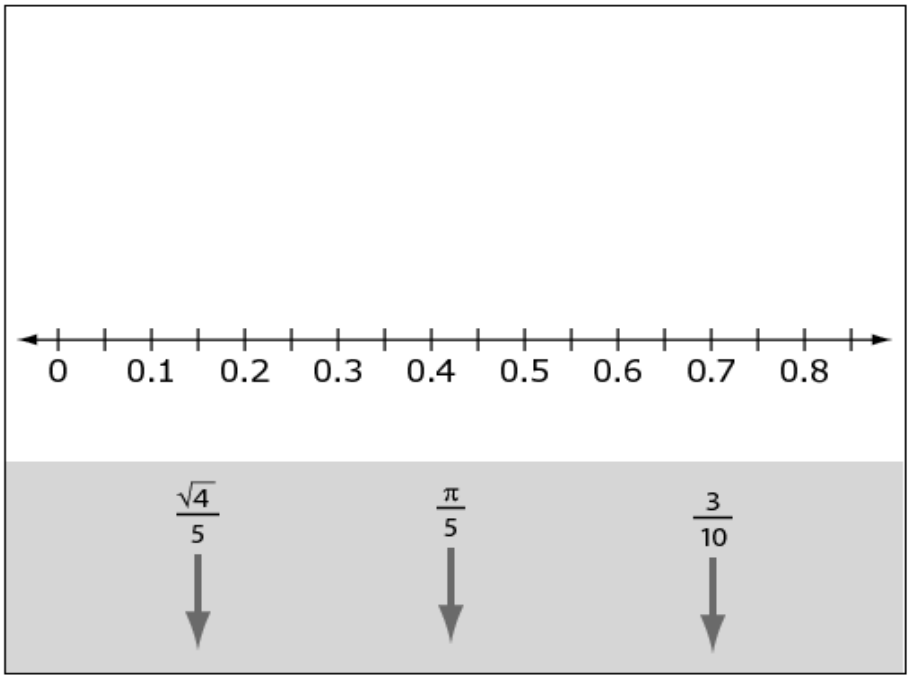
1.

Place each value at the correct position on the number line.



2.

For each number, indicate whether it is rational or irrational.

	Rational	Irrational
$\frac{4}{7}$	☐	☐
$\sqrt{30}$	☐	☐
$\frac{21}{\sqrt{4}}$	☐	☐
π	☐	☐
-27	☐	☐

3.

A square with side length s has an area of 324 square centimeters. This equation shows the area of the square.

$s^2 = 324$

What is the side length of the square in centimeters?

4.

Approximately 7.5×10^5 gallons of water flow over a waterfall each second. There are 8.6×10^4 seconds in 1 day. Select the approximate number of gallons of water that flow over the waterfall in 1 day.

