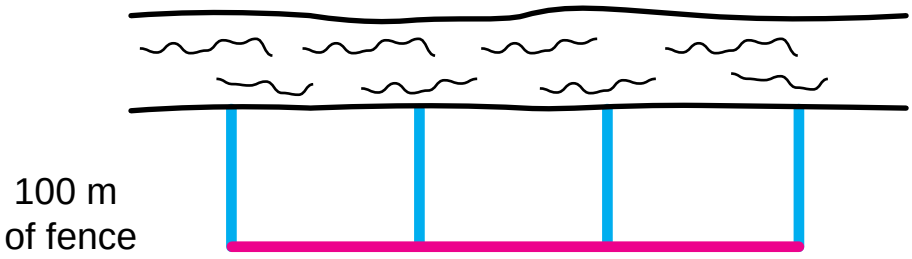


● ●	●	Area

Name _____

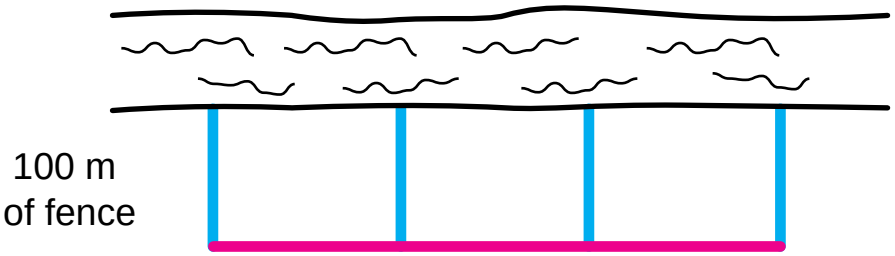
G12(a)

What is the largest possible area? _____



		Total Area
10 m	60 m	600 m^2

Use the other side to record other solutions.

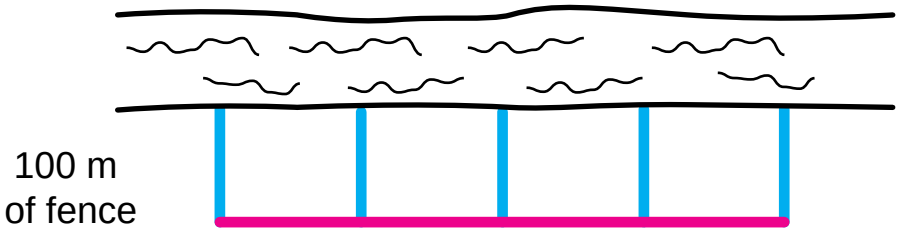


		Total Area

Name _____

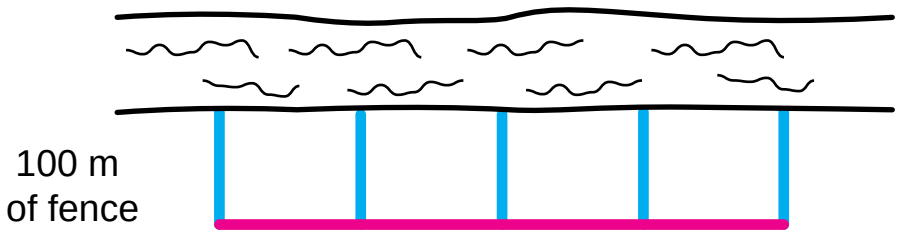
G12(b)

What is the largest possible area? _____



●●●●●	●	Total Area

Use the other side to record other solutions.

