

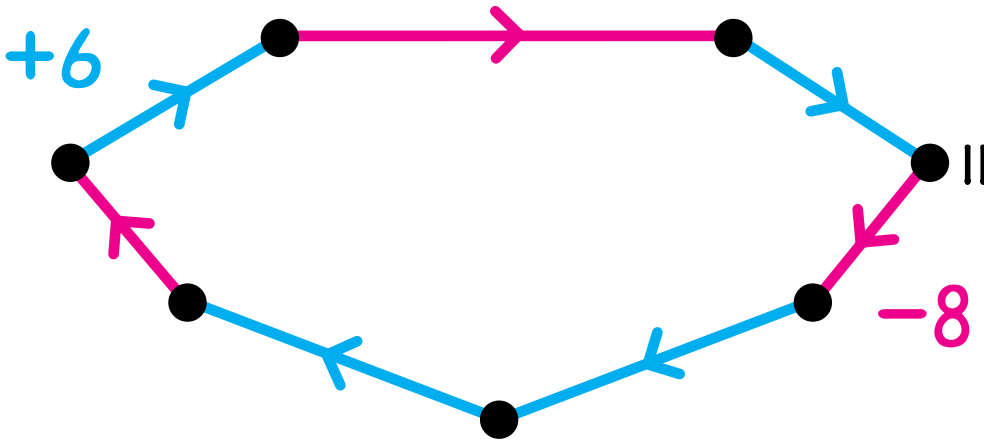
Name _____

Selection of Problems #6

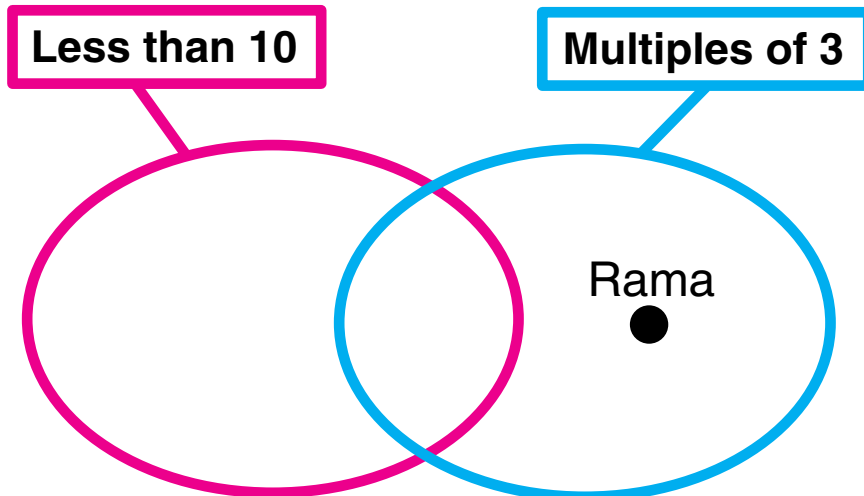
Rama is a secret number.

Clue 1

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

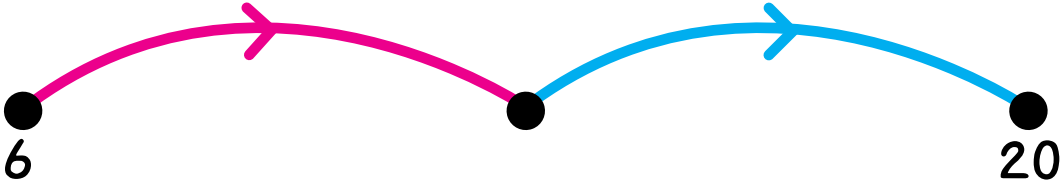


Clue 2



Who is Rama? _____

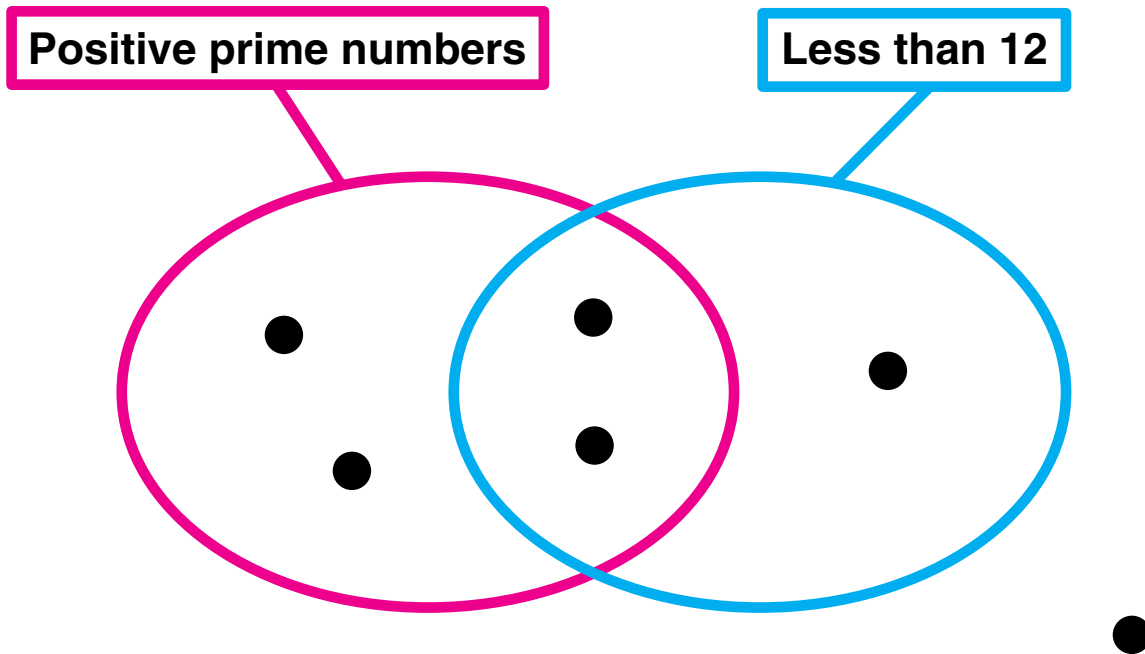
Pair the tags. One is done for you.



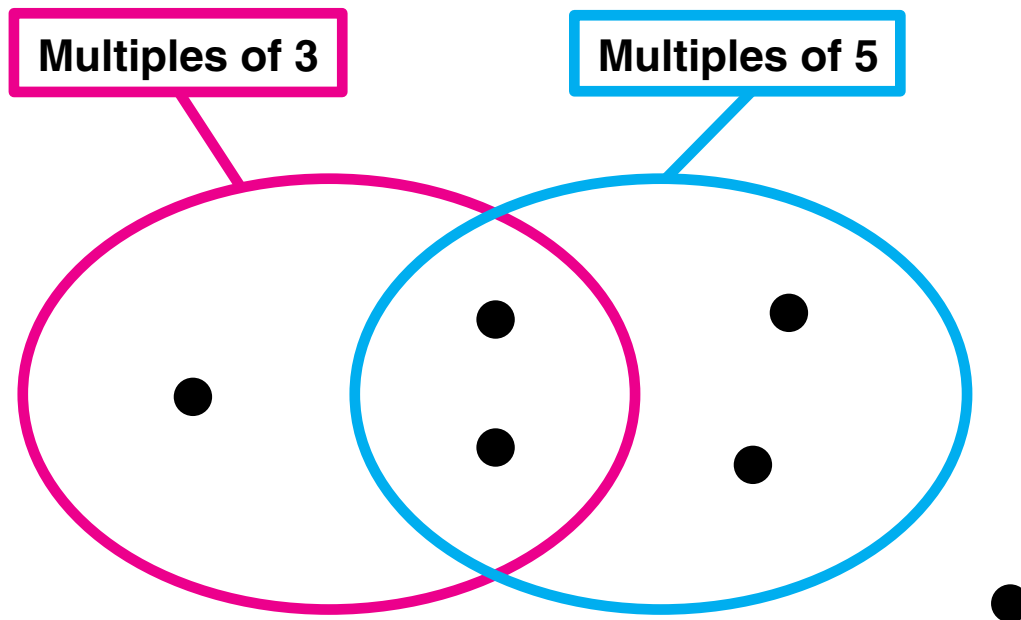
$+9$	-10
$+4$	$\times 10$
$\times 5$	$\times 2$
$\frac{1}{2} \times$	$\frac{1}{3} \times$
$\times 10$	$+5$
$\div 3$	$+17$

A diagram showing two columns of boxes, each containing a mathematical operation. A black line connects the top-left box ($+9$) to the second box from the bottom in the right column ($+5$).

