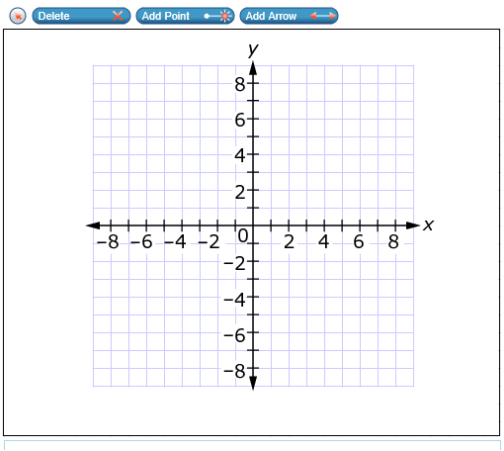
SAGE Practice Questions (9th Grade) Name _____

A function is shown.

$f(x) = -\frac{1}{2}(x+4)+5$

Use the Add Arrow tool to graph this function.



A linear function is shown.

$f(x) = \frac{-5}{2}x - 3$

A. Create a linear function $g(x)$ such that $f(x) = g(x)$ has exactly one solution.

B. What is the exact solution to $f(x) = g(x)$?

$A.\ g(x) =$ _____

$B.\ x =$ _____

A square is rotated about its center.

Select all of the angles of rotation that will map the square onto itself.

- ☐ 45 degrees
- ☐ 60 degrees
- ☐ 90 degrees
- ☐ 120 degrees
- ☐ 180 degrees
- ☐ 270 degrees

The gravitational potential energy of an object is given by the formula $P = mgh$.

Which equation is correctly solved for the height, h?

Ⓐ $h = P + mg$

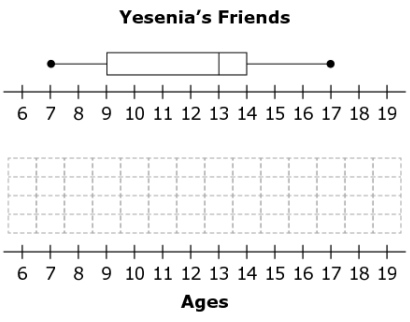
Ⓑ $h = P - mg$

Ⓒ $h = \frac{P}{mg}$

Ⓓ $h = Pmg$

Yesenia records the ages of 9 friends. A box plot of her data set is shown.

Click above the number line to create a dot plot that could represent Yesenia's data set.



Create the equation of a line that is perpendicular to $2y = 14 + \frac{2}{3}x$ and passes through the point $(-2, 8)$.

A system of equations is shown.

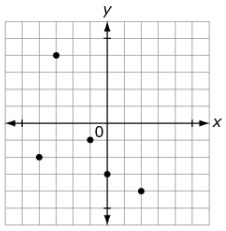
$4c + 2d = 11$
$\frac{7}{2}d = 41 - 22c$

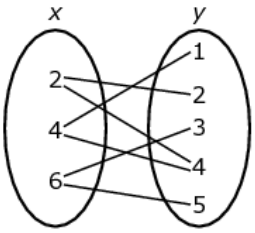
What is the solution to the system?

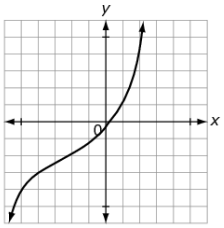
$c =$ ____

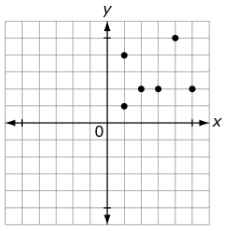
$d =$ ____

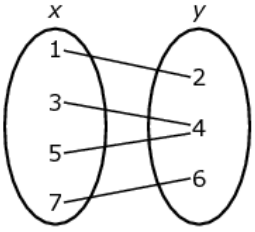
Select all relations where y is a function of x