(A) 6.45×10^{21}

(B) 6.45×10^{20}

(C) 6.45×10^{10}

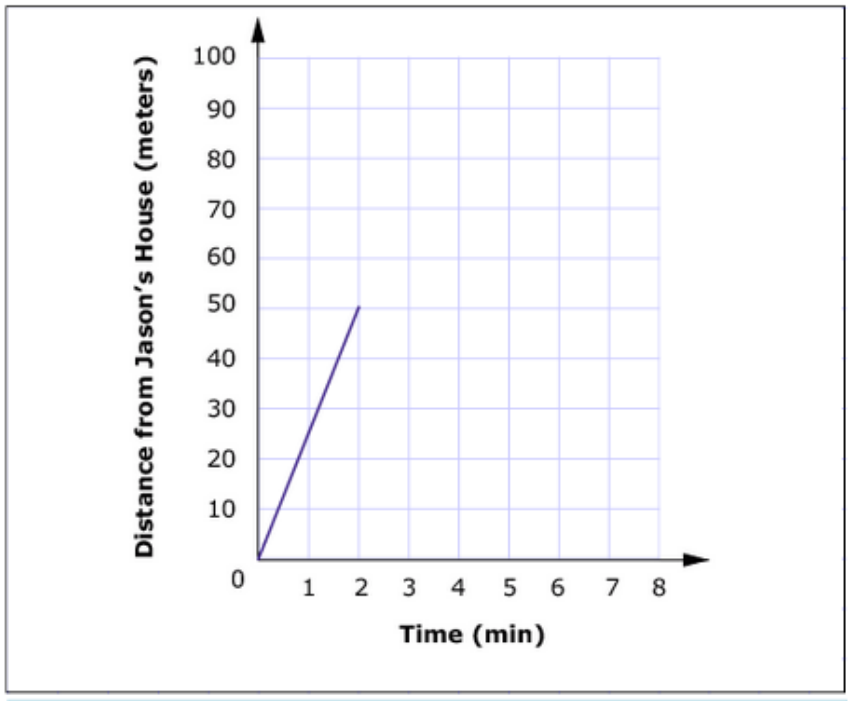
(D) 6.45×10^{9}

5.

The school is 100 meters from Jason's house. The following describes his most recent trip:

- He walked 50 meters toward school in 2 minutes. He realized that he left a book at home.
- He turned around and walked home at the same speed.
- He spent 1 minute looking for his book.
- He walked all the way to school at twice his original speed.

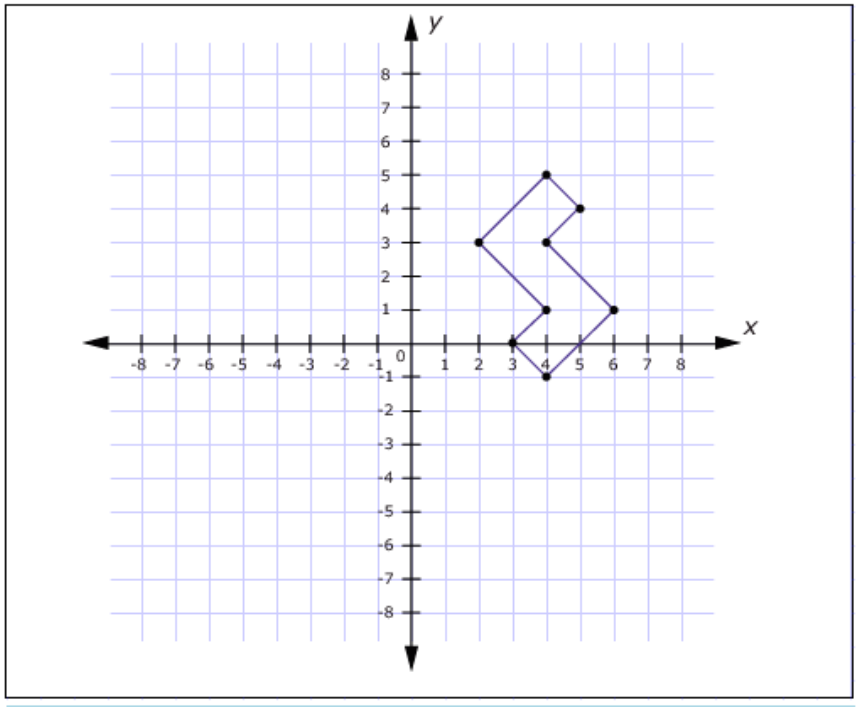
Finish the graph to accurately represent Jason's trip.



6.

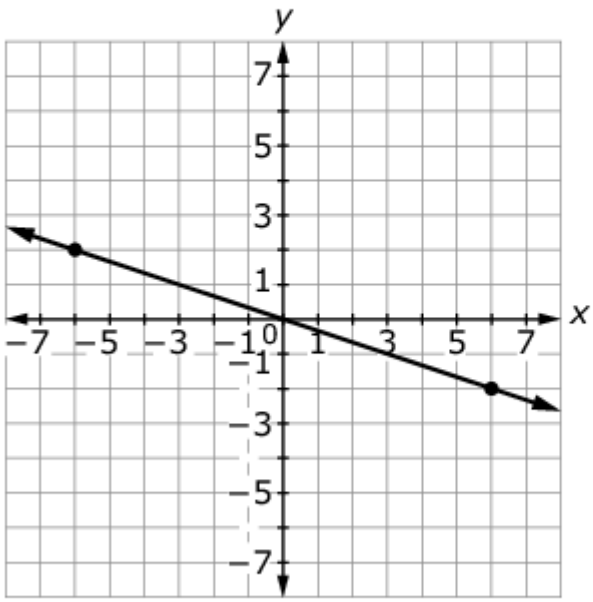
Draw the image of the figure on the graph after the following transformations:

- a reflection over the x-axis
- a horizontal translation 7 units to the left



7.