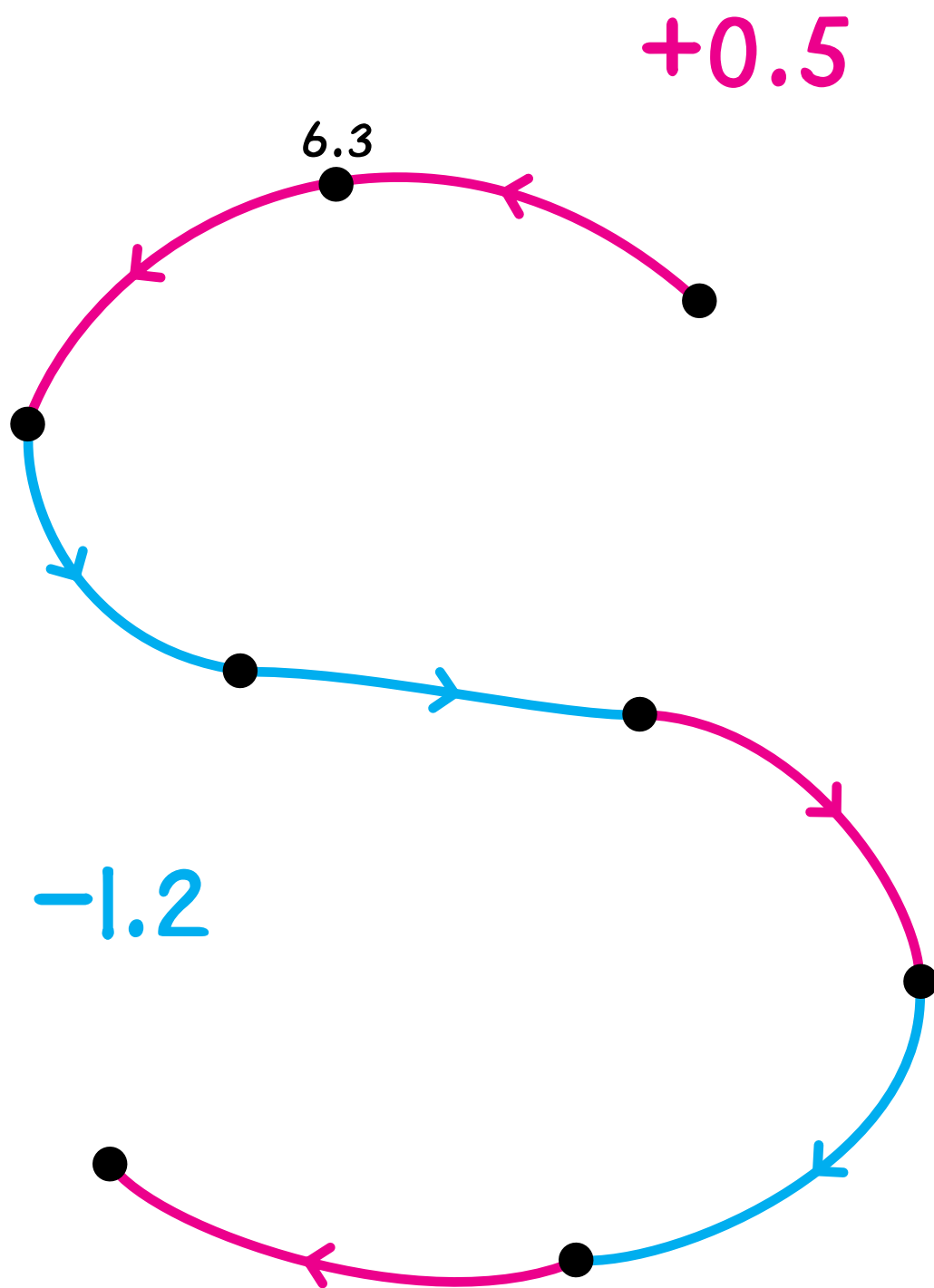
Label the dots. Many solutions are possible.



Label the dots. Many solutions are possible.



Label the dots.



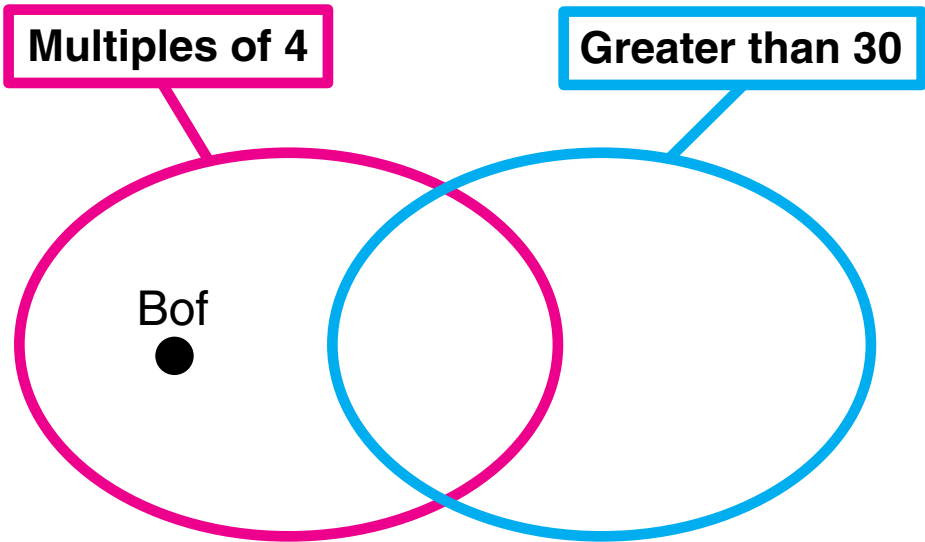
Bof is a secret number.

Clue 1

Bof is one of these numbers.

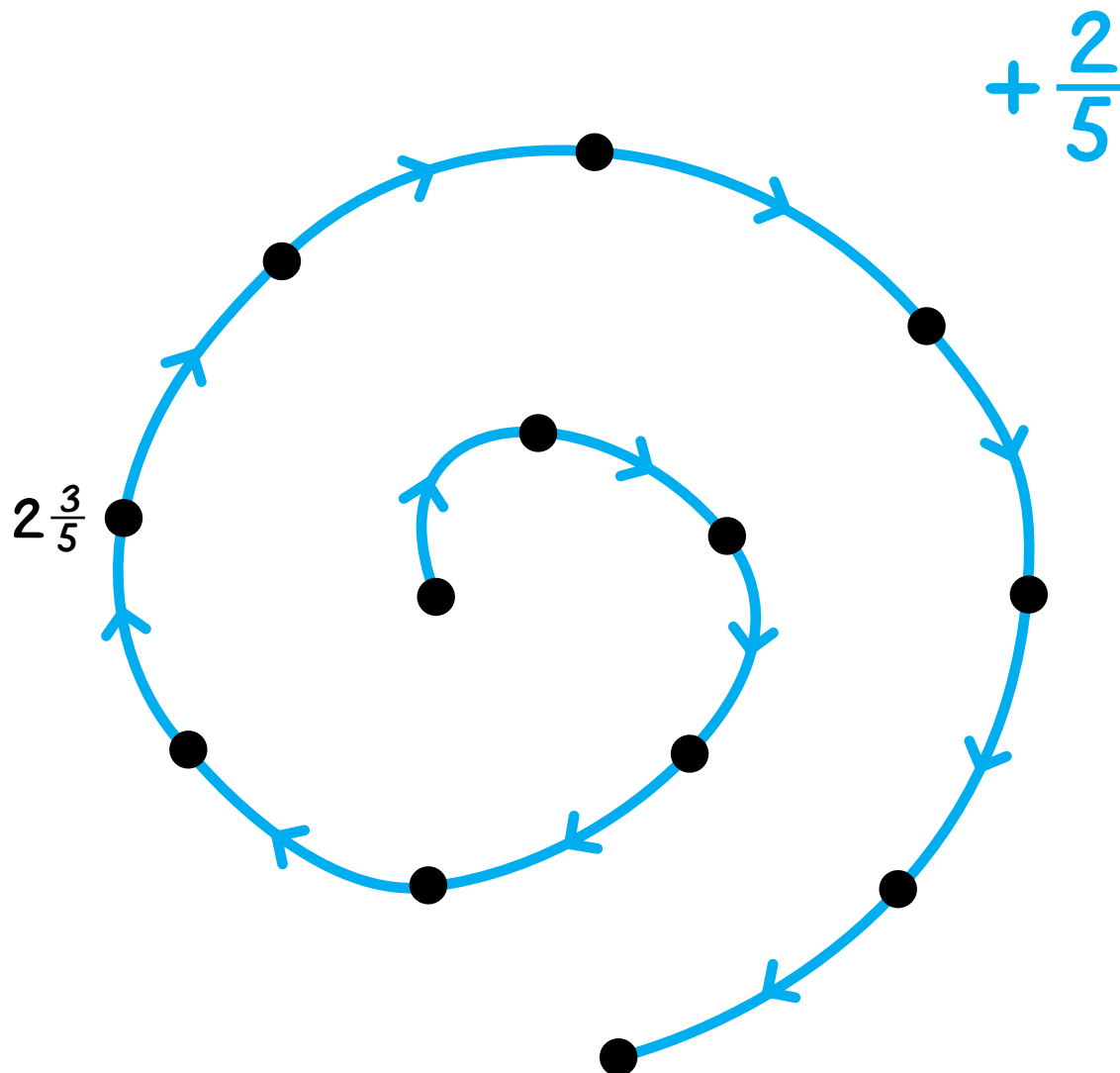
<table border="1"><tr><td>●</td><td>●</td></tr><tr><td>●</td><td></td></tr></table> = _____	●	●	●		<table border="1"><tr><td></td><td>⑥</td></tr><tr><td></td><td></td></tr></table> = _____		⑥			<table border="1"><tr><td>●</td><td>⑧</td></tr><tr><td></td><td></td></tr></table> = _____	●	⑧		
●	●													
●														
	⑥													
●	⑧													
<table border="1"><tr><td>⑨</td><td></td></tr><tr><td></td><td></td></tr></table> = _____	⑨				<table border="1"><tr><td></td><td>⑦</td></tr><tr><td></td><td>●</td></tr></table> = _____		⑦		●	<table border="1"><tr><td></td><td>⑤</td></tr><tr><td>③</td><td></td></tr></table> = _____		⑤	③	
⑨														
	⑦													
	●													
	⑤													
③														