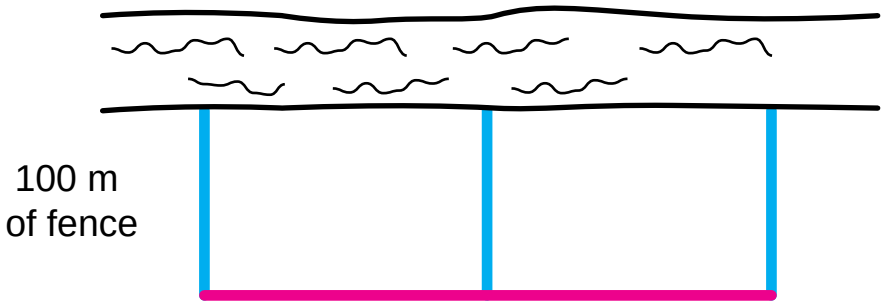


		Total Area

Name _____

G12(c)

What is the largest possible area? _____

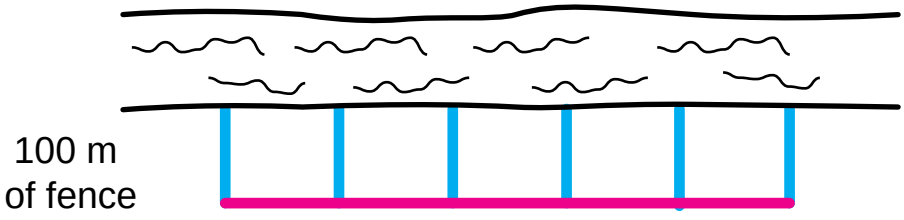


● ● ●	●	Total Area
15 m	55 m	825 m^2

Name _____

G12(d)

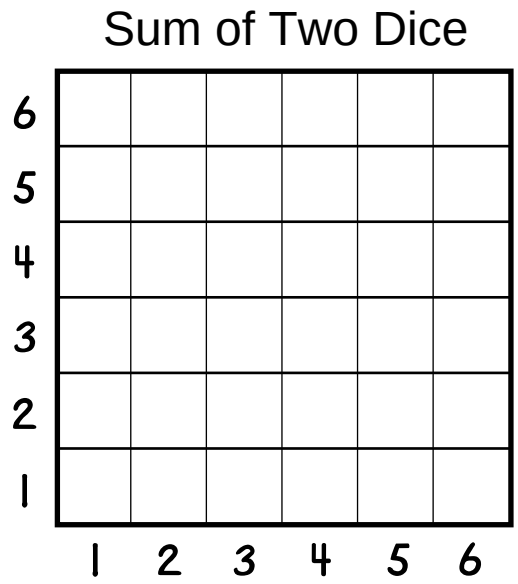
What is the largest possible area? _____



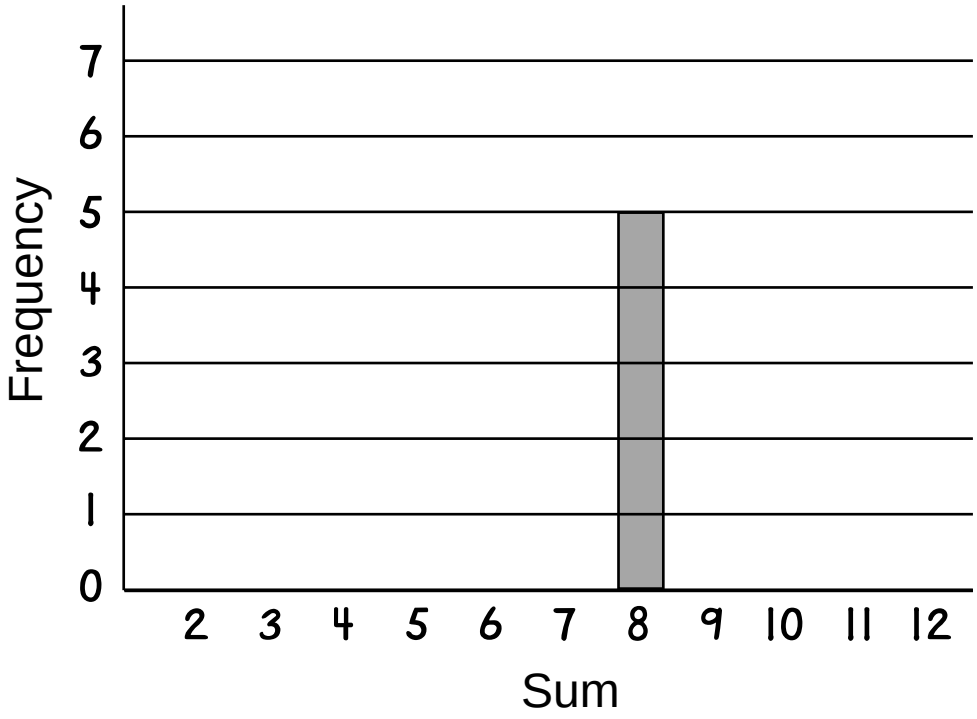
● ● ● ● ● ●	●	Total Area
10 m	40 m	400 m^2