Consider this graph of a line.

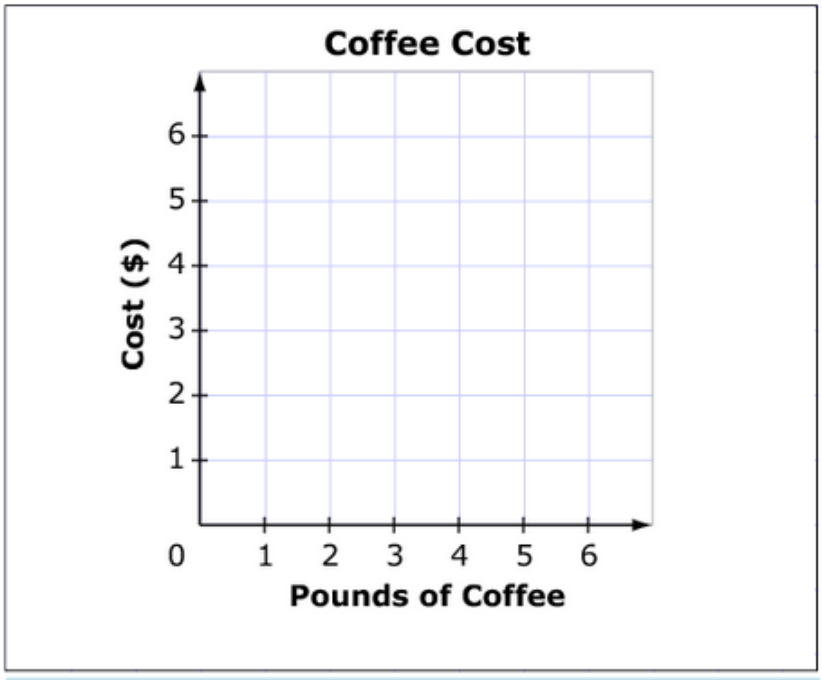


Enter an equation for the line.

8.

Coffee costs $2.00 per pound at a coffee shop.

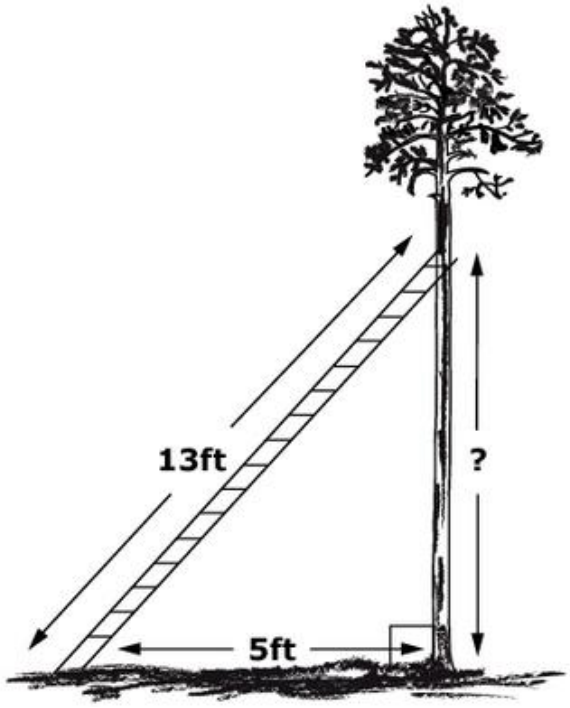
Draw a ray on the graph that shows the proportional relationship between the number of pounds of coffee purchased and the total cost.



9.