Clue 2



Who is Bof? _____

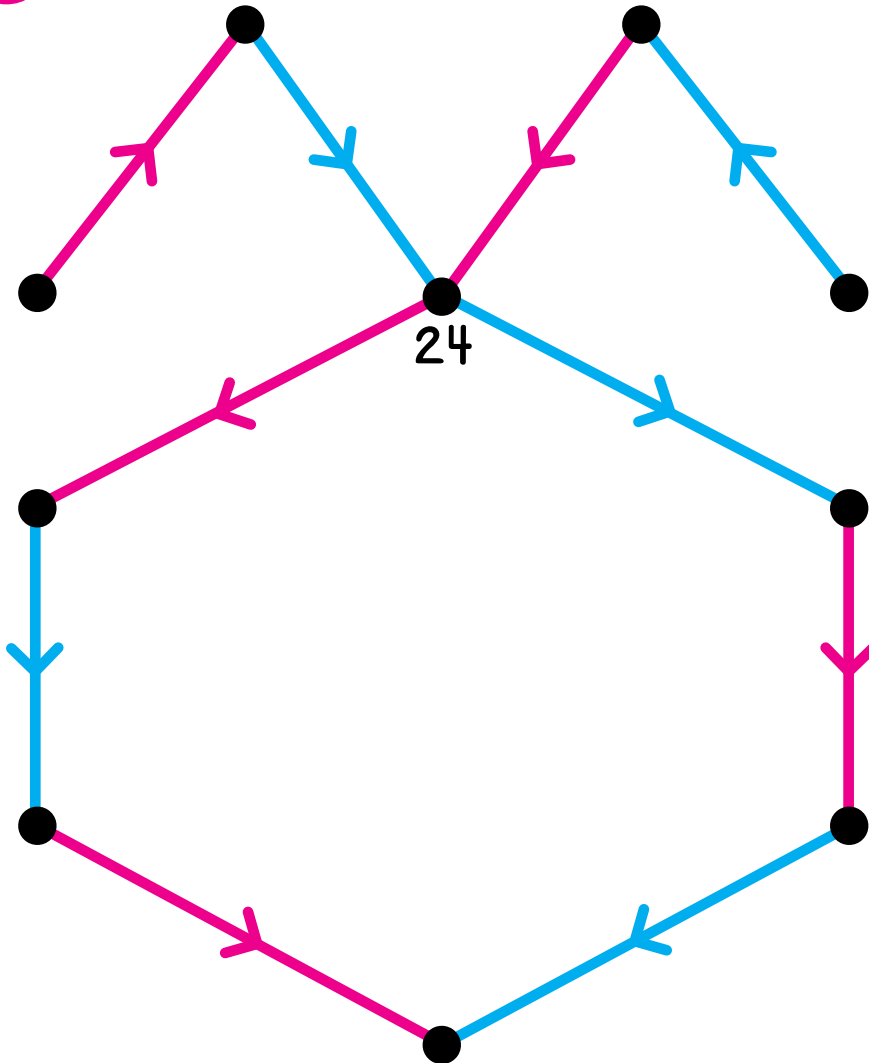
Label the dots.



Label the dots.

-6

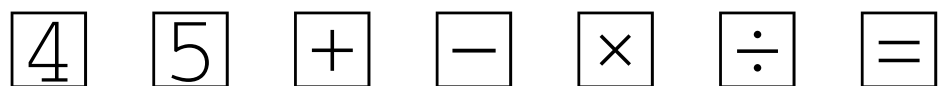
$\frac{1}{2}x$



In this picture, exactly three numbers are multiples of 9.

Name them. _____, _____, and _____

Put each number on the display of a calculator using just these keys:



List the keys in the order you use them. You may use a key more than once.

It costs 1¢ each time you press a key. Try to spend less than the amount shown for each number.

_____ **21 [10¢]**

_____ **60 [8¢]**

_____ **-6 [8¢]**

Put a single digit in each box to make the calculations correct.

$$\begin{array}{r}
 4 \square 8 2 \\
 - 7 \square 5 \\
 \hline
 \square 8 3 \square
 \end{array}$$

$$\begin{array}{r}
 \square 4 \square \\
 - 2 4 1 \\
 \hline
 3 \square 9
 \end{array}$$

$$\begin{array}{r}
 1 \square 3 \text{ R}=8 \\
 19 \overline{) 2345} \\
 \underline{-19 \square \square} \quad \square 00 \\
 \square \square \square \\
 \underline{- \square \square \square} \quad 20 \\
 \square 5 \\
 \underline{- \square \square} \quad \square \\
 \square
 \end{array}$$

$$\begin{array}{r}
 \square \square \square \text{ R}=\square \square \\
 31 \overline{) 9635} \\
 \square \square \square \square
 \end{array}$$

Ned is a secret number.

Clue 1

The blue arrow could be for:

$+6$
-6
$\div 6$

The red arrow could be for:

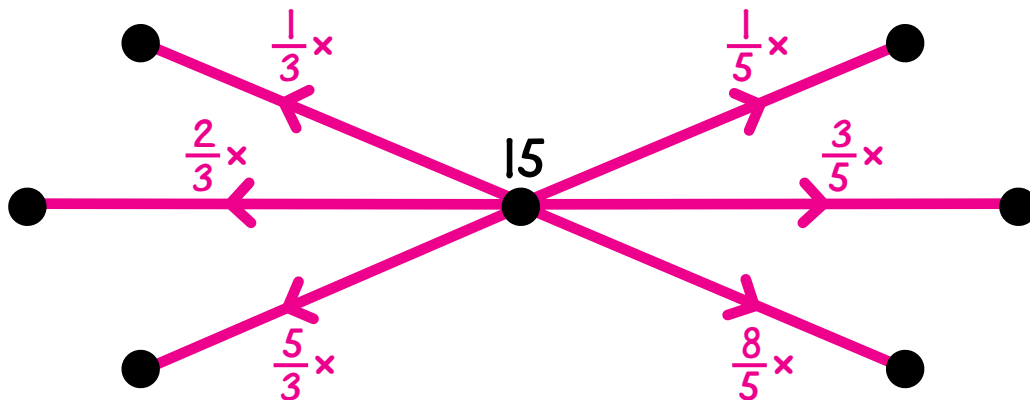
-20
$\div 2$



Ned could be _____, _____, _____, _____, _____, or _____.

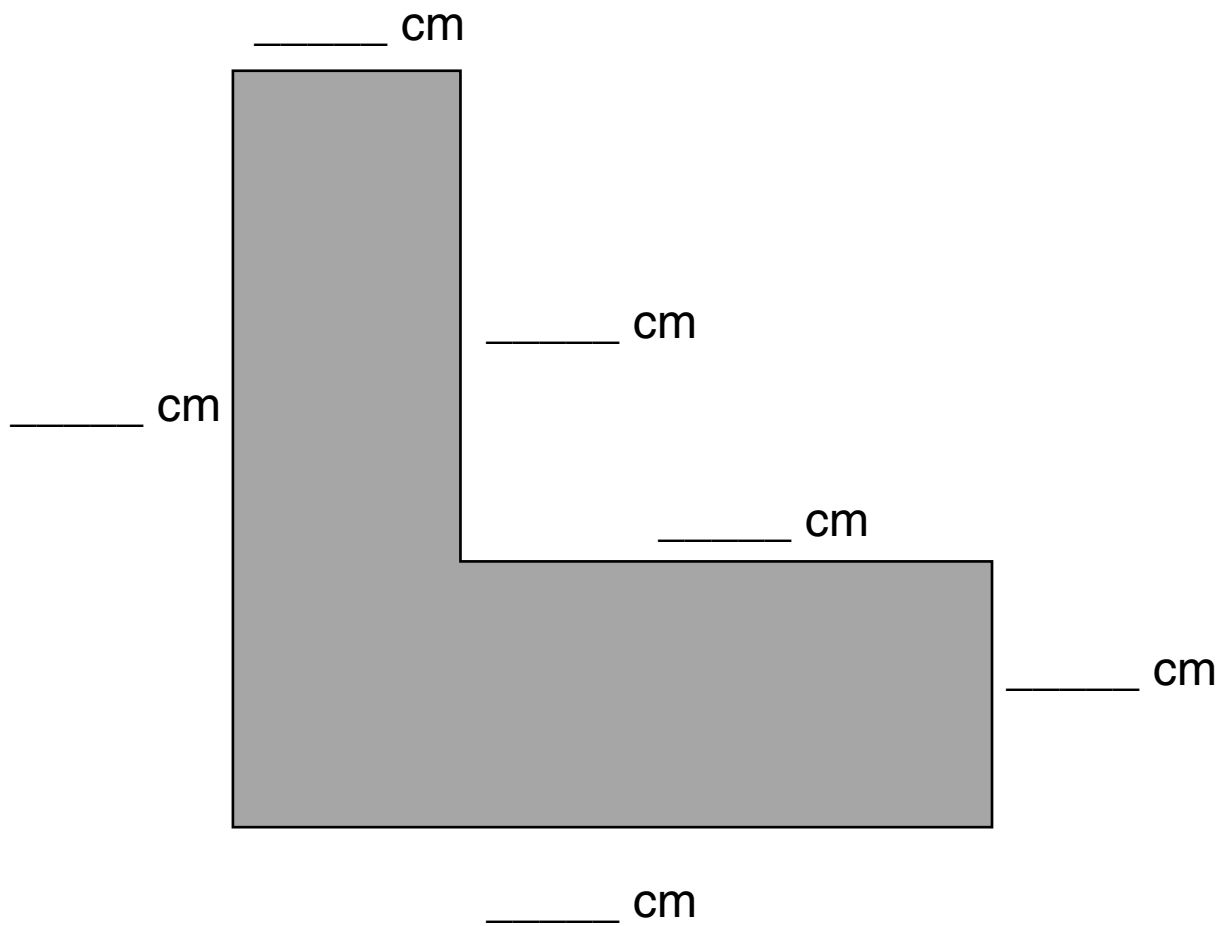
Clue 2

Ned is in this arrow picture. Label the dots.



