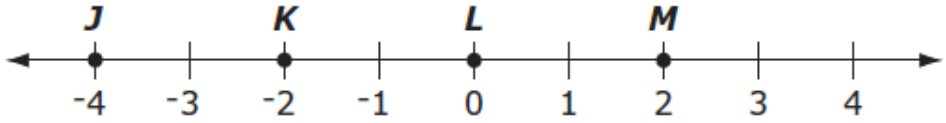
7th Grade Only

1. Four points are graphed on a line.



Which point is located at the opposite of -2?

A. Point *J*

B. Point *K*

C. Point *L*

D. Point *M*

THINK

"OPPOSITE" means the SAME DISTANCE from 0 on the opposite side of the number line.
Can you think of a shortcut?

2. Which statement is true?

A. $0.75 < 0.75^2$

B. $-\frac{3}{8} < -0.38$

C. $\frac{46}{25} > 1\frac{5}{6}$

D. $-2\frac{3}{5} > 1.5$

THINK

It is easiest to compare numbers that LOOK the same. Change each number to a DECIMAL to compare.

Remember, the greedy  "eats" the largest number. The CLOSER a negative number is to zero on a number line, the LARGER the number is.

0.75^2 = _____ $-\frac{3}{8}$ = _____ $\frac{46}{25}$ = _____

$1\frac{5}{6}$ = _____ $-2\frac{3}{5}$ = _____

3. Jeremy can plant 10 trees in 4 hours. How many trees can he plant in 10 hours?

A. 16

B. 25

C. 40

D. 100

THINK

I will use a proportion to solve this problem because I am trying to find _____.
STEPS TO SOLVE:
1. THINK: What TWO things is the problem talking about?

$\frac{\text{trees}}{\text{hours}}$

2. WRITE A WORD RATIO and SUBSTITUTE the NUMBERS.

$\frac{\text{trees}}{\text{hours}}$ = _____ = _____

3. CROSS MULTIPLY to SOLVE for variable.

4. On Mondays, Jayda runs between 2 and 5 miles. On Tuesdays, she runs 3 times as far as she runs on the previous Monday. Which inequality can be used to find x, the distance Jayda could run on a Tuesday?

A. $2 < 3x < 5$

B. $2 < 3x > 5$

C. $2 < \frac{x}{3} < 5$

D. $2 < \frac{x}{3} > 5$

THINK

Math Talk...

"Between" means < because it is greater than the 1st number and less than the 2nd number (it is in the middle).

5. What is the value of $4t^2 + 6r - tr$ when $t = -3$ and $r = 5$?

To answer this question online, you will have to use this keypad to enter your answer.

1	2	3	4
5	6	7	8
9	0	.	-
/	Delete		

Answer: _____

THINK

1. SUBSTITUTE the number in place of the variable – remember... the number goes inside ( ) – ALWAYS.
2. PEMDAS
3. The exponent is like a  ... he will "lasso" ONLY what he is "touching" (the base).

Example: $3a^2$ when $a = -2$

Substitute: $3(-2)^2 = 3(-2)(-2) = 12$

6. The equation $y = 12x + 60$ can be used to estimate y, the height of a tree in centimeters x months after it is planted. When a tree is 150 cm tall, how long ago was the tree planted?

A. 7.5 months

B. 10.8 months

C. 17.5 months

D. 78.0 months

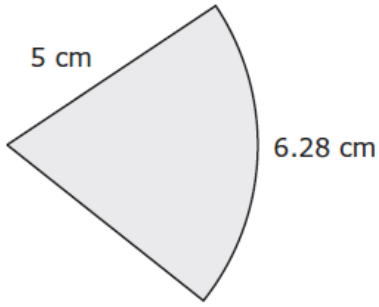
THINK

In problems like this it is important to define x and y (write the word).

Example: x = months
y = height

Now think... do you substitute 150 for x or for y? ____ So smart.

7. A sector of a circle is shown. What is the area of the sector? (Use 3.14 for π.)



A. 12.5 cm^2

B. 15.7 cm^2

C. 31.4 cm^2

D. 78.5 cm^2

THINK

Wowee Zowee… this problem is tough. But, then so are your math skills!

