



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
2013**

**Grade 11
Mathematics**

Mathematics



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



- 1 The values of x , y , and z are shown.

$$x = -3 + 0.8$$

$$y = -3 - \frac{5}{8}$$

$$z = -3 + 0.45$$

Which inequality is true?

- A. $x > z$
 - B. $y > x$
 - C. $y > z$