Who is Ned? _____

Measure each of the sides of this shape.



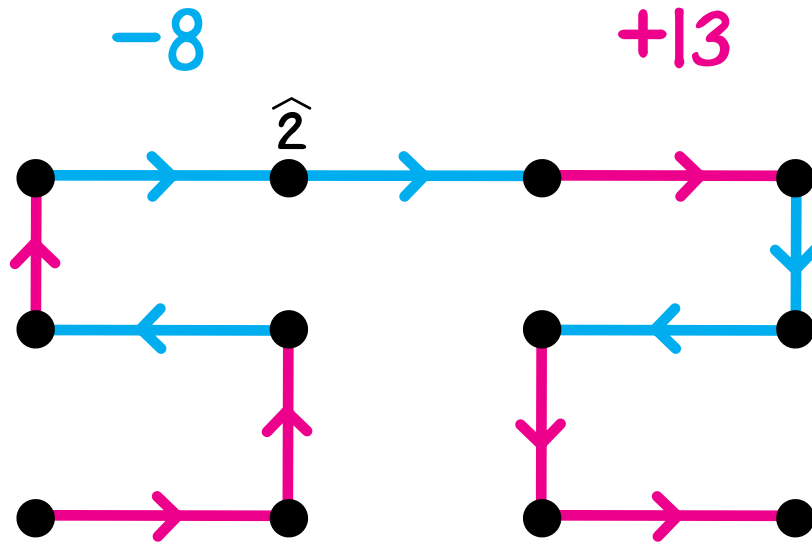
What is the perimeter of this shape? _____ cm

What is the area of this shape? _____ cm²

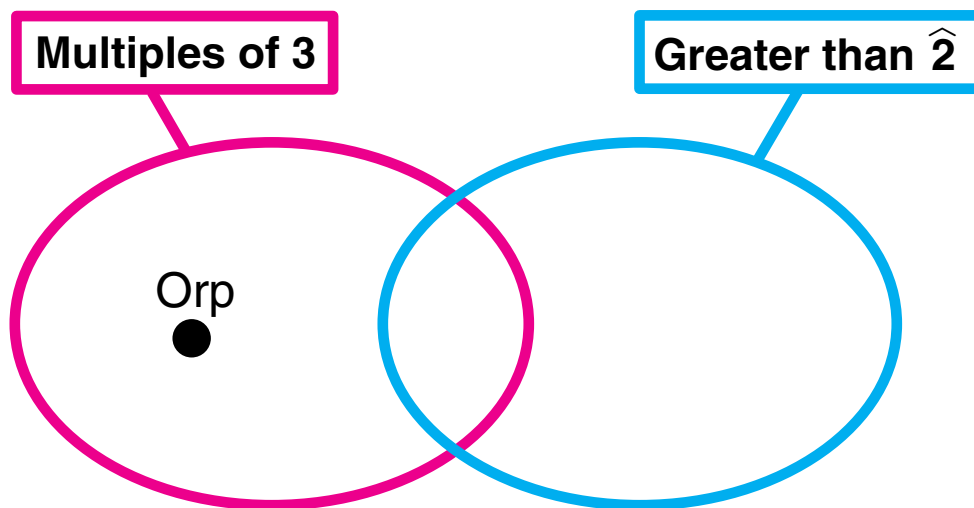
Orp is a secret number.

Clue 1

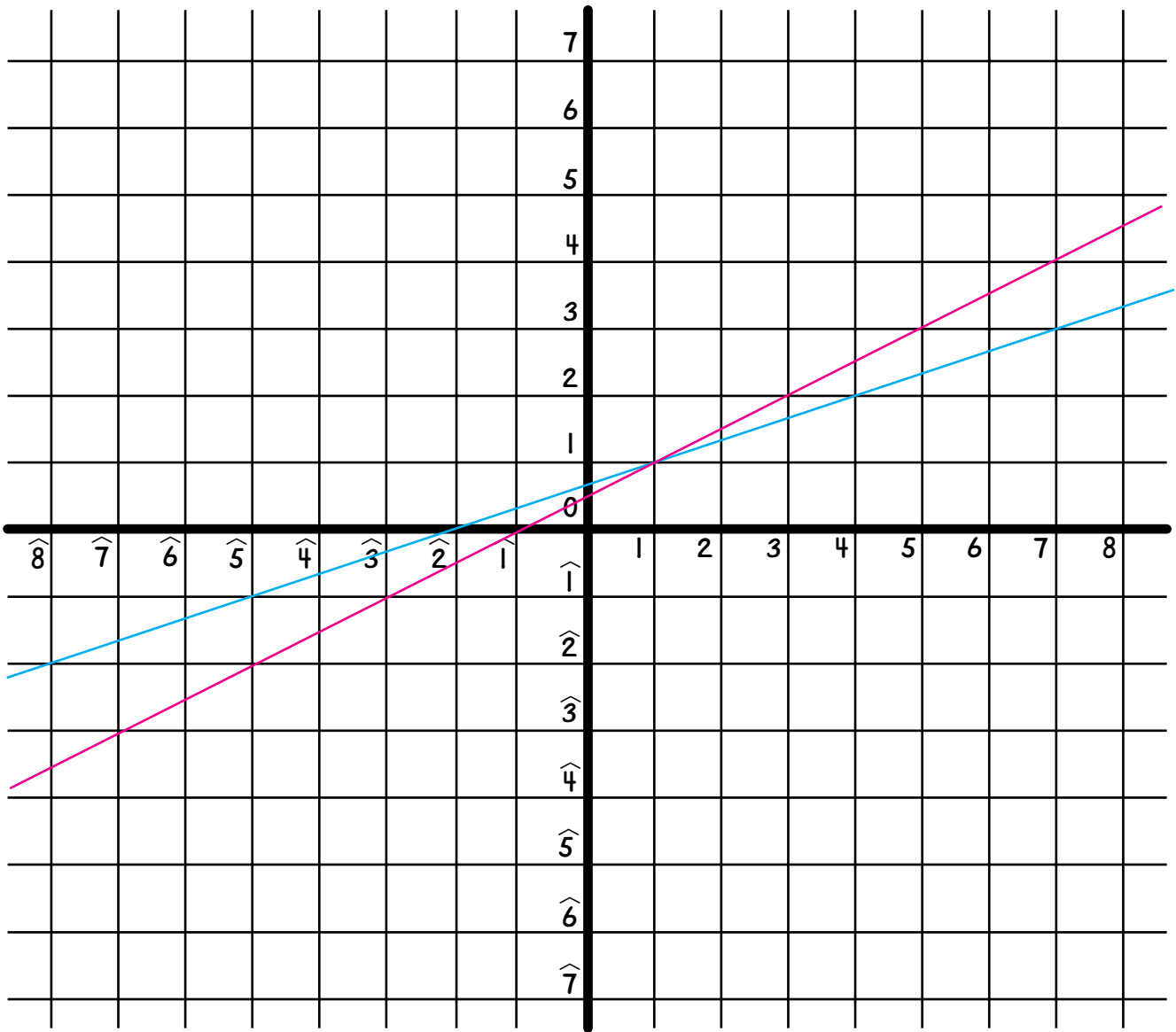
Orp is in this arrow picture.



