



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
2012**

**Grade 11
Mathematics**

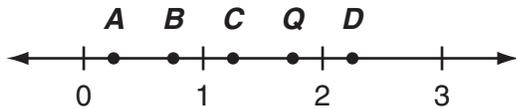
Mathematics



Items with this symbol were selected from Session One—no calculators or other mathematics tools allowed.



- 1 Look at this number line.



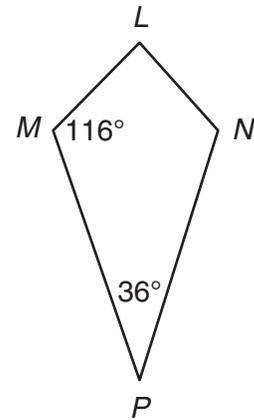
Which point is closest to \sqrt{Q} ?

- A. point *A*
- B. point *B*
- C. point *C*
- D. point *D*



- 2 The current value of an investment is 125% of its initial value. The increase in value was \$10 million. What was the initial value of the investment?
- A. \$ 25 million
 - B. \$ 40 million
 - C. \$100 million
 - D. \$115 million

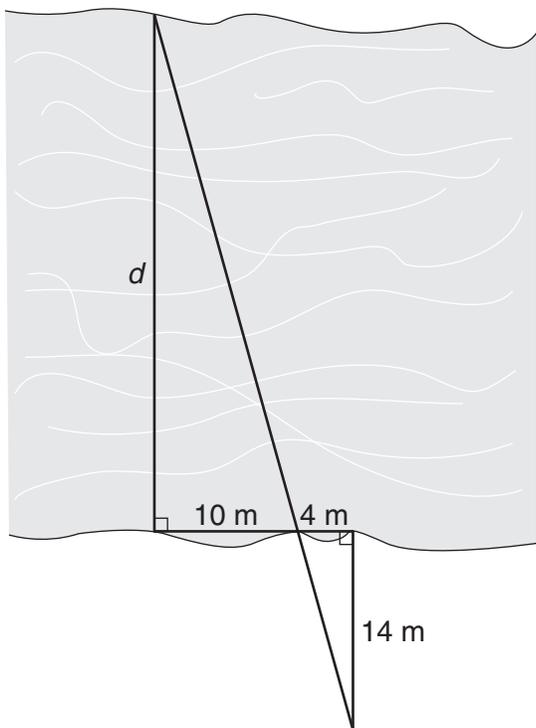
- 3 In quadrilateral $LMPN$, \overline{LM} is congruent to \overline{LN} ($\overline{LM} \cong \overline{LN}$) and \overline{MP} is congruent to \overline{NP} ($\overline{MP} \cong \overline{NP}$).



The measure of $\angle M$ is 116° . The measure of $\angle P$ is 36° . What is the measure, in degrees, of $\angle L$?

- A. 64
- B. 76
- C. 88
- D. 92

- 4 This drawing shows the measurements Eduardo made along a river.



not drawn to scale

What is the distance, d , across the river?

- A. 56 meters
 - B. 35 meters
 - C. 24 meters
 - D. 20 meters
- 5 The center of circle P is located at $(5, -2)$.

- \overline{ST} is a diameter of circle P .
- Point T is located at $(-3, 3)$.

What are the coordinates of point S ?

- A. $(1, 0.5)$
- B. $(4, 2.5)$
- C. $(8, -5)$
- D. $(13, -7)$



- 6 The first term in this pattern is $\frac{3}{5}$.

$$\frac{3}{5}, \frac{2}{5}, \frac{4}{15}, \frac{8}{45}, \dots$$

Which expression represents the 20th term in the pattern?