A 13-foot ladder is leaning on a tree. The bottom of the ladder is on the ground at a distance of 5 feet from the base of the tree. The base of the tree and the gound form a right angle as show.

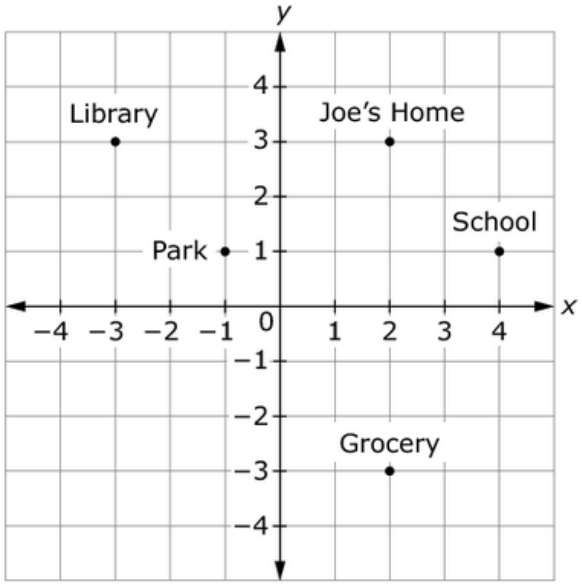
Enter the distance, in feet, between the ground and the top of the ladder.



10.

The points show different locations in Joe's town. Each unit represents 1 mile.

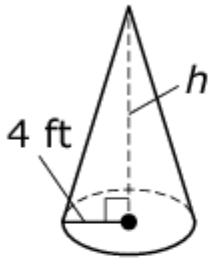
Places in Joe's Town



Enter the shortest distance, in miles, between Joe's home and the park. Round your answer to the nearest tenth.

11.

A cone with radius 4 feet is shown. Its approximate volume is 165 cubic feet.

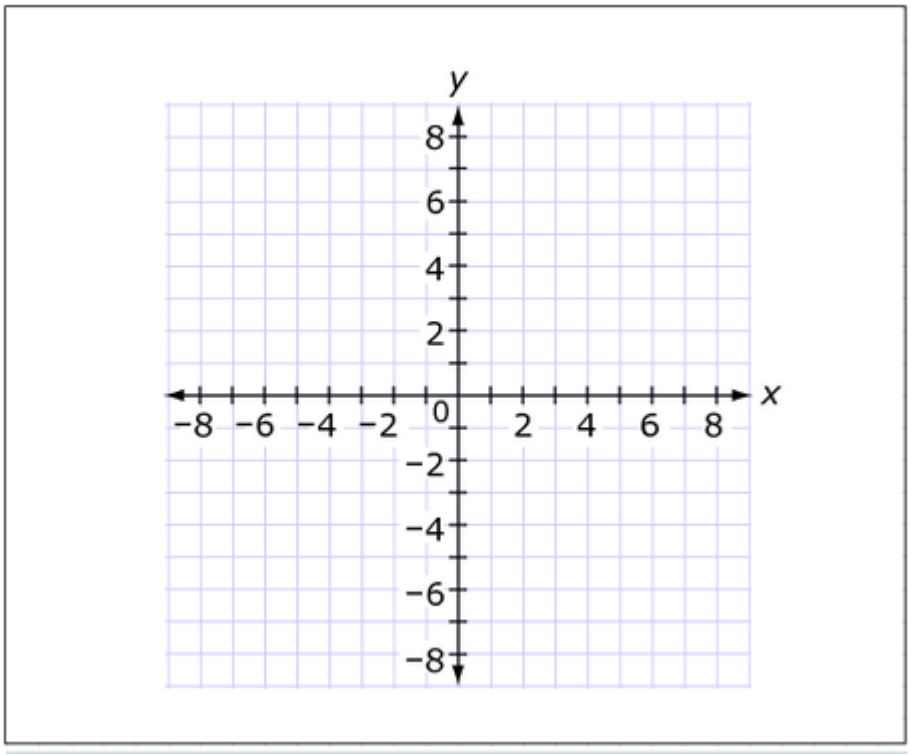


Enter the height of the cone, in feet. Round your answer to the nearest hundredth.