Name _____

P1(a)



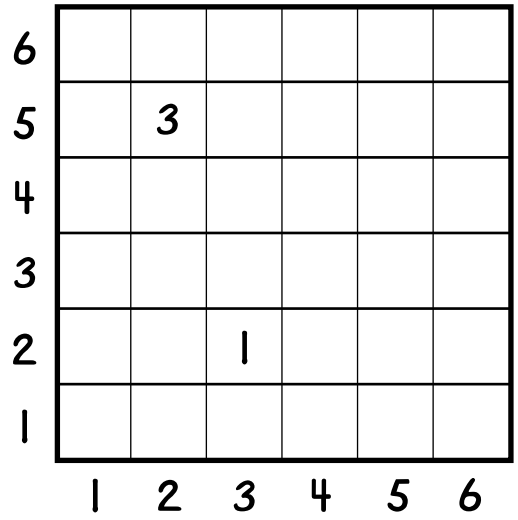
Draw a bar graph to show the frequency of each sum. One is done for you.



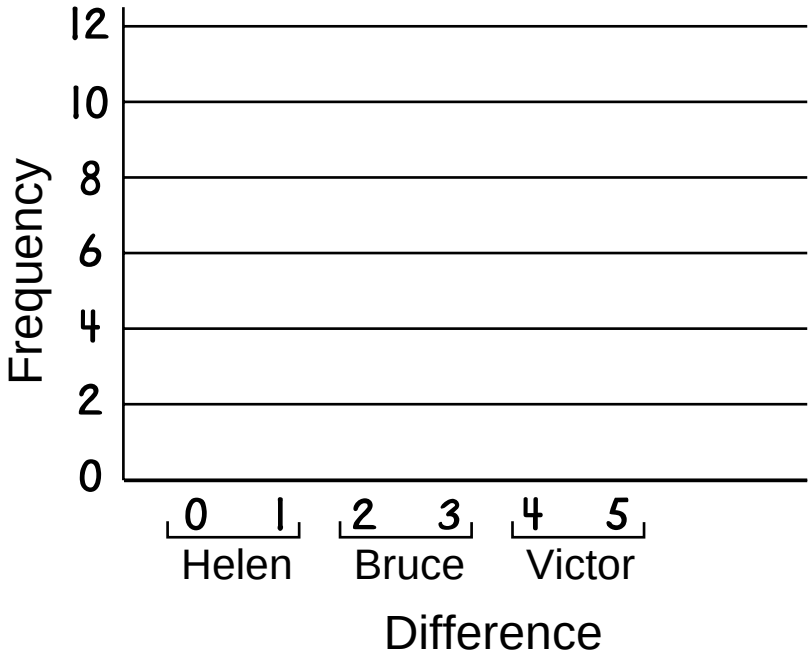
Name _____ P1(b)

Complete. Two squares are filled in for you.

Difference of Two Dice



Draw a bar graph to show the frequency of each difference.



How many ways does Helen have to win? _____
How many ways does Bruce have to win? _____
How many ways does Victor have to win? _____

Name _____ P1 *

Use the information on Worksheet P1(a) to answer these questions.