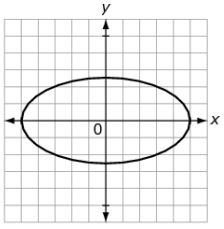






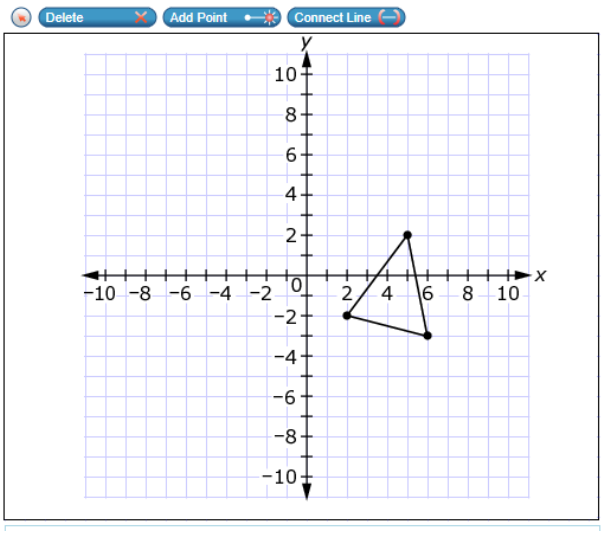






A triangle is shown on the coordinate grid.

Use the Connect Line tool to draw the triangle after a transformation following the rule $(x, y) \rightarrow (x - 4, y + 3)$.



A scientist is studying the population of an ancient civilization. She found that at one point the population was 5,000. The population doubled every decade after that.

Create an equation that can be used to find after how many decades, d, the population reached 640,000.

Juan collects data on the number of hot dogs sold at a hot dog stand each hour one day and the number of cars that drive by the stand in that hour. His data are shown in the table.

Number of Hot Dogs Sold	Number of Cars
30	73
9	32
21	56
0	11
24	62

Based on his data, which conclusion can Juan make?

Ⓐ An increase in cars is associated with a decrease in hot dog sales.

Ⓑ An increase in cars is associated with an increase in hot dog sales.

Ⓒ An increase in cars causes a decrease in hot dog sales.

Ⓓ An increase in cars causes an increase in hot dog sales.

All corresponding sides and angles of $\triangle RST$ and $\triangle DEF$ are congruent.

Select all of the statements that must be true.

- ☐ There is a reflection that maps $\overline{RS}$ to $\overline{DE}$.
- ☐ There is a dilation that maps $\triangle RST$ to $\triangle DEF$.
- ☐ There is a translation followed by a rotation that maps $\overline{RT}$ to $\overline{DF}$.
- ☐ There is a sequence of transformations that maps $\triangle RST$ to $\triangle DEF$.
- ☐ There is not necessarily a sequence of rigid motions that maps $\triangle RST$ to $\triangle DEF$.

An equation is shown.

$4[a+(-7)]+10[2a+3]=1$

Drag a statement to each box to justify each step.

Steps	Justifications
1. $4[a + (-7)] + 10[2a + 3] = 1$	1. Given
2. $4a + (-28) + 20a + 30 = 1$	2.
3. $(-28) + 4a + 20a + 30 = 1$	3.
4. $(-28) + (4a + 20a) + 30 = 1$	4.
5. $(-28) + 24a + 30 = 1$	5. Addition

Addition property of equality

Associative property of addition

Commutative property of addition

Distributive property

Multiplication property of equality

Two functions, $q(x)$ and $r(x)$, are shown.

$q(x) = (1.05)^x$
$r(x) = 38x + 125$

Both functions have domains of $x > 0$.

Which statement about $q(x)$ and $r(x)$ is true?

Ⓐ $q(x) > r(x)$ for all values of x.

Ⓑ $r(x) > q(x)$ for all values of x.

Ⓒ $q(x) > r(x)$ only for very large values of x.

Ⓓ $r(x) > q(x)$ only for very large values of x.

Steven constructs an equilateral triangle inscribed in circle P. His first three steps are shown.

1. He creates radius $\overline{PQ}$ using a point Q on the circle.
2. Using point Q as the center and the length of $\overline{PQ}$ as a radius, he uses a compass to construct an arc that intersects the circle at R.
3. Using point R as the center and the length of $\overline{PQ}$ as a radius, he uses a compass to construct an arc that intersects the circle at S.

What should be Steven's next step in constructing the equilateral triangle?

Ⓐ Draw line segments connecting the points Q, R, and S to construct $\triangle QRS$.

Ⓑ Draw line segments connecting the points P, R, and S to construct $\triangle PRS$.