There is more than one way to solve this. You can…

#1 WAY

Estimate the size of the sector (like a  slice of a circle) and use the Area Formula. Like this:

Area = πr^2 = 3.14 (__)(__) = ____

THINK: The sector is about a fifth of the whole pizza so divide your answer by 5.

OR… if 

with Geometry you can use the formula for sectors (and dazzle us with your brilliance because it is not on your formula sheet):

$$\text{Area of an arc} = \frac{\text{Arc}}{2} \cdot r$$

8. A map uses the scale 1.5 cm = 25 mi. Two cities are 190 miles apart. How far apart are the cities on the map?

A. 0.21 cm

B. 11.4 cm

C. 2,917 cm

D. 6,563 cm

THINK

You will need a proportion to solve this problem.

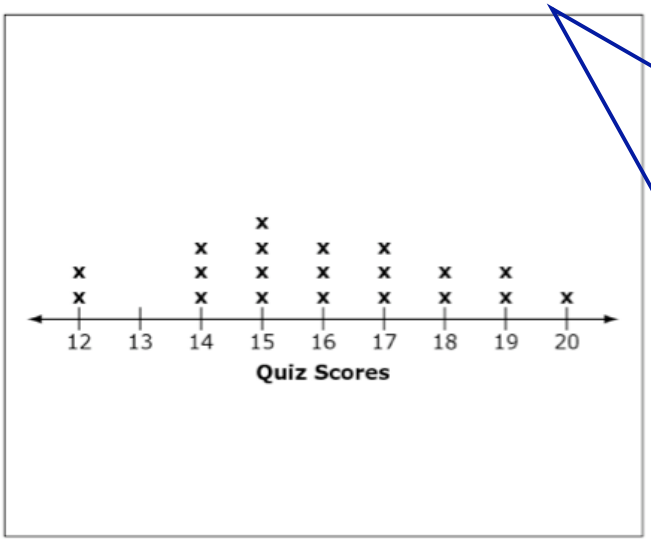
THINK: What 2 things is the problems about?

Forgot how to solve proportions?

LOOK at problem #3!

9. A teacher made a line plot to show the scores of a quiz. After 2 more students took the quiz, the mean score was 16. Plot 2 possible scores on the line plot to make the mean 16.

To answer this question online, you will have to enter an "x" by clicking above the top "x" for each number.



THINK

MEAN – the AVERAGE (find the sum and divide by the number of x's).

There are 2 ways to solve this problem:

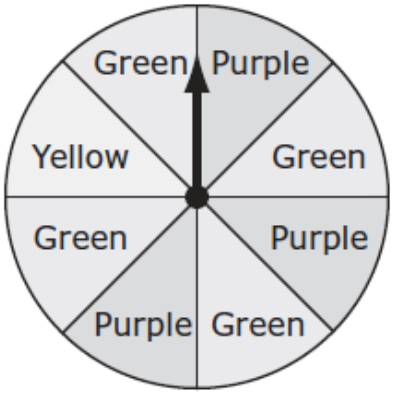
1. Guess and Check
2. Use Algebra…

THINK: The total is 319. You must plot 2 unknown numbers (x). You must then divide by the total number of x's (20 + 2 more = 22). Your mean must be 16.

This formula will work if you can figure out how to solve for x: $\frac{319+x}{22}=16$

*Remember, x must be 2 Quiz Scores.

10. A spinner is divided into 8 equal sections. Lara spins the spinner 120 times. It lands on purple 30 times.



How many more times does Lara need to spin the spinner and have it land on purple for the relative frequency to equal the theoretical probability?

A. 15
B. 24
C. 45
D. 54

11. Which numbers are rational?

THINK

THEORETICAL PROBABILITY: What <u>SHOULD</u> happen.

EXAMPLE: What is the theoretical probability of spinning a purple on this spinner? Answer: There are 3 purples out of 8 total so P(purple) = $\frac{3}{8}$

RELATIVE FREQUENCY: What <u>ACTUALLY</u> happens.

EXAMPLE: Lara spins the spinner 120 (total) times and it lands on purple 30 (out of the total) times. What is the relative frequency? Answer: $\frac{30}{120}$

There *is* more than one way to solve this problem. This is my way (x = additional spins):

$$\frac{30+x}{120+x}=\frac{3}{8}$$

This is solved the SAME WAY you solve <u>any</u> proportion EXCEPT you have to remember your old BFF (the Distributive Property – whoosh… whoosh).