What is the probability that the sum is 6? _____

What is the probability that the sum is not 6? _____

What is the probability that the sum is more than 6? _____

What is the probability that the sum is less than 6? _____

When Bruce goes home, Helen and Victor decide to continue playing the sum game. They wish to play a fair game. List the sums each person could take to make the game fair.

Helen _____

Victor _____

Explain why your solution produces a fair game.

Name _____ P1 **

Use the information on Worksheet P1(b) to answer these questions.

What is the probability that the difference is 1? _____

What is the probability that the difference is not 1? _____

What is the probability that the difference is 0? _____

What is the probability that the difference in not 0? _____

When Helen goes home, Bruce and Victor decide to continue playing the difference game. They want to play a fair game. List the differences each person could take to make a game fair.

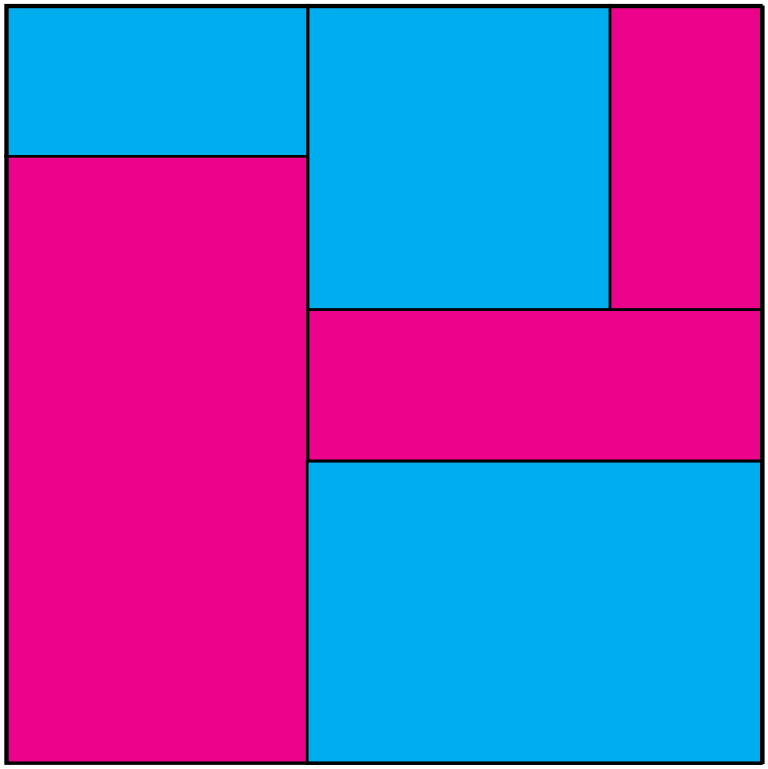
Bruce _____

Victor _____

Explain why your solution produces a fair game.

Name _____

P2 *



Use a ruler, if you wish, to answer these questions.