Ⓒ Construct an arc intersecting the circle by using point S as the center and the length of $\overline{PQ}$ as a radius.

Ⓓ Construct an arc intersecting the circle by using point P as the center and the length of $\overline{PQ}$ as a radius.

Some friends spent a total of $12.00 on popcorn and drinks at the movie theater. A bucket of popcorn cost $2.00 and a drink cost $1.50.

A. Create an equation to represent the relationship between the number of buckets of popcorn, x, and the number of drinks, y, the friends bought for $12.00.

The friends bought 4 drinks.

B. How many buckets of popcorn did they buy?

$A.$

$B.$

What is the exact perimeter of a parallelogram with vertices at (3, 2), (4, 4) and (6, 1)?

A system of inequalities is shown.

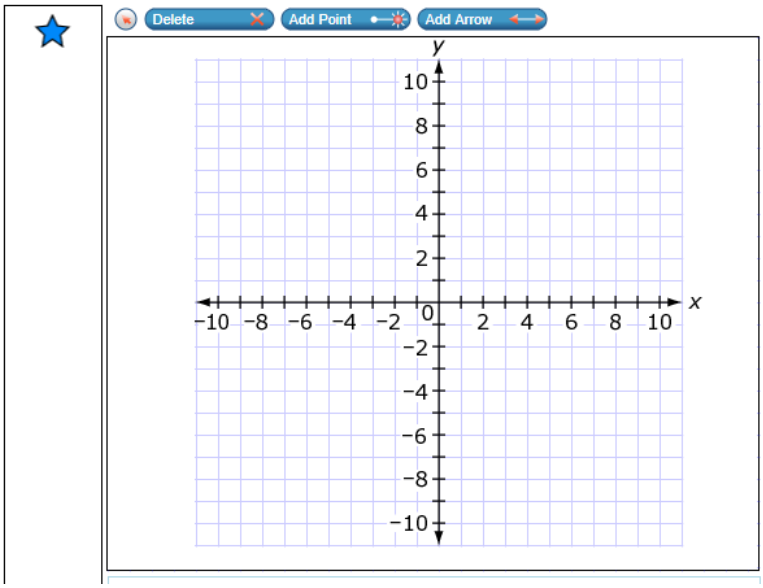
$-2x+y \geq -9$

$x+4y \geq 24$

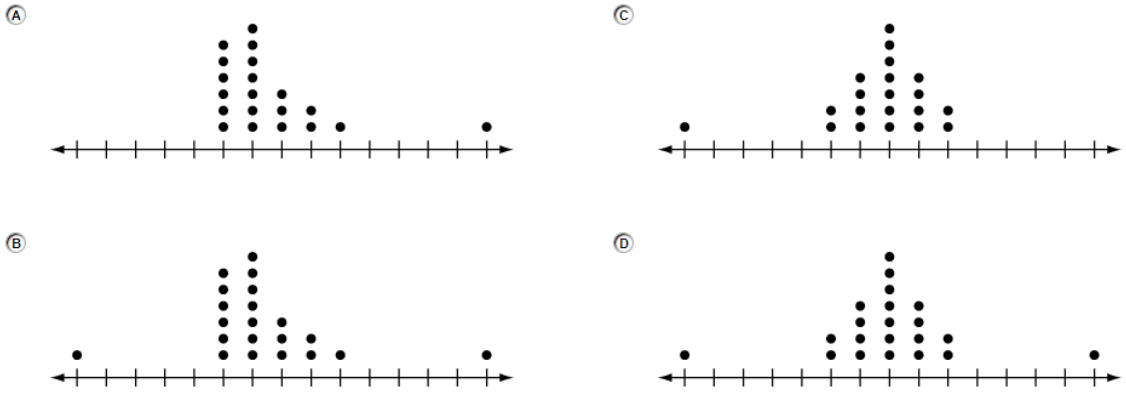
$6x-3y \geq -9$

A. Use the Add Arrow tool to graph the boundary lines of the system.

B. Drag a star to the coordinate plane to show one solution to the system.



Which dot plot represents a data set in which the mean is less than the median?



Julian graphs the function $f(x)=2^x+5$. He then moves the graph down 8 units to create function $g(x)$.

Create an equation that represents $g(x)$.

$g(x) =$