To answer this question online, you will have to click and circle <u>all</u> of the rational numbers. If you miss one you will not receive points for this problem.

$2.0 \qquad 1\frac{7}{8} \qquad \pi \qquad \sqrt{5} \qquad 6.3\overline{9}$

THINK

Fancy Definition: **RATIONAL NUMBERS- Any number that can be expressed as a ratio** (all fractions are rational numbers).

Easy  (cheesy) definitions…

RATIONAL Numbers: Numbers that MAKE SENSE (you know the <u>VALUE</u> or can see the <u>PATTERN</u>.)

EXAMPLES:

- **INTEGERS (… -2, -1, 0, 1, 2…)**
- **TERMINATING (1.65) and REPEATING DECIMALS ($0\overline{3}$)**
- **FRACTIONS and MIXED NUMBERS ($\frac{3}{4}$, $\frac{9}{5}$, $2\frac{1}{6}$)**
- **PERFECT SQUARES ($\sqrt{25} = 5$)**

THAT'S IT!

IRRATIONAL Numbers: Numbers that DON'T make sense because they have <u>NO</u> set <u>VALUE</u> or NO <u>PATTERN</u>.

Examples: 1.2344457… $\sqrt{15}$

12. Simplify.

$$3(2.25)^2$$

To answer this question online, you will have to use this keypad to enter your answer.

1	2	3	4
5	6	7	8
9	0	.	−
/	Delete		

Answer: _____

REMEMBER

The exponent is like a 

And "lassos" everything it is "touching."

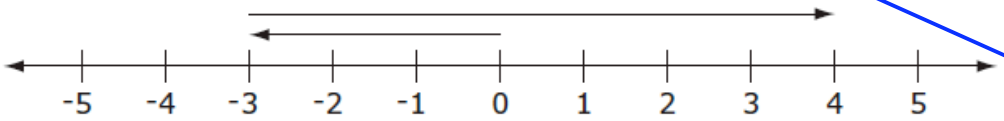
Examples:

$2(6)^2 = 2(6)(6) = 72$

$5(1.5)^2 = 5(1.5)(1.5) = 11.25$

$\frac{1}{2}(3.75)^3 = \frac{1}{2}(3.75)(3.75)(3.75) \approx 26.4$

13. Which shows a model of -3 + 4?

A.


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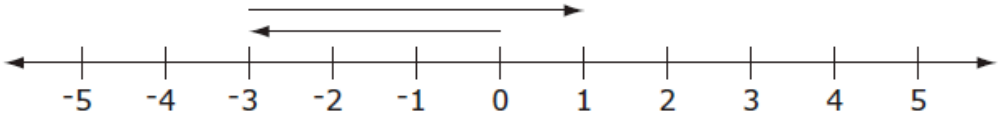

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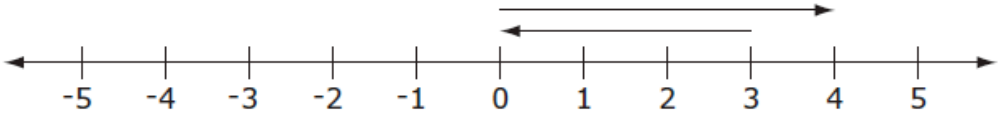

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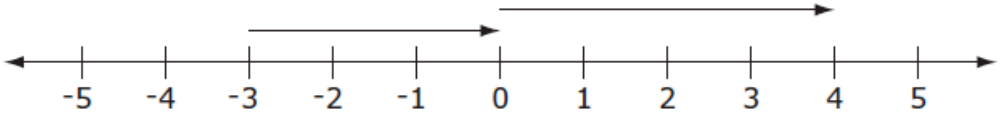


THINK
1. START at 0.
2. ← Negative
→ Positive

14. Which number describes |k| on a number line?

A. The opposite of k

B. The same value as k

C. A value between k and –k

D. A distance k units from 0

THINK
Absolute Value - the distance of a given number to zero on a number line. Big Deal Fact: Since distance cannot be negative, absolute value cannot be negative.