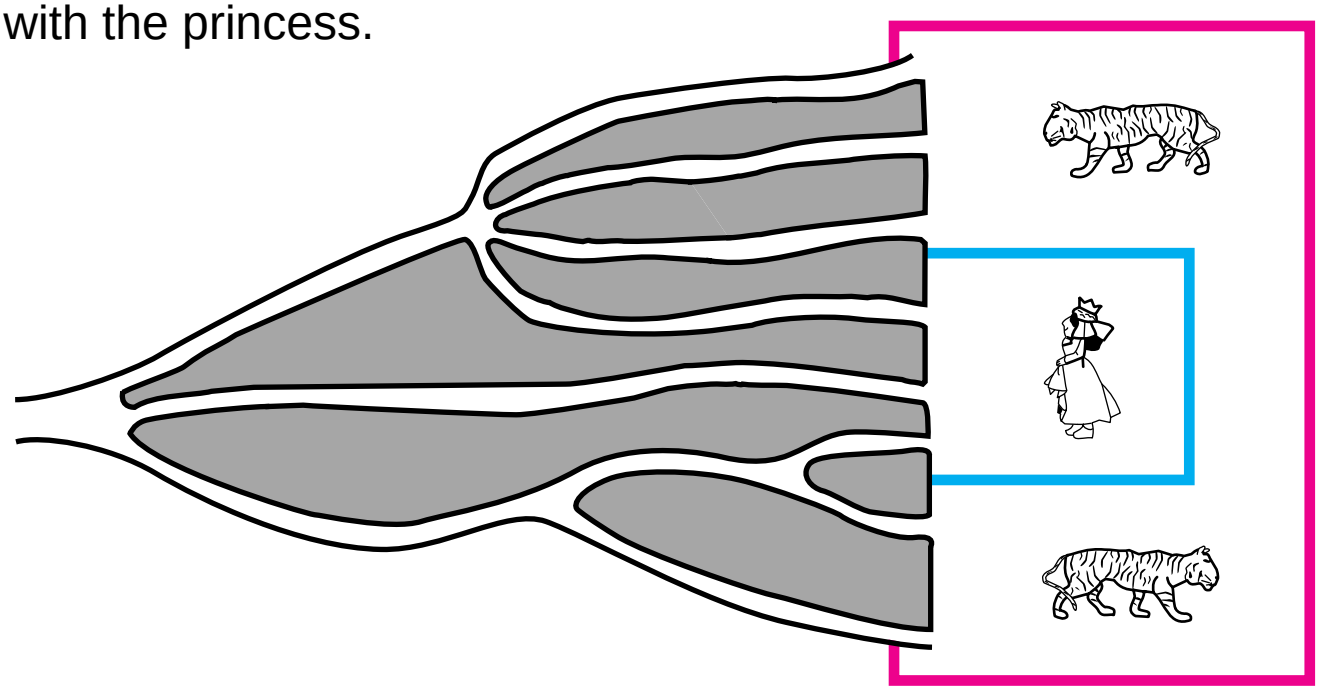
How many squares of this size  fit into the red region? _____

How many squares of this size  fit into the blue region? _____

Name _____

P2 **

The king has another maze near the castle. If Reynaldo goes through this maze, find his probability of entering the room with the princess.



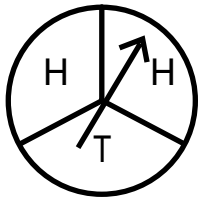
Use this square to help you solve the problem.

What is Reynaldo's probability of finding the princess? _____

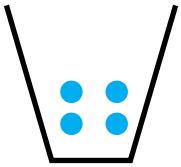
What is Reynaldo's probability of finding the tigers? _____

Name _____ P3

Alice, Bruce, and Carl agree to play the following game.

1. Spin this spinner. 

2. Select two marbles at random from the appropriate cup.

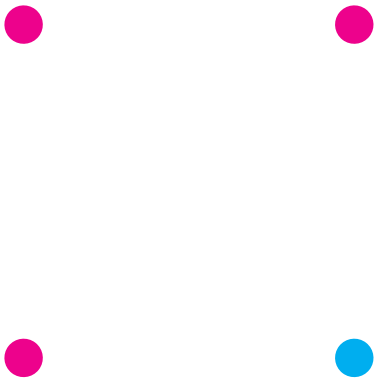


Winners: Alice wins if two red marbles are chosen.

Bruce wins if one red marble and one blue marble are chosen.

Carl wins if two blue marbles are chosen.

Use cords to show the winning combinations for cup H.



Use this square to show each player's probability of winning.

Alice ___ Bruce ___ Carl ____

Name _____

P4(a)

Decode this message.