- A. $\frac{3}{5} \cdot \left(\frac{2}{3}\right)^{19}$
- B. $\frac{3}{5} \cdot \left(\frac{2}{3}\right)^{20}$
- C. $\frac{3}{5} \cdot \left(\frac{2}{3} \cdot 19\right)$
- D. $\frac{3}{5} \cdot \left(\frac{2}{3} \cdot 20\right)$



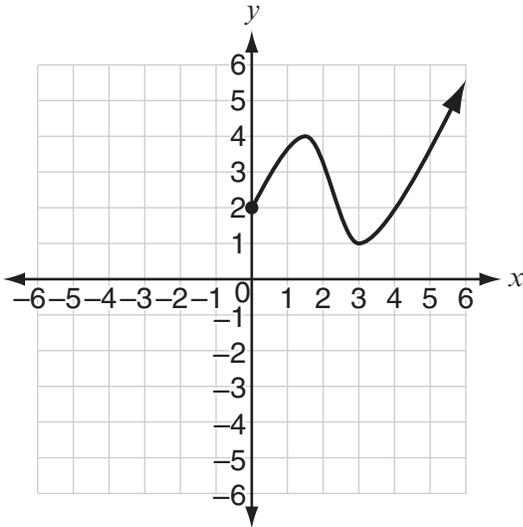
- 7 Alana drew the graph of a function, $f(x)$. She gave these three clues about the graph of her function:

- The function is linear.
- The x -coordinate of the x -intercept is positive.
- The y -coordinate of the y -intercept is positive.

What could be Alana's function?

- A. $f(x) = |x - 3|$
- B. $f(x) = |3 - x|$
- C. $f(x) = 3x - 3$
- D. $f(x) = 3 - 3x$

- 8 This coordinate plane shows the graph of a function.



What is the range of the function?

- A. $y \geq 1$
- B. $y \geq 2$
- C. $x \geq 0$
- D. $x \geq 3$



- 9 Which expression is equivalent to $2(x^2 + y)$?

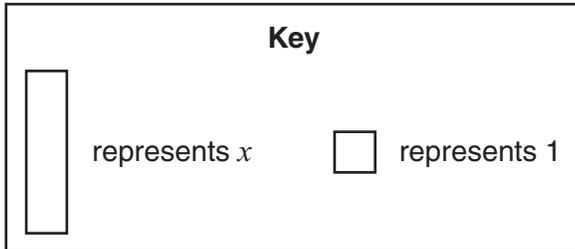
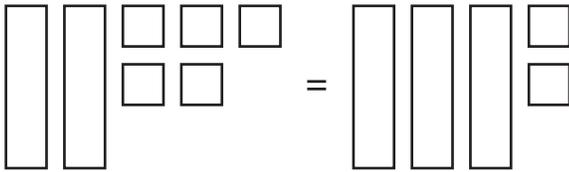
- A. $x^2 + x^2 + y + y$
- B. $x^4 + y + y$
- C. $2x^2 + y^2$
- D. $2x^2 + y$



- 10 Which expression is equivalent to $3x^{-2}$?

- A. $-9x^2$
- B. $-3x^2$
- C. $\frac{1}{9x^2}$
- D. $\frac{3}{x^2}$

- 11 Look at these tiles.



What is the value of x in this equation?

- A. 2
- B. 3
- C. 5
- D. 7

- 12 The distance between r and t on a number line is 10. Which equation **must** be true?

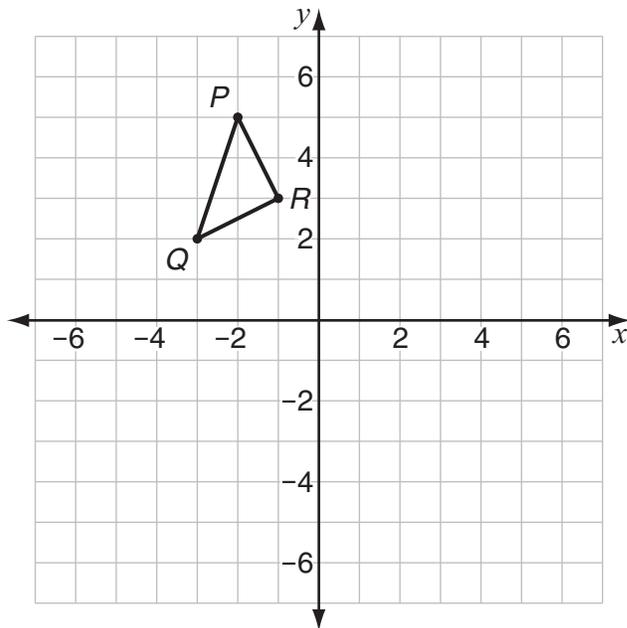
- A. $\frac{r+t}{2} = 10$
- B. $t - r = 10$
- C. $|r - t| = 10$
- D. $|t + 10| = r$