Clue 2



Who is Orp? _____



At which point do the red and blue lines intersect? _____

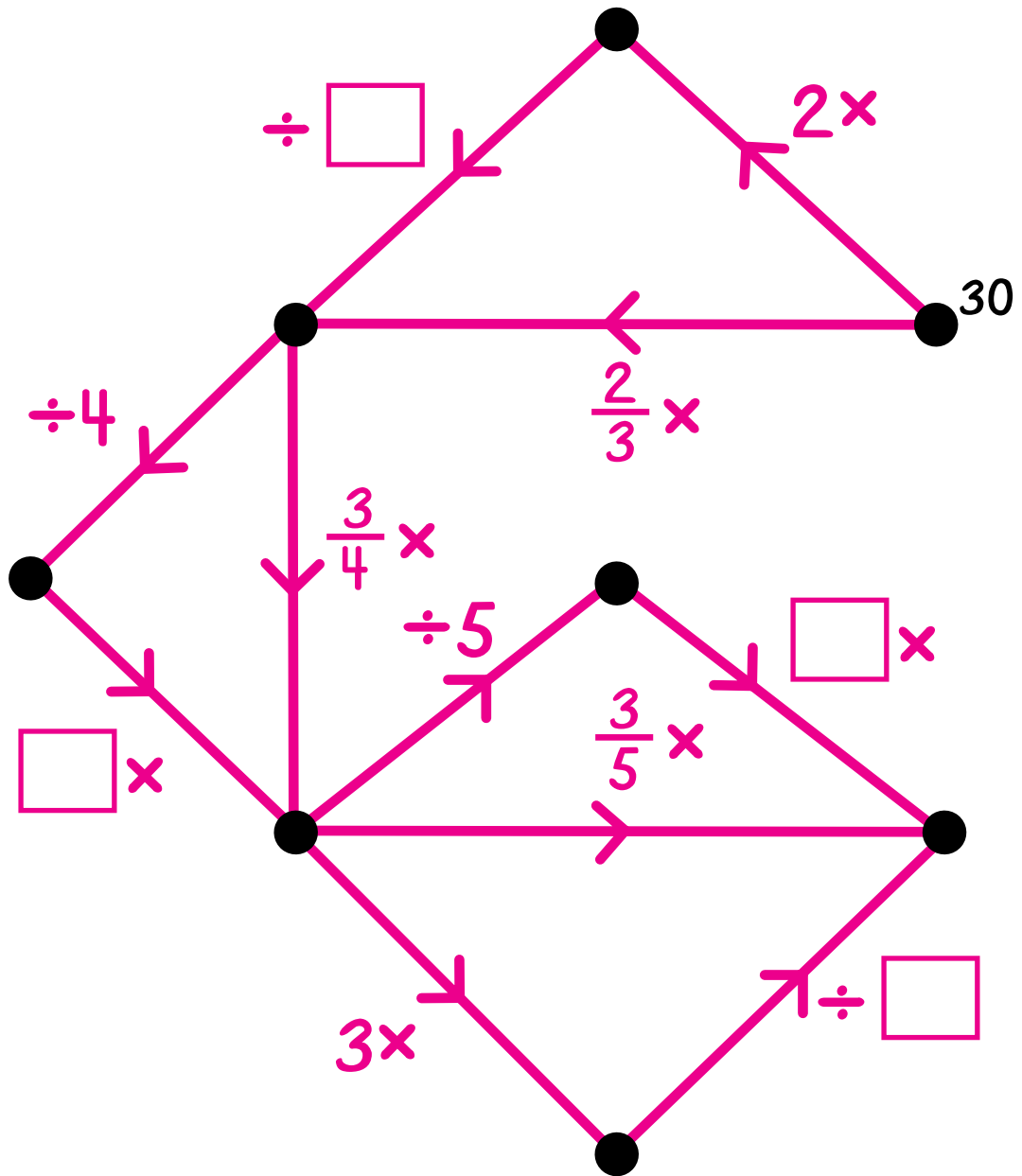
Name some points on the red line. _____

Name some points on the blue line. _____

On which of the two lines does the point (11, 6) lie? _____

On which of the two lines does the point $(\widehat{14}, \widehat{4})$ lie? _____

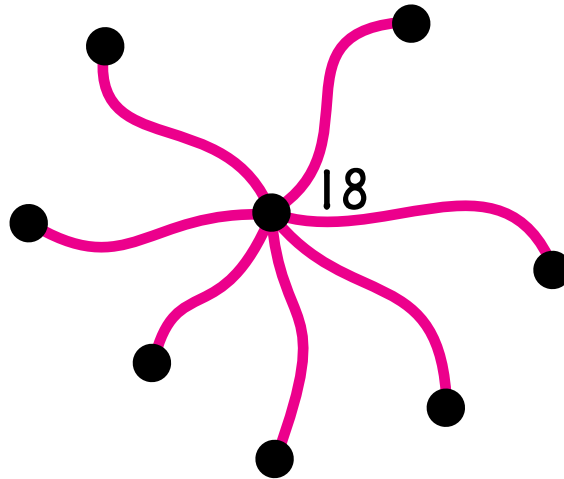
Label the dots and fill in the boxes for the arrows.



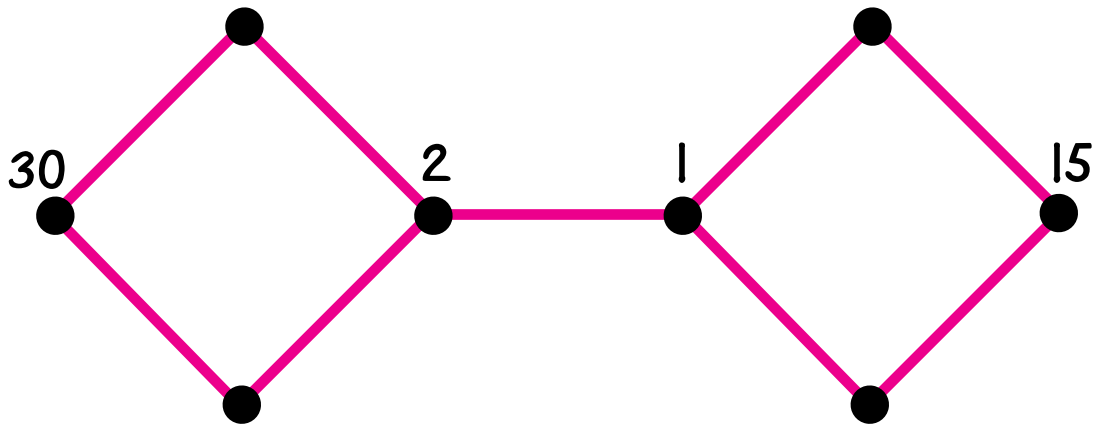
Prime Factor Relation

Two numbers are connected by a cord
if and only if
one of the numbers equals a
prime number times the other number.

Label the dots. Many labels are possible for each dot.

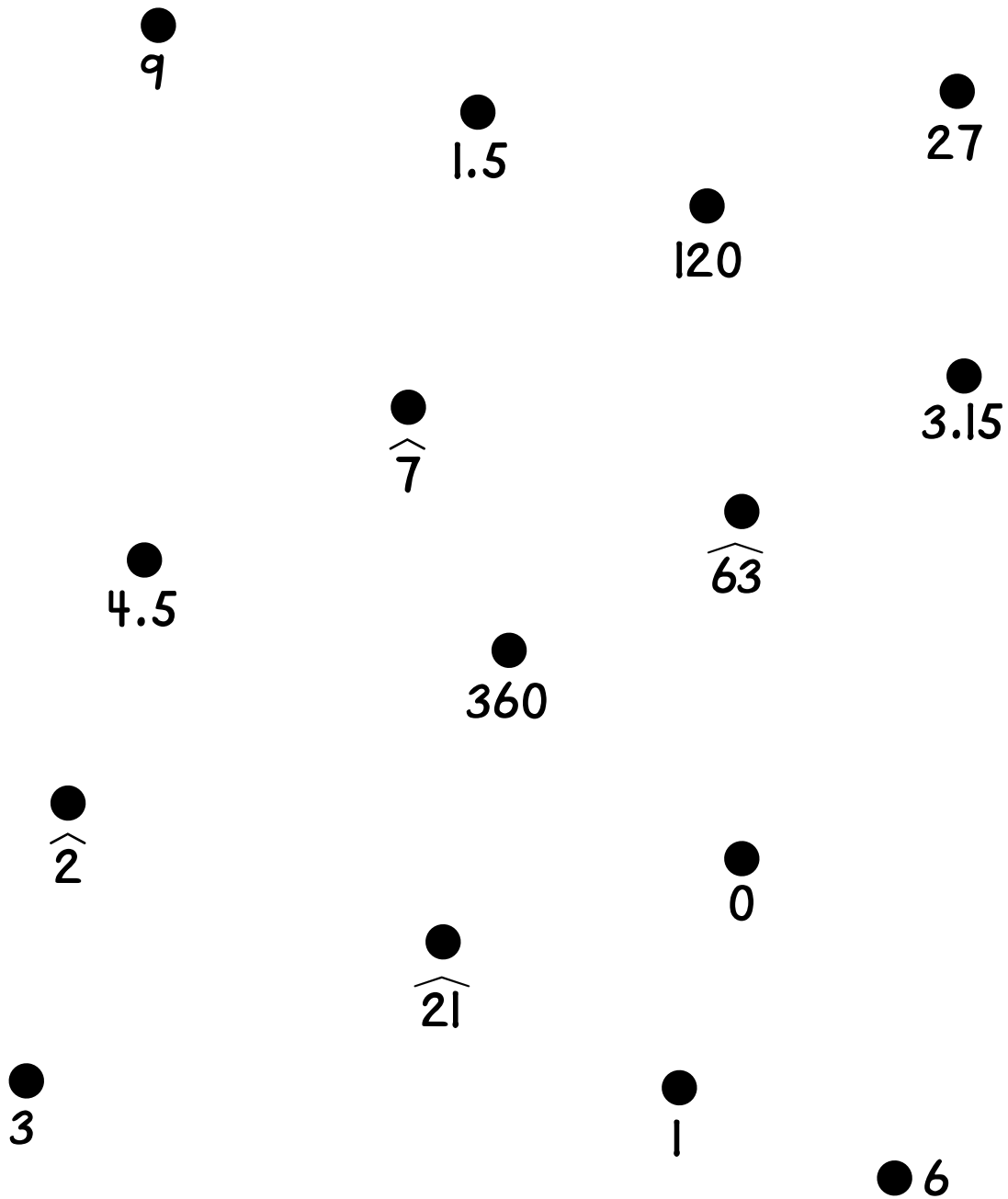


Label the dots.



Draw all of the possible red arrows in this picture.

$3\times$



Put a single digit in each box to make the calculations correct.

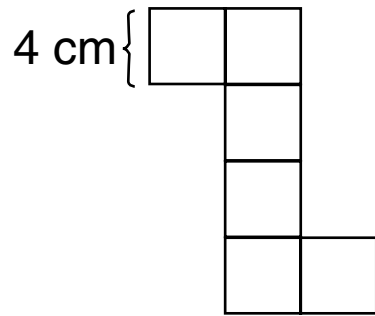
$$\begin{array}{r}
 \square 7 6 \\
 \times \quad \square \\
 \hline
 4 3 \square 0
 \end{array}$$

$$\begin{array}{r}
 \square 7 \\
 \times \square 6 \\
 \hline
 4 0 \square \\
 \square \square 6 0 \\
 \hline
 \square \square \square \square
 \end{array}$$

$$\begin{array}{r}
 \square \square \square \text{ R} = \square \\
 12 \overline{) 259 \square} \\
 \underline{- \square \square \square \square} \quad \square 00 \\
 \square \square \square \\
 \underline{- \square \square \square} \quad \square 0 \\
 \square 4 \\
 \underline{- \square \square} \quad \square \\
 \square
 \end{array}$$

$$\begin{array}{r}
 \square \square \square \\
 15 \overline{) 4605}
 \end{array}$$

This is a (reduced) map of a cube with 4 cm square faces.