W	E		J	E		J	X	U		S	H	U	U	A		D	U	Q	H			
J	X	U		B	Q	I	J		J	H	Q	Y	D		I	J	Q	J	Y	E	D	
M	X	U	H	U		Q		J	H	U	U		X	Q	I		V	Q	B	B	U	D
E	L	U	H		J	X	U		M	Q	J	U	H		Y	D	I	Y	T	U		
J	X	U		J	H	U	U		O	E	K		M	Y	B	B		V	Y	D	T	
Q		V	E	H	C	K	B	Q		V	E	H		Q		I	U	S	H	U	J	
F	E	J	Y	E	D		M	Y	J	X		J	X	Y	I		F	E	J	Y	E	D
M	U		M	Y	B	B		H	K	B	U		J	X	U		M	E	H	B	T	

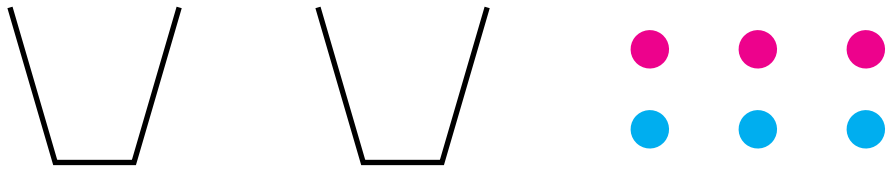
Name _____ P4(b)

Determine the number of times each letter appears in the message.

Letter	Frequency	Letter	Frequency
A	_____	N	_____
B	_____	O	_____
C	_____	P	_____
D	_____	Q	_____
E	_____	R	_____
F	_____	S	_____
G	_____	T	_____
H	_____	U	_____
I	_____	V	_____
J	_____	W	_____
K	_____	X	_____
L	_____	Y	_____
M	_____	Z	_____

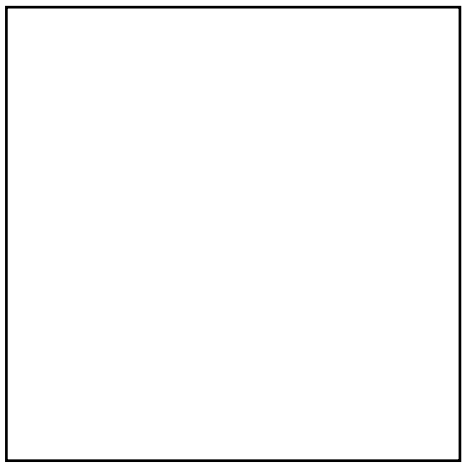
Name _____ P6

Distribute 3 red marbles and 3 blue marbles into the two cups. Use all 6 marbles and put at least one marble in each cup.



Cup 1 Cup 2

Use the square below to calculate the probabilities of winning with this distribution of marbles.



Bruce wins

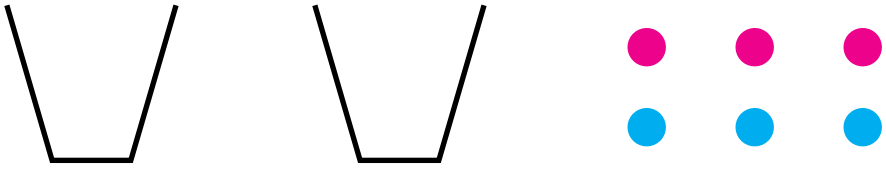
Player wins

What is Bruce's probability of winning? _____

What is the player's probability of winning? _____

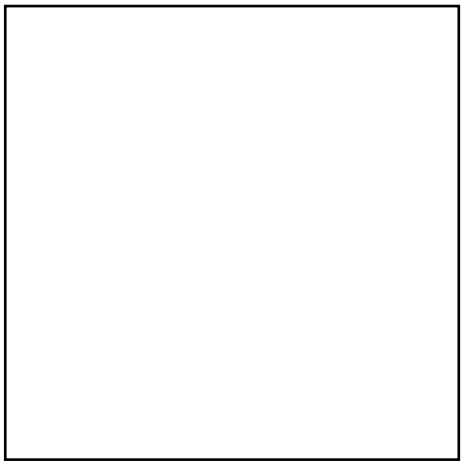
Who is favored, Bruce or the player? _____

Distribute 3 red marbles and 3 blue marbles into the two cups. Use all 6 marbles and put at least one marble in each cup.