- 13 A real-estate agent receives a 3.5% commission on the sale of a house that costs \$200,000. What is the amount, in dollars, of the commission? [commission = sale price \times rate]

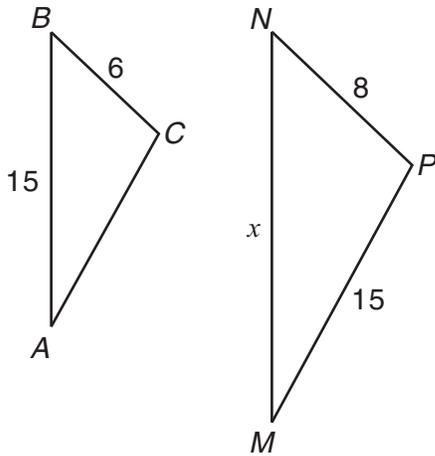


- 14 Look at $\triangle PQR$ on this grid.



Triangle PQR is reflected over the horizontal line $y = b$, where b is an integer. The coordinates of the image of point Q are $(-3, -4)$. What must be the value of b ?

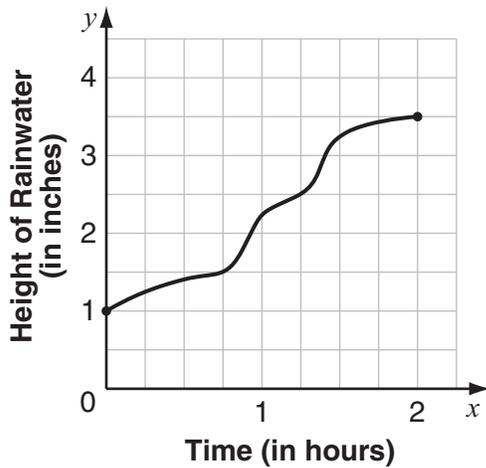
- 15 Triangle ABC is similar to triangle MNP ($\triangle ABC \sim \triangle MNP$).



not drawn to scale

What is the value of x ?

- 16 This graph shows the height of rainwater collected in a plastic tube over a period of 2 hours.



What is the average rate of change, in inches per hour, of the height of rainwater in the tube during this time period?



- 17 The formula below is used to approximate the boiling point of water, b , in degrees Fahrenheit, at altitudes, a , above 1000 feet.

$$b = 210.2 - 0.9\left(\frac{a - 1000}{500}\right)$$

Use the formula to approximate the boiling point of water, to the nearest tenth of a degree Fahrenheit, at an altitude of 4500 feet.

- 18 This table shows the number of available lockers at a gym.

Locker Numbers	Number of Available Lockers
100–199	40
200–299	35
300–399	25
400–499	20

One of the available lockers is randomly assigned to a new member at the gym. What is the probability that the locker number starts with a 3 or a 4?