15. Which represents a proportional relationship?

A. $np = 5$

B. $n = 2$

C. $n = \frac{4}{p}$

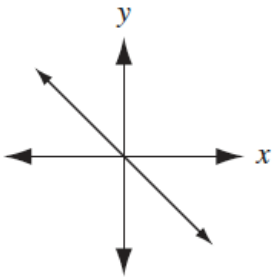
D. $\frac{n}{p} = 3$

THINK
PROPORTION: Equations that show two EQUIVALENT RATIOS are called PROPORTIONS.
Examples: $\frac{2}{3} = \frac{4}{6}$ and $\frac{12}{4} = \frac{3}{1}$

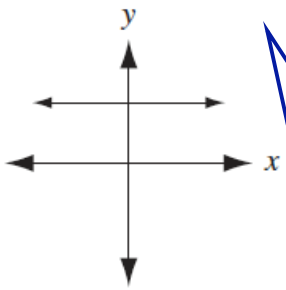
Big Fat Hint: Only one of these is a ratio that has variables that can be equal to a constant.

16. Which represents a proportional relationship?

A.



B.



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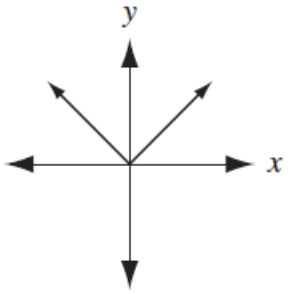

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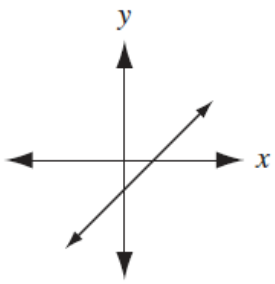
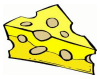


THINK

Graphing Proportional Relationships

Fancy Definition: The graph of a proportional relationship must be a linear equation with a y-intercept equal to zero.



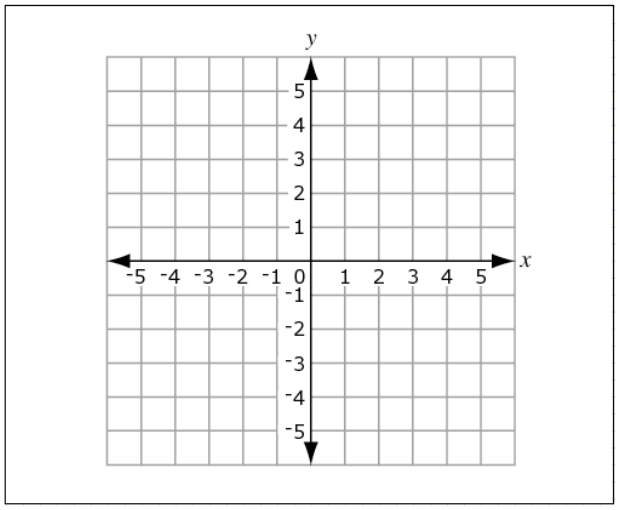
Easy Definition:

Your graph must be LINEar and cross the origin.

17. Graph the line of the equation

$y = 2x$

To answer this question online, you will have to use tools to create the points and draw the line.



THINK

Remember:

$y = mx + b$

slope y-intercept

LOOK at the equation and identify:

STARTING POINT:

y-intercept (b) = _____

DIRECTIONS:

Slope (m) = _____

$$\frac{\text{rise(+up or -down)}}{\text{run (over)}}$$

18. ΔEFG is similar to ΔJKL and ΔJKL is similar to ΔQRS. Which statement must be true?

A. ΔEFG is congruent to ΔQRS.

B. ΔEFG is similar to ΔQRS.

C. ΔEFG is a reflection of ΔQRS.

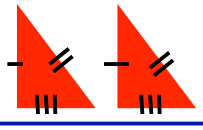
D. There is no relationship between ΔEFG and ΔQRS.

THINK

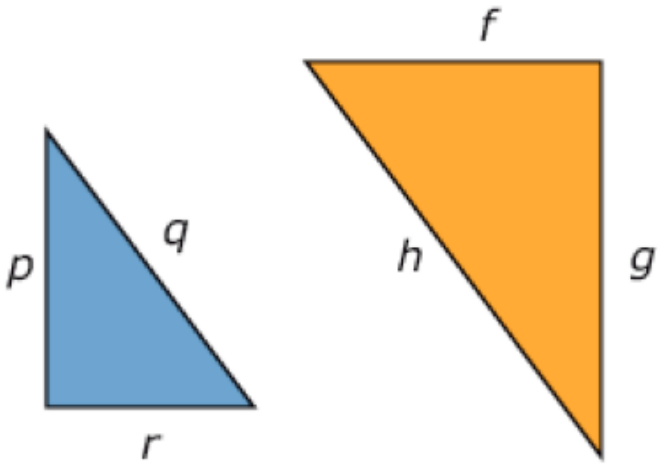
SIMILAR FIGURES: Figures with the SAME SHAPE, but NOT always the SAME SIZE.