Cup 1 Cup 2

Use the square below to calculate the probabilities of winning with this distribution of marbles.



Bruce wins

Player wins

What is Bruce's probability of winning? _____

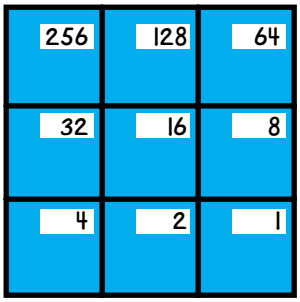
What is the player's probability of winning? _____

Who is favored, Bruce or the player? _____

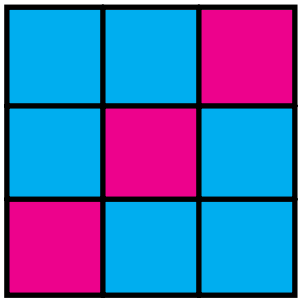
Name _____

P7 *

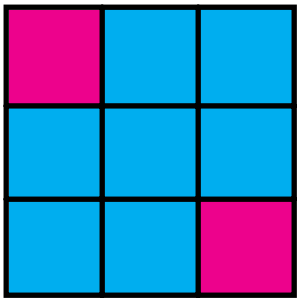
Label each picture with its code number.



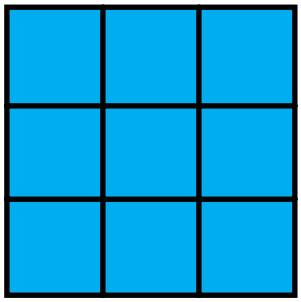
_____



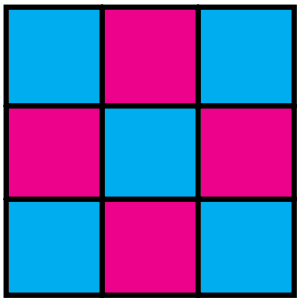
_____



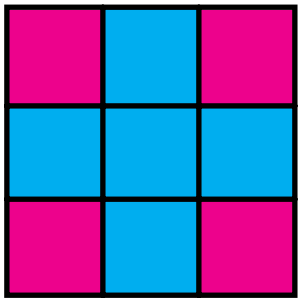
_____



_____



_____

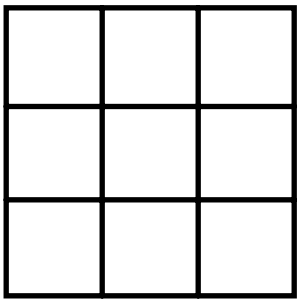


_____

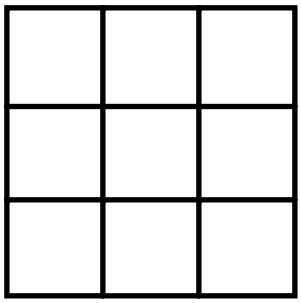
Name _____

P7 **

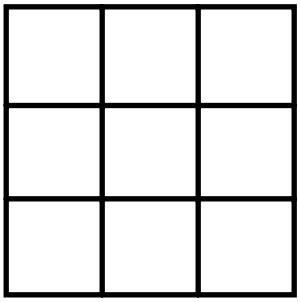
Color the pictures that have these code numbers.