12.

Add arrows to graph a system of two equations that has a single solution of

(- 2, - 3).



13.

Joe solved this linear system correctly.

$6x + 3y = 6$

$y = -2x + 2$

These are the last two steps of his work.

$6x - 6x + 6 = 6$

$6 = 6$

Which statement about this linear system must be true?

(A) x must equal 6

(B) y must equal 6

(C) There is no solution to this system.

(D) There are infinitely many solutions to this system.

14.

From the choices below, enter a number into each box to create an equation that has no solution.

0
1
2
3
4
5
6
7
8
9

$8x - 3x + 2 - x = \square x + \square$

15.

Segment FG begins at point $F(-2, 4)$ and ends at point $G(-2, -3)$. The segment is translated by $\langle x - 3, y + 2 \rangle$ and then reflected across the y-axis to form segment $F'G'$.

How many units long is segment $F'G'$?

(A) 0

(B) 2

(C) 3

(D) 7

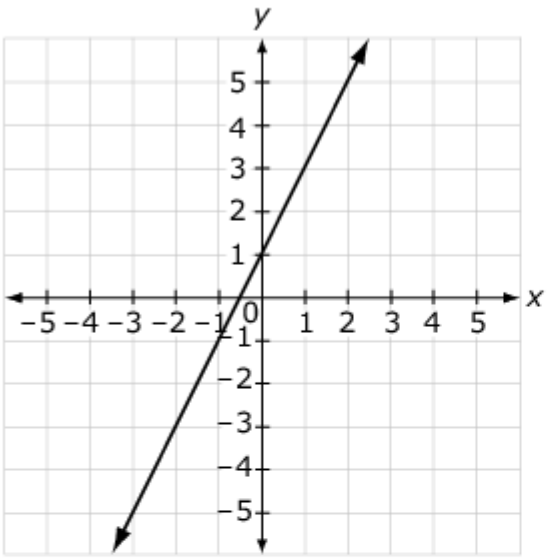
16.

A sequence of transformations is applied to a polygon. Select **all** statements which indicate a sequence of transformations where the resulting polygon has an area greater than the original polygon.

- ☐ Reflect over the x-axis, dilate about the origin by a scale factor of $\frac{1}{2}$, translate up 5 units.
- ☐ Rotate 90° counterclockwise around the origin, dilate about the origin by a scale factor of $\frac{3}{2}$.
- ☐ Dilate about the origin by a scale factor of $\frac{2}{3}$, rotate 180° clockwise around the origin, translate down 2 units.
- ☐ Dilate about the origin by a scale factor of 2, reflect over the y-axis, dilate about the origin by a scale factor of $\frac{2}{3}$.

17.

Consider this graph of a line.



Which equation has a rate of change **greater than** the rate of change for the line shown?

Ⓐ $y = 3x - 1$

Ⓑ $y = \frac{x}{2} + 4$

Ⓒ $y = 2x + 2$

Ⓓ $y = \frac{x}{3} - 3$

18.

Consider this equation.

$$c = ax - bx$$

Joseph claims that if a, b, and c are non-negative integers, then the equation has exactly one solution for x.

Select **all** cases that show Joseph's claim is **incorrect**.

- ☐ $a - b = 1, c = 0$
- ☐ $a = b, c \neq 0$
- ☐ $a = b, c = 0$
- ☐ $a - b = 1, c \neq 1$
- ☐ $a \neq b, c = 0$