What is the area of each face? _____

What is the surface area of the cube? _____

What is the volume of the cube? _____

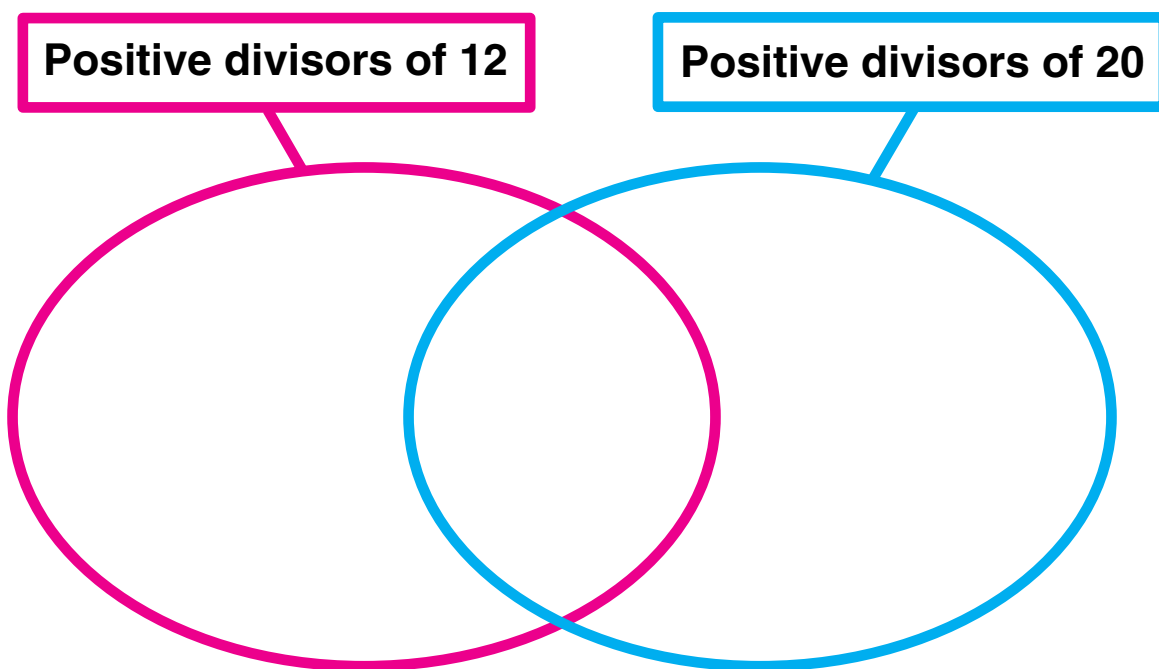
Draw a map of a cube with surface area 54 cm^2 . What is the volume of this cube? _____

Fill in the boxes and then label the arrows.

$5 \times 3 =$	<input type="text"/>	
$5 \times 2 =$	<input type="text"/>	
$5 \times 1 =$	<input type="text"/>	
$5 \times 0 =$	<input type="text"/>	
$5 \times \hat{1} =$	<input type="text"/>	
$5 \times \hat{2} =$	<input type="text"/>	
$5 \times \hat{3} =$	<input type="text"/>	

$\hat{3} \times 3 =$	<input type="text"/>	
$\hat{3} \times 2 =$	<input type="text"/>	
$\hat{3} \times 1 =$	<input type="text"/>	
$\hat{3} \times 0 =$	<input type="text"/>	
$\hat{3} \times \hat{1} =$	<input type="text"/>	
$\hat{3} \times \hat{2} =$	<input type="text"/>	
$\hat{3} \times \hat{3} =$	<input type="text"/>	

Put every positive divisor of 12 and every positive divisor of 20 in this string picture.



Complete.

\square : greatest common divisor

$$12 \square 20 = \underline{\hspace{2cm}}$$

$$12 \square 30 = \underline{\hspace{2cm}}$$

$$26 \square 20 = \underline{\hspace{2cm}}$$

Lada is a secret number.

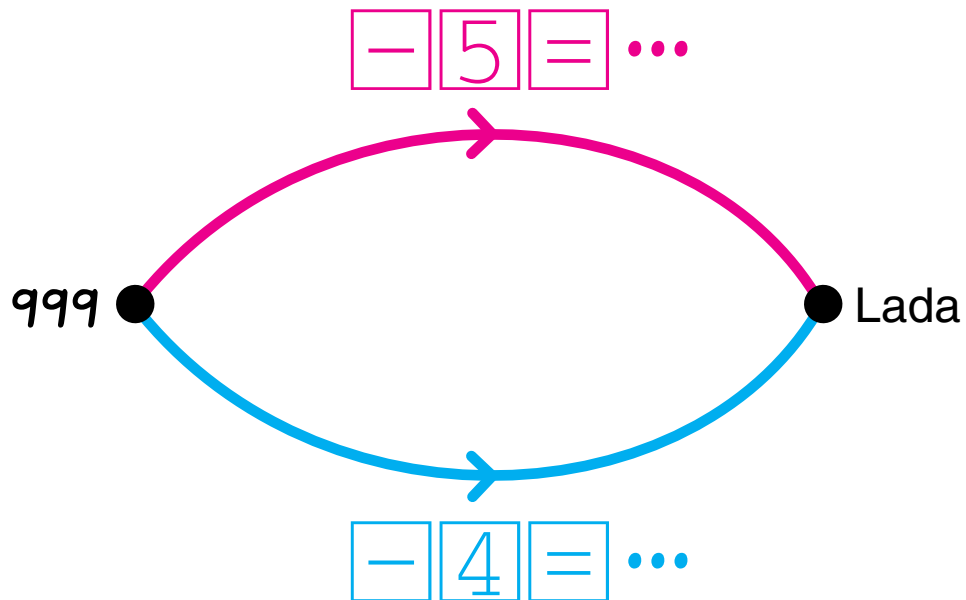
Clue 1

Two pairs of parentheses are missing from this expression for Lada.

$$3 \times 5 - 2 \times 8$$

Lada could be _____, _____, _____, or _____.

Clue 2



Who is Lada? _____

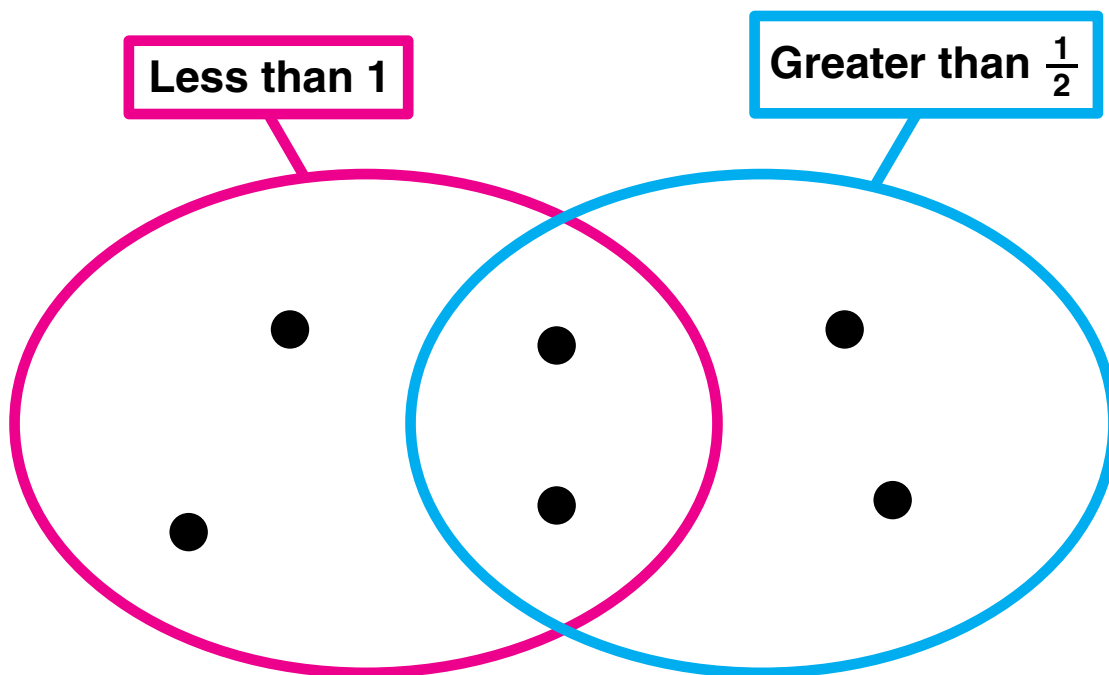
Locate these numbers on this number line.

$$\frac{1}{10} \quad \frac{9}{10} \quad \frac{13}{10} \quad \frac{1}{5} \quad \frac{3}{5} \quad \frac{1}{2} \quad \frac{3}{2} \quad \frac{1}{4}$$