Example:

CONGRUENT FIGURES: EXACTLY the SAME SHAPE and SIZE.



19. The 2 figures shown are similar.



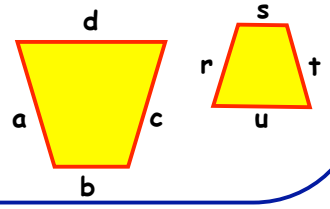
THINK

CORRESPONDING SIDES: A segment that is in the SAME LOCATION (MATCHING) on different figures.

Corresponding segments can be written as ratios that are equal (proportions).
Note: The numerator and denominator of each ratio do NOT have to come from different similar figures. They can come from the same figure as long as the respective position is the same.

Examples:

$\frac{a}{r}=\frac{b}{s}$, $\frac{b}{c}=\frac{s}{t}$



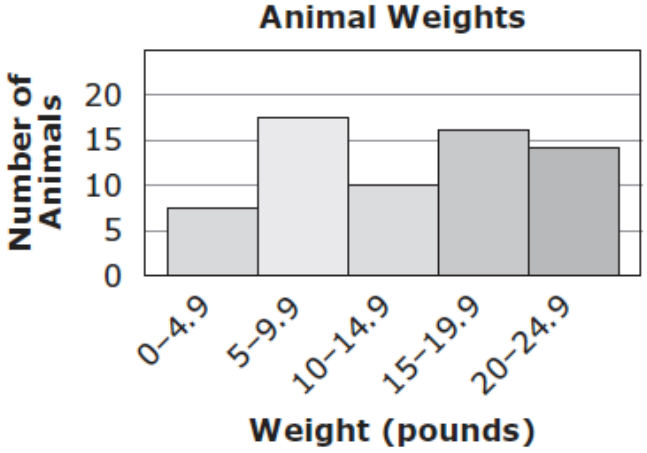
Make a proportion to show the relationship between the lengths of the sides.

To answer this question online, you will have to click and drag the boxes with the variables to the numerator and denominator of the fractions.

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

p	q	r
f	g	h

20. A veterinarian recorded the weights of animals in a histogram.



THINK

Histogram: A histogram is a special kind of bar graph that uses INTERVALS instead of individual values. In addition, the bars are right next to each other. To read it, you look for a range that can be read from the graph.
THINK: Which question can be answered using the graph?

Which question can be answered using the information from the histogram?

A. How many animals weigh 4.9 pounds?

B. How many animals weigh between 5 and 10 pounds?

C. How many animals weigh less than 8 pounds?

D. How many animals weigh at least 15 pounds?

21. An equation is shown.

$$n = 1 \div 17$$

Which describes *n*?

A. Integer

B. Irrational

C. Rational

D. Whole

THINK

Math Talk… Oh, Yeah. Math is a language.

INTEGER: Think of numbers on a number line. An integer is a number with a positive (+) sign, negative (-) sign, or zero. Zero has no sign.
Examples: 2 -5 0 3 etc…
IRRATIONAL: Any number that CAN'T be expressed as a ratio (all fractions are ratios).
RATIONAL: Any number that CAN be expressed as a ratio (all fractions are ratios).
WHOLE: Counting numbers that you learned in kindergarten are whole numbers (0, 1, 2, 3,…).

22. Which is equivalent to $5\frac{2}{15}$?

A. $5.1\overline{3}$

B. $5.\overline{13}$

C. 5.13

D. $5.\overline{3}$

THINK

You would read this mixed number as 5 and 2 fifteenths. The "AND" holds the place of the decimal. Remember, the fraction bar means DIVIDE!

LEFT ← ● → RIGHT
Integers Decimal Remainder

23. Nora is running a race that is 26.2 miles. She is running at a speed of 8 miles per hour. She has completed $\frac{3}{4}$ of the race. How much longer will it take Nora to finish the race?