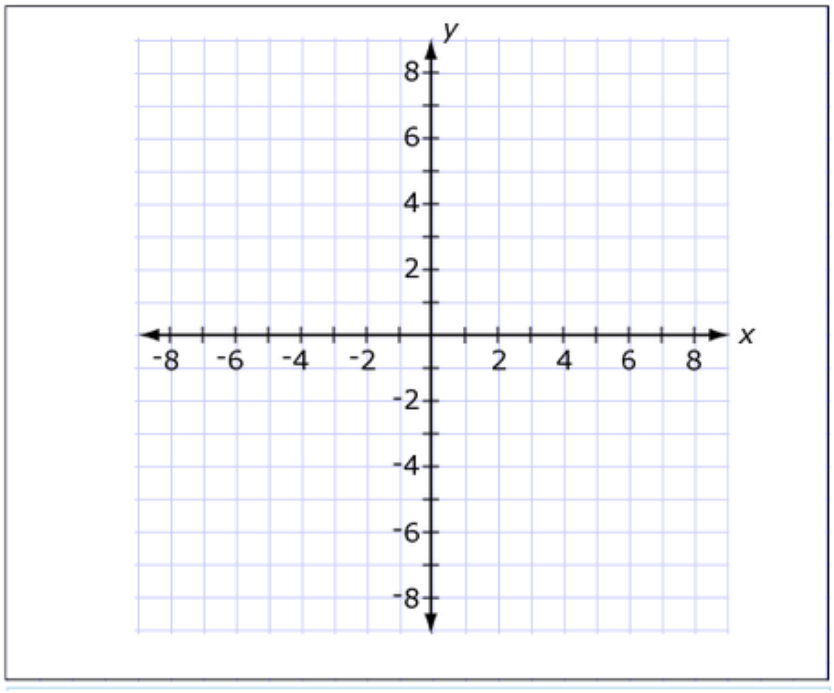
19.

John and Kim wrote down two different functions that have the same rate of change.

John's function is represented by the table shown.

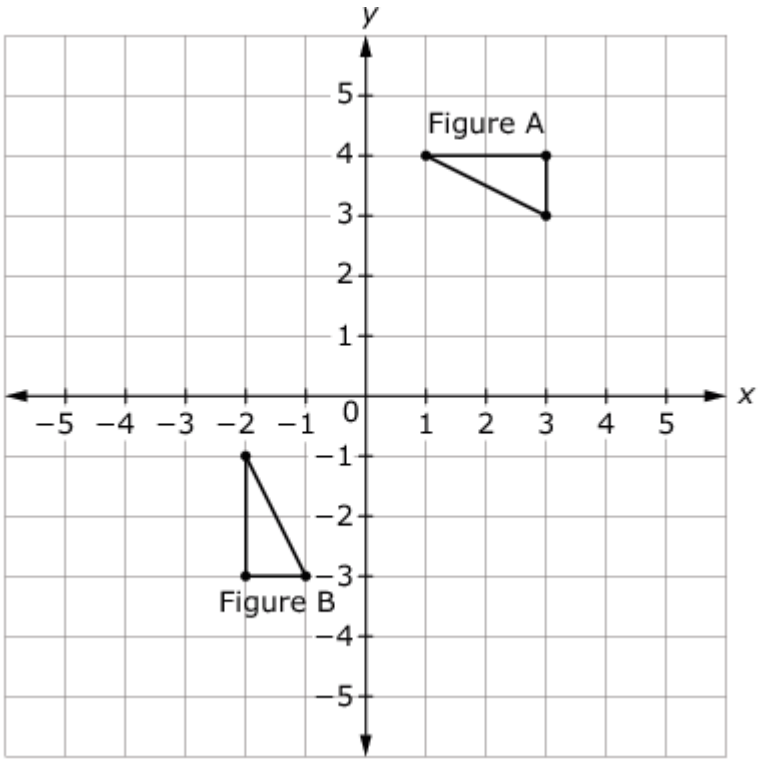
x	y
-1	-5
1	-1
3	3

Add an arrow to graph a function that could be Kim's function.



20.

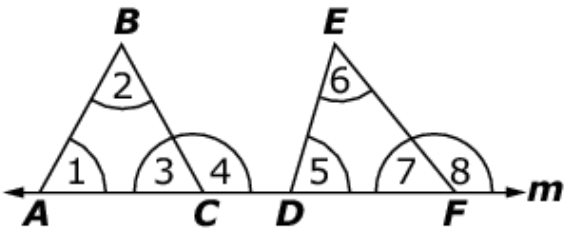
Two figures are shown on the coordinate grid.



Show that Figure A and Figure B are congruent by describing a sequence of basic transformations that maps Figure A onto Figure B. In your response, be sure to identify the transformations in the order they are performed.