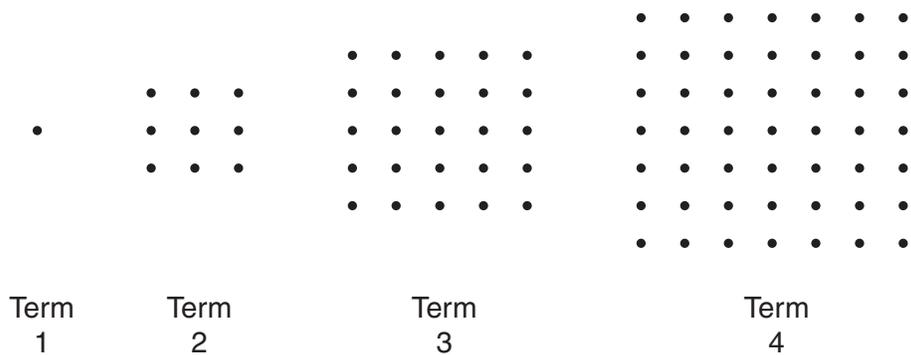
19 For what values of x is this inequality true?

$$x > |x|$$

Show your work or explain how you know.



20 Look at this pattern.

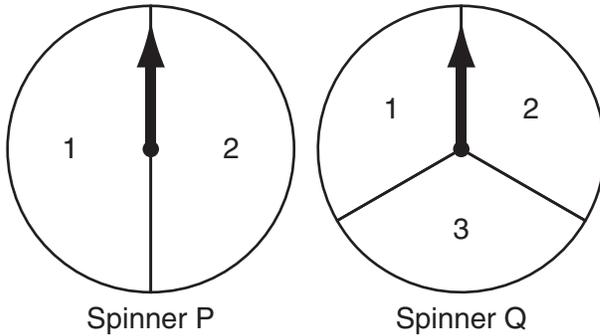


a. How many dots are in Term 6 of the pattern?

b. Write an expression using n that represents the number of dots in Term n of the pattern.

- 21 The number of a certain bacteria doubles every hour. What is the ratio of the number of bacteria after 10 hours to the number of bacteria after 5 hours? Show your work or explain how you know.
- 22 Each wheel of Sue's bicycle has a diameter of 2 feet 3 inches.
- Approximately how many **feet** will the bicycle have traveled when each wheel completes 1 revolution? [1 foot = 12 inches]
 - If each wheel completes 100 revolutions per minute, what is the approximate speed of Sue's bicycle in miles per hour? Show your work or explain how you know. [1 mile = 5280 feet]
- Sue rode her bicycle to school. She traveled $2\frac{1}{2}$ miles in $\frac{1}{4}$ hour.
- On average, how many revolutions per minute did each wheel complete during Sue's ride to school? Show your work or explain how you know.

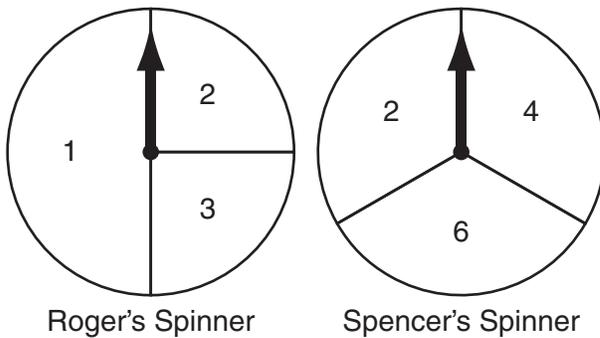
- 23 Emily has these two spinners.



She will spin the arrow on Spinner P once and on Spinner Q once. Then she will record the numbers from the sections in which the arrows stop.

- List all the possible outcomes when each arrow is spun once. Write the outcomes as ordered pairs in the form (number on Spinner P, number on Spinner Q).
- What is the probability that the sum of the numbers Emily spins will be greater than 4?

Roger and Spencer will use the two spinners below to play a game.



On a turn, each of them will spin the arrow on his spinner once. They will record the sum of the numbers from the sections in which the arrows stop. In this game, Roger will receive 1 point if the sum is odd. Spencer will receive 3 points if the sum is even. The player with the greatest number of points wins.

- A game is fair when each player has an equal probability of winning. Explain whether or not this game is fair.