A. 0.82 hour

B. 2.46 hours

C. 3.28 hours

D. 6.55 hours

THINK

STEPS to solve:

1. How much is $\frac{3}{4}$ of 26.2? _____
2. What is the difference between this number and the total distance? _____
3. If Nora runs 8 mi/hr how long (hour(s)) will it take her to run 6.55 miles?

24. The table shows the cost of different numbers of boxes of cookies.

Selling Cookies

Boxes of Cookies	Cost (dollars)
5	11.25
7	15.75
11	24.75

What is the cost to buy 15 boxes of cookies?

A. $33.75

B. $36.00

C. $40.50

D. $51.75

THINK

There is more than one way to solve this problem.

WAY #1: Try to find and extend the pattern (good luck☺).

The BEST way to solve it is to recognize:

1. Two things are being compared. $\frac{\text{cookies}}{\text{price}}$
2. You are trying to find an unknown quantity (price).
3. A PROPORTION would be fab.

25. Simplify. $8 - 2(n + 4)(-3)^2$

A. $-2n - 9$

B. $-18n$

C. $-18n - 64$

D. $36n - 216$

THINK

(PEMDAS) never goes away…

$8 - 2(n + 4)(-3)^2$

1. **Exponents:** _____
2. **Distributive Property (Multiply):** _____
3. **Distributive Property (Multiply):** _____
4. **Combine Like Terms (Subtract):** _____

26. The equation $3c = 4s$ gives the relationship between c, the weight ofclay, and s, the weight of sand in a mixture. There are 6.25 pounds of clay in the mixture. What is the weight of the sand?

A. 4.69 pounds

B. 8.88 pounds

C. 18.75 pounds

D. 75.00 pounds

THINK

I have to SUBSTITUTE what I know (6.25 = clay(c)) and solve for sand (s).

Equation: 3(_____) = 4s

27. A cylinder has a height of x inches. The diameter of the base is also x inches. Which gives the volume of the cylinder?

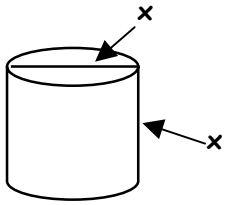
A. $2\pi x^2$

B. $\frac{1}{4}\pi x^3$

C. $\frac{1}{2}\pi x^3$

D. πx^3

THINK



Remember:

1. The formula for finding the Volume of a cylinder.
2. Diameter = $\frac{1}{2}r$

$V = \pi r^2 h$

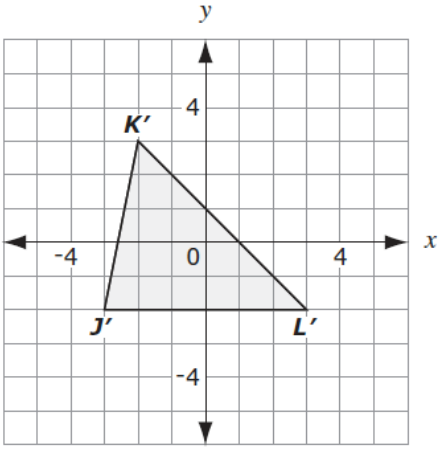
$V = \pi \cdot r \cdot r \cdot h$

$V = \pi \cdot \frac{1}{2}x \cdot \frac{1}{2}x \cdot x$

$V =$ _____

*Volume is always expressed in cubic units.

28. The translation $(x,y) \rightarrow (x - 4, y + 5)$ was used to move $\triangle JKL$ to $\triangle J'K'L'$. $\triangle J'K'L'$ is shown on the grid.



What are the coordinates of point K?

A. (-6, 8)

B. (-4, 5)

C. (-2, 3)

D. (2, -2)

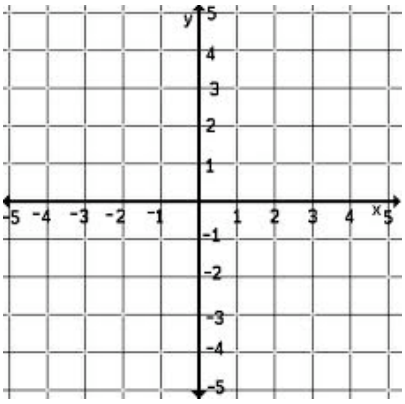
THINK

The figure has already been translated (moved). To move it back, you have to do the opposite for both x and y. Use the coordinate plane redraw the figure:

K (-2, 3) = x + 4 = -2 + 4 = _____

= y - 5 = 3 - 5 = _____

"New" ordered pair = (___, ___)



29. The number of students of each age on a bus is shown in the table.

Ages of Students

Age (years)	Number of Students
13	2
14	10
15	5
16	18
17	24

THINK

Math Talk… Oh, Yeah. Math is a language.