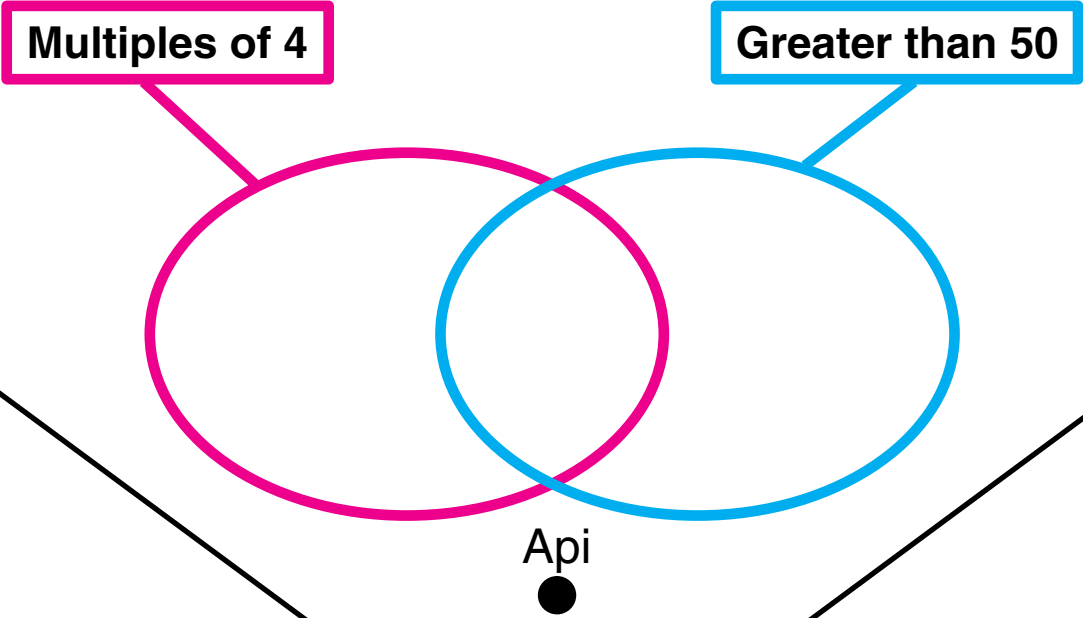


Put each of these numbers in the string picture.

$$\frac{1}{10} \quad \frac{9}{10} \quad \frac{13}{10} \quad \frac{1}{5} \quad \frac{3}{5} \quad \frac{3}{2}$$



Api is a secret number.



Api can be written using each of these symbols exactly once.

\times 6
(+ 7
2)



Who is Api? _____

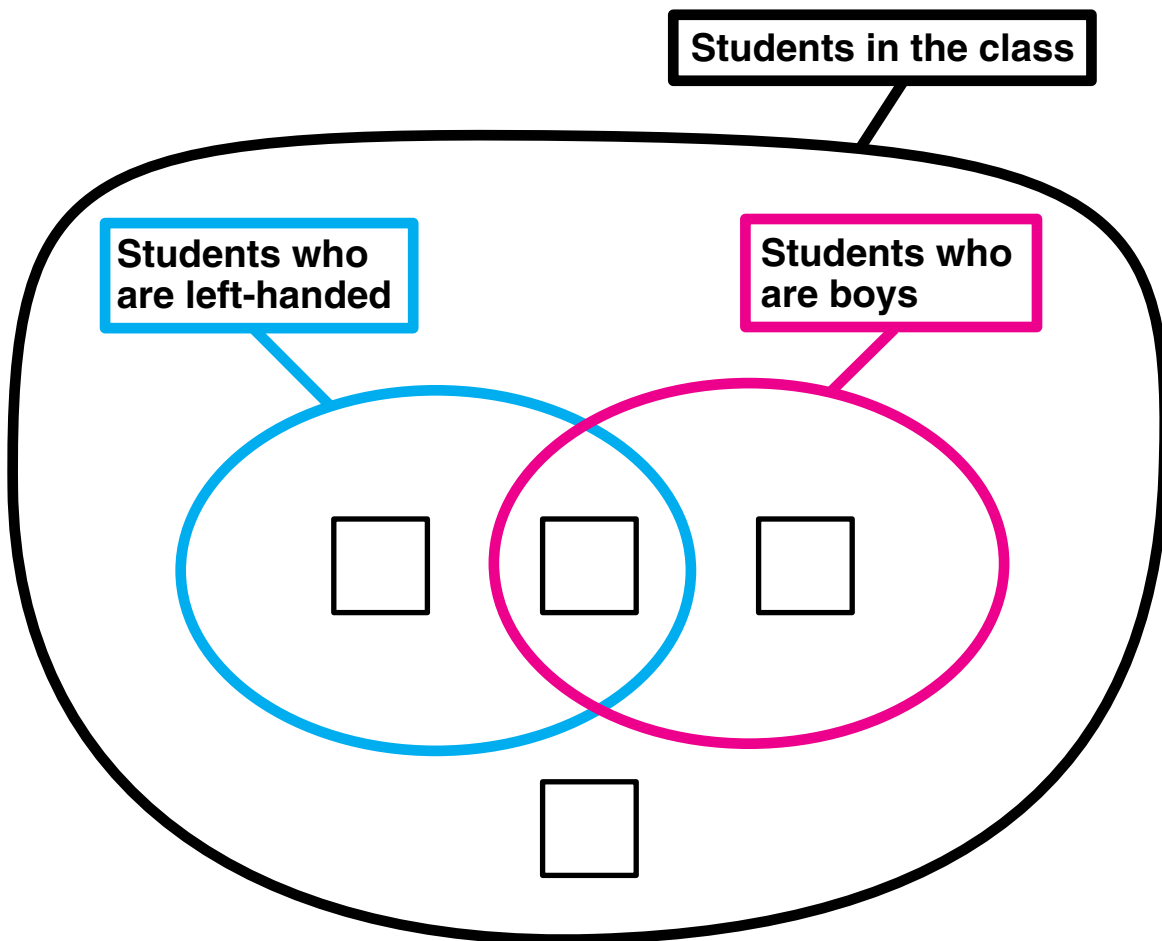
Find the number of students in each region of the string picture and record these numbers in the boxes.

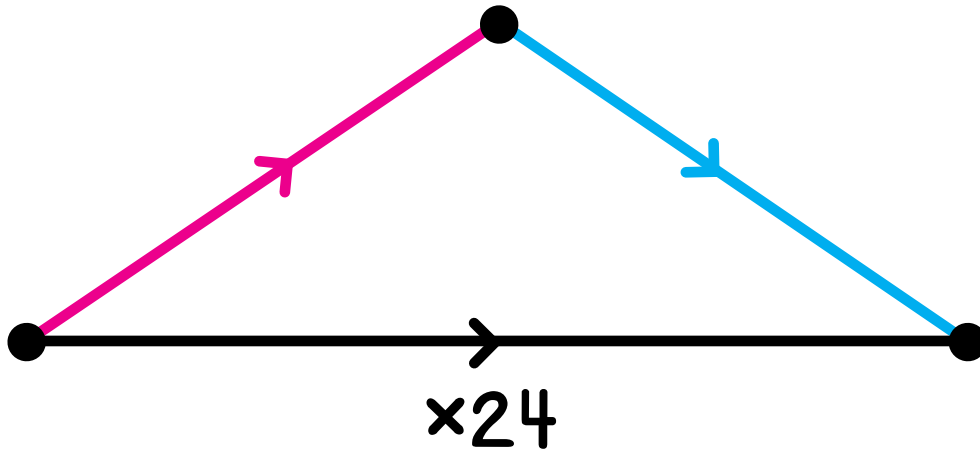
There are 30 students in the class.

One-half of the students are boys.

13 of the boys are right-handed.

One-third of the class is left-handed.