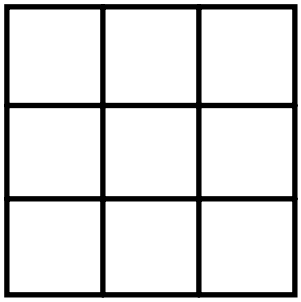
12



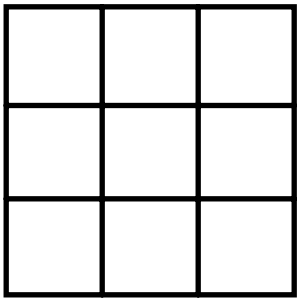
50



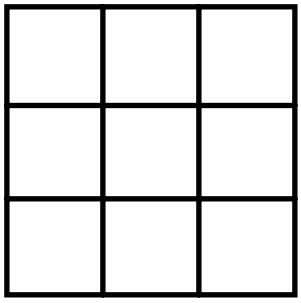
20



100



75

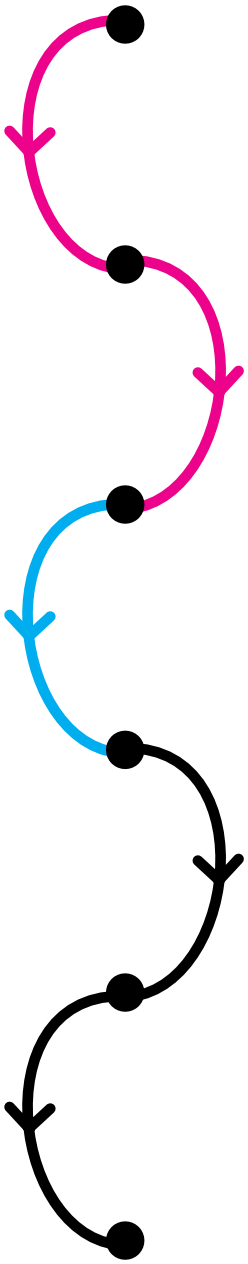


300

Name _____

W2 *

40 and 100 are both on this arrow road. Label their dots.



5×

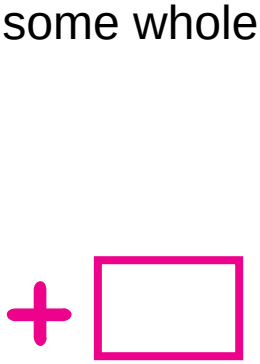
2×

$\frac{1}{4}$×

Name _____

W2 **

40 and 100 are on the same arrow road with arrows for plus some whole number.



Find at least eight possibilities for the red arrows.

_____ _____

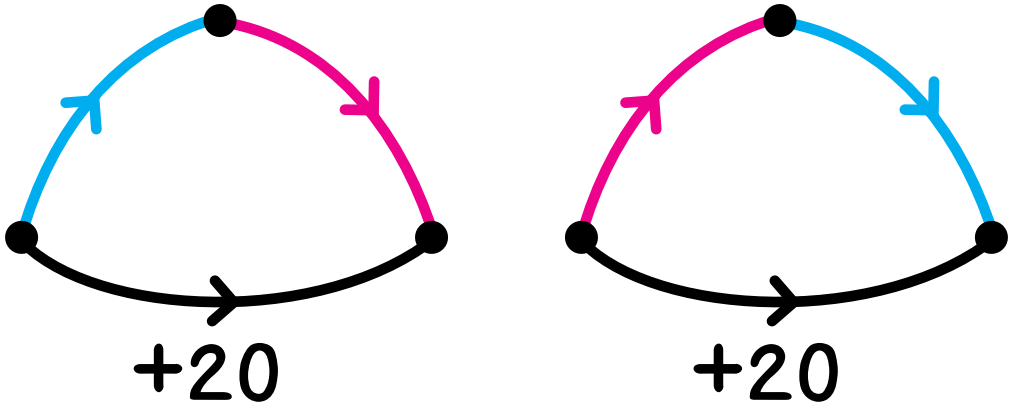
_____ _____

_____ _____

_____ _____

Name _____

W2 ***



Use the composition rules above to find 40 and 100 in the picture below.