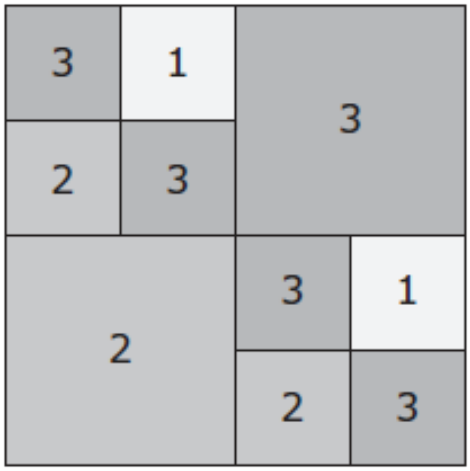
MEAN: the average
MEDIAN: the middle number
MODE: the most frequent

Strategy 1: Make a list from smallest to largest.
Strategy 2: Use the table to add/subtract.
Strategy 3: Can you think of another way to solve this problem?

What is the median age of the students?

A. 10 years
B. 14 years
C. 15 years
D. 16 years

30. Leon uses squares to make a board. He randomly throws a stone onto the board.



THINK

STEPS:
1. Draw lines so the board is divided into equal pieces.
2. How many squares are there for each?

1 = ____ out of 16 squares
2 = ____ out of 16 squares
3 = ____ out of 16 squares

3. Probability is expressed as a fraction, decimal or percent. Write the probability as a fraction for this problem and simplify it.

What is the probability the stone lands on a space marked 3?

A. $\frac{1}{10}$

B. $\frac{1}{4}$

C. $\frac{1}{3}$

D. $\frac{1}{2}$

31. A floor has red, blue and yellow square tiles that are the same size. The probability that a randomly dropped coin lands on a red tile is 0.5. The probability that the coin lands on a blue tile is 0.2. How many tiles of each color does the floor have?

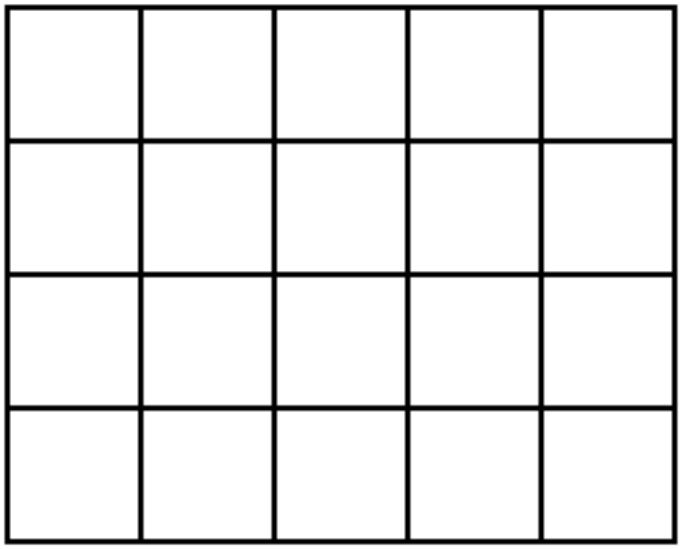
To answer this question online, you will have to click and drag the red, blue and yellow tiles into each box. Since you can't click and drag on paper, color your boxes red, blue and yellow with markers, crayons or colored pencils.

red

blue

yellow

Floor



THINK

This question will assess your understanding of probability AND decimal ←→ fraction conversions. It is 

There are 20 total tiles on the floor. This is your fraction: $\frac{\text{tile color}}{\text{total}} = \frac{\quad}{20}$

RED = 0.5 = $\frac{5}{10}$ = $\frac{\quad}{20}$ tiles are red.

Blue = 0.2 = $\frac{2}{10}$ = $\frac{\quad}{20}$ tiles are blue.

Yellow = _____ tiles out of 20 are left over.