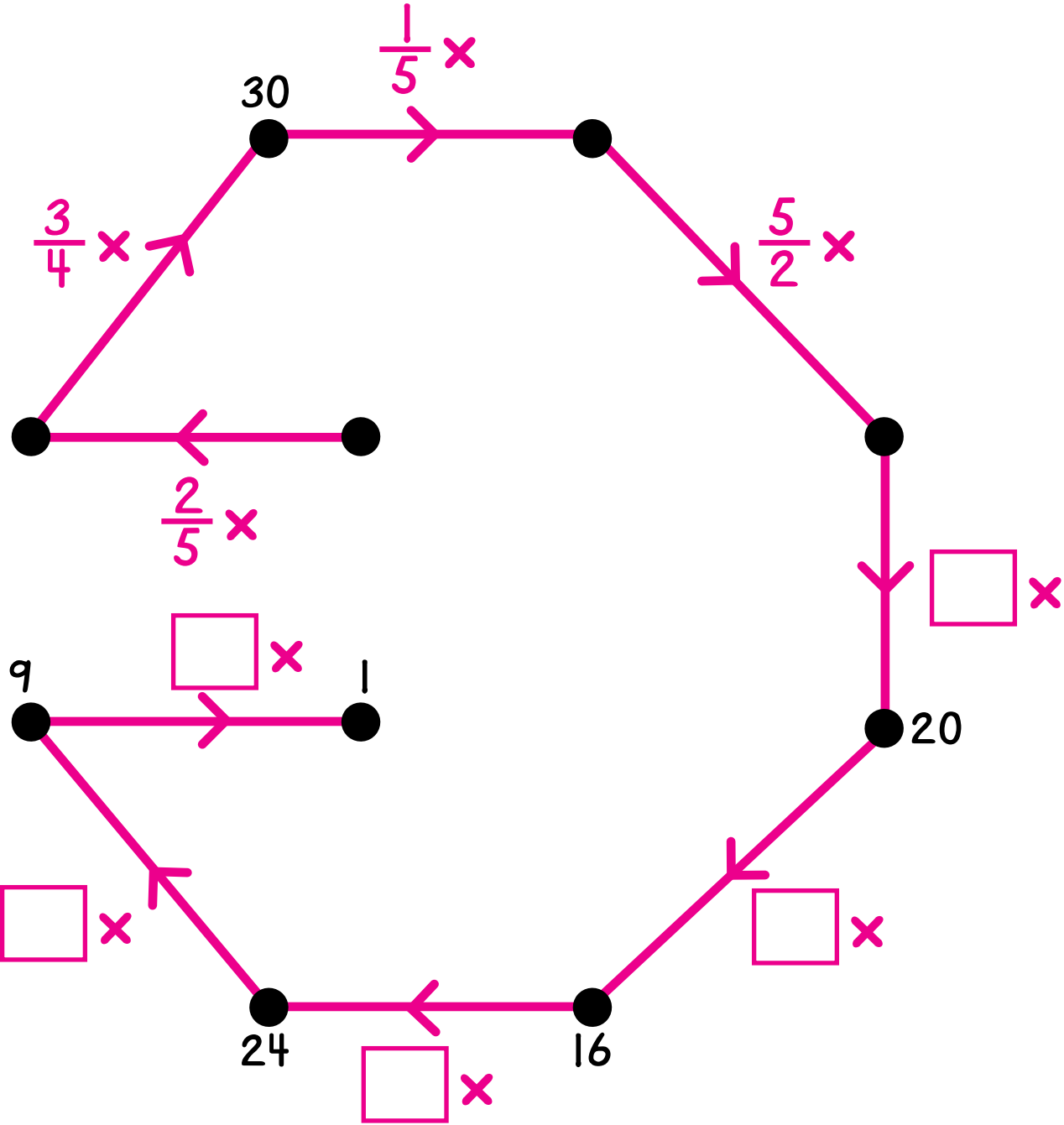


Complete the charts.

$\times 4$	$\times 6$
$\div 2$	
	$\div 3$

$\times 240$	
	$\times 480$
$\div 100$	
	$\div 200$
$\div 30$	

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



Viva is a secret number.

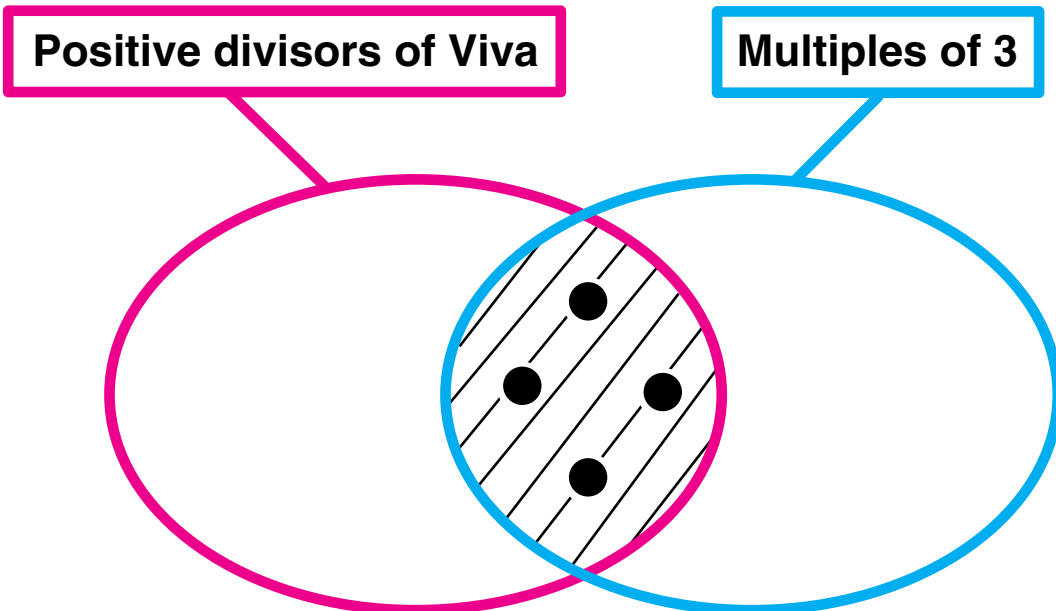
Clue 1

\square : least common multiple

$$60 = 12 \square Viva$$

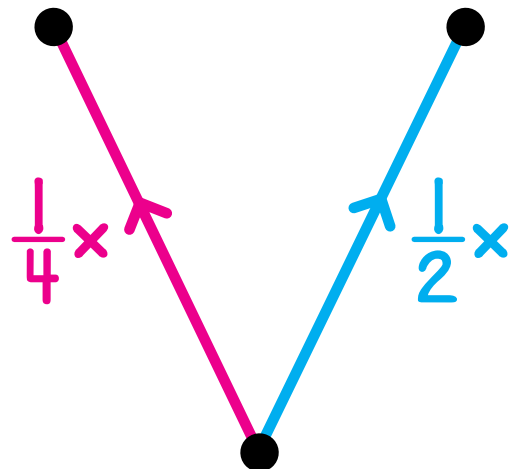
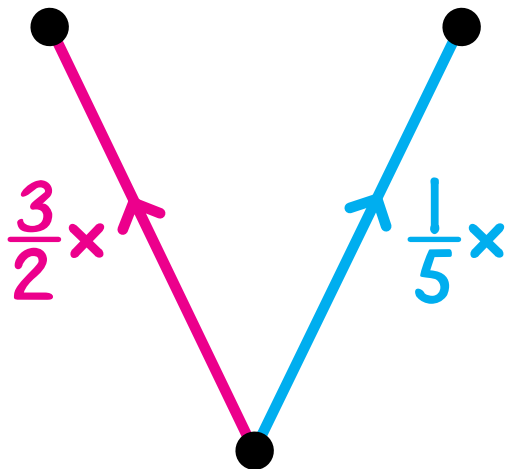
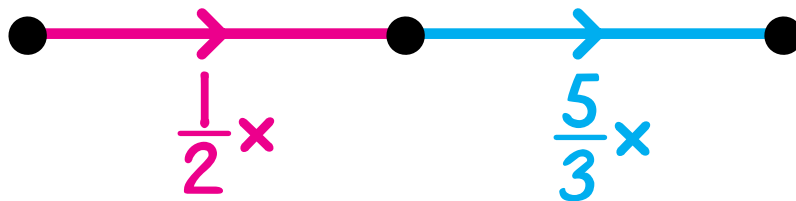
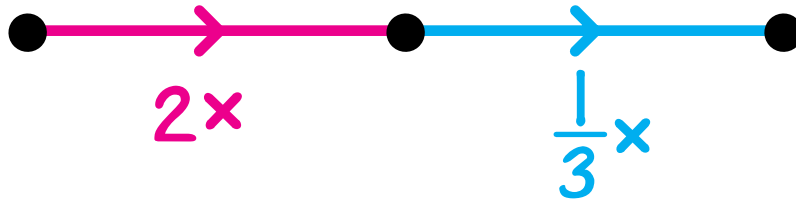
Viva could be _____, _____, _____, _____, _____, or _____.

Clue 2



Who is Viva? _____

6 is the smallest number in each arrow picture.
Find 6 in each picture and then label all of the dots.



Put a single digit in each box to make the calculations correct.

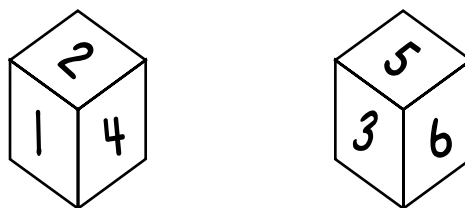
$$\begin{array}{r}
 \square \square \\
 \times \square 2 \\
 \hline
 1 \square 4 \\
 \square \square 5 0 \\
 \hline
 \square \square 8 \square
 \end{array}$$

$$\begin{array}{r}
 \square \square \square \\
 \times \square \square \\
 \hline
 \square \square 3 \square \\
 \square 3 9 \square 0 \\
 \hline
 3 \square \square 8 7
 \end{array}$$

$$\begin{array}{r}
 \square \square \\
 \times \square 9 \\
 \hline
 \square 3 \square \\
 \square 8 \square 0 \\
 \hline
 \square \square 7 2
 \end{array}$$

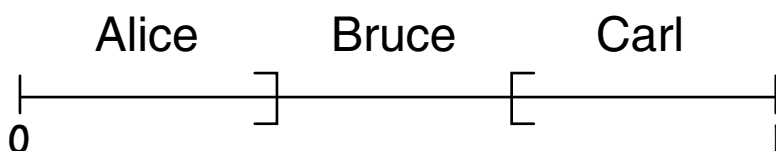
$$\begin{array}{r}
 \square 3 \square \quad R = \square \\
 2 \square \overline{) 3 \square \square 9} \\
 \underline{- \square 7 \square \square} \quad \square 00 \\
 8 \square \square \\
 \underline{- \square \square \square} \quad \square 0 \\
 8 \square \\
 \underline{- \square \square} \quad \square \\
 \square
 \end{array}$$

Alice, Bruce, and Carl play a game with two number cubes. Each cube has 1, 2, 3, 4, 5, and 6 on the faces.



The game is:

- Toss the two cubes and use the numbers on the top faces to make a fraction less than or equal to 1; for example, $\frac{2}{5}$.
- Alice gets a point for results $\frac{1}{3}$ or less.
Bruce gets a point for results between $\frac{1}{3}$ and $\frac{2}{3}$.
Carl gets a point for results $\frac{2}{3}$ or more.



Is this a fair game? _____

If not, explain who is favored.

If the game is not fair, explain how to make a fair game for the three players.