21.

The base of triangle *ABC* and the base of triangle *DEF* lie on line *m*, as shown in the diagram.



not drawn to scale

The measure of ∠4 is less than the measure of ∠8.

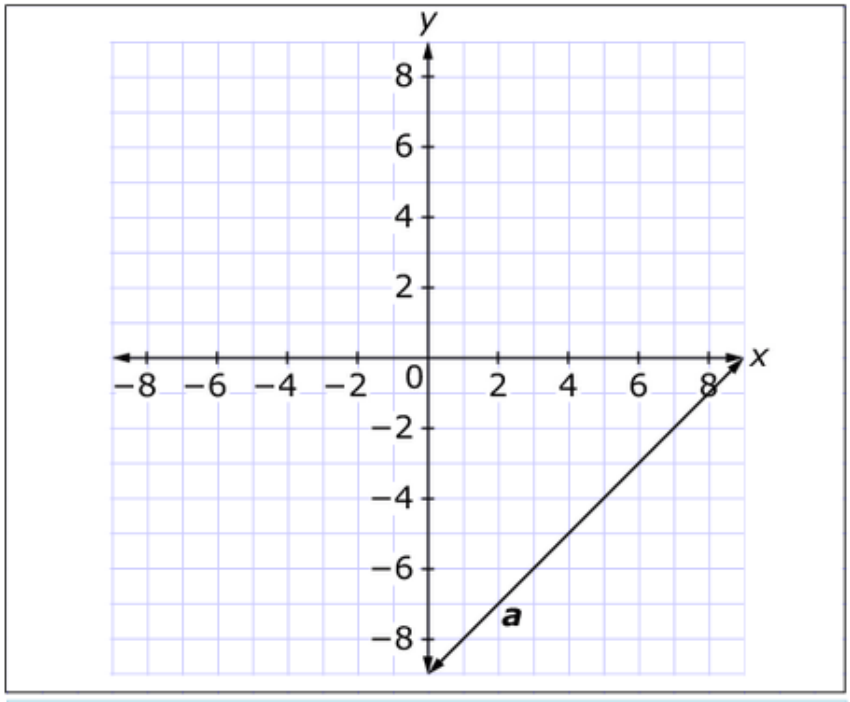
For each comparison, select the symbol (<, >, =) that makes the relationship between the first quantity and the second quantity true.

First Quantity	Comparison	Second Quantity
$m\angle 3$	< = >	$m\angle 7$
$m\angle 1 + m\angle 2$	< = >	$m\angle 5 + m\angle 6$

22.

Line ***a*** is shown on the graph. Add an arrow to construct line ***b*** on the grpah so that:

- Line ***a*** and line ***b*** represent a system of linear equeations with a solution of (7, -2).
- The slope of line ***b*** is greater than -1 and less than 0.
- The ***y***-intercept of line b is positive.



23.

The table shows the relationship between the average number of hours students study for a mathematics test and their average grade.

Hours Studying	Average Grade
0	62
1	78
2	85
5	74

Which type of function is most likely to model these data?

Ⓐ linear function with positive slope

Ⓑ linear function with negative slope

Ⓒ non-linear function that decreases then increases

Ⓓ non-linear function that increases then decreases

24.

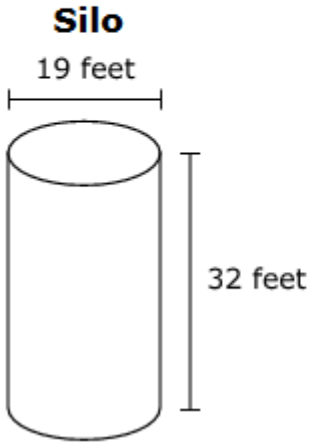
This table shows the linear relationship of the water level in a tank and time.

Time (hr)	Water Level (ft)
0	50
2	40
4	30
6	20

Enter the rate of change of the water level, in feet per hour.

25.

An empty corn silo in the shape of a cylinder is being filled with corn.



The silo is filled at a constant rate for a total of 10 hours. The table shows the amount of corn, in cubic feet, in the silo at the given number of hours after filling started.

Number of Hours	Amount of Corn (cu ft)
0	0
3	2475
5	4125
8	6600

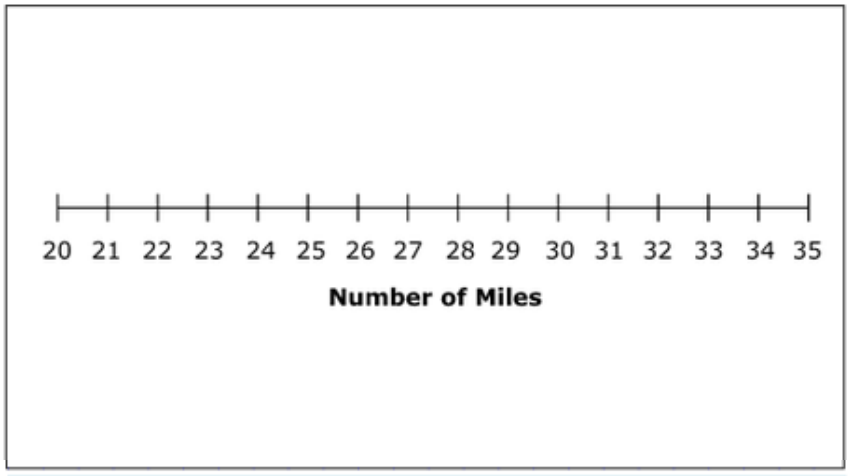
Enter the **percent** of the silo that is filled with corn at 10 hours.

26.

Justin's car can travel $77\frac{1}{2}$ miles with $3\frac{1}{10}$ gallons of gas.

Kim's car can travel $99\frac{1}{5}$ miles with $3\frac{1}{5}$ gallons of gas.

Draw labeled points on the number line to show the number of miles each car can travel with 1 gallon of gas.



27.

Kyle was given the following problem to solve.

> A company sells baseball gloves and bats. The gloves regularly cost $30 and the bats regularly cost $90. The gloves are on sale for $4 off, and the bats are on sale for 10% off. The goal is to sell $1200 worth of bats and gloves each week. Last week, the store sold 14 gloves and 9 bats.
>
> Did the store meet its goal?

The steps Kyle used to solve the problem are shown. Select the first step that shows an error.

☐ **Step 1:**

$$\begin{array}{r} \$30 \\ -\ \$4 \\ \hline \$26 \end{array}$$

☐ **Step 2:**

$$\begin{array}{r} \$26 \\ \times\ 14 \\ \hline \$364 \end{array}$$

☐ **Step 3:**

$$\begin{array}{r} \$90 \\ \div\ 0.9 \\ \hline \$100 \end{array}$$

☐ **Step 4:**

$$\begin{array}{r} \$100 \\ \times\ 9 \\ \hline \$900 \end{array}$$

☐ **Step 5:** Yes, the store met its goal.

$$\begin{array}{r} \$900 \\ +\ \$364 \\ \hline \$1264 \end{array}$$

28.
All 8th-grade students at a school answered Yes or No to the two survey questions shown.

- Do you have a cell phone?
  Yes No
- Do you have an MP3 player?
  Yes No

The same students responded to both questions. Complete the two-way frequency table to show the correct totals for the given data. You must complete **all** five cells of the table for a full credit response.

	MP3 Player	No MP3 Player	Total
Cell Phone	57	122	
No Cell Phone	30	65	
Total			

29. This graph shows a proportional relationship between the amount of money in Jack's savings account and the number of weeks Jack has been saving money.

Select the statement that correctly reflects what is shown in the graph.

Ⓐ The slope of the line is $\frac{6}{1}$, so Jack's savings rate is \$6 every week.

Ⓑ The slope of the line is $\frac{6}{1}$, so Jack's savings rate is \$1 every 6 weeks.

Ⓒ The slope of the line is $\frac{1}{6}$, so Jack's savings rate is \$6 every week.

Ⓓ The slope of the line is $\frac{1}{6}$, so Jack's savings rate is \$1 every 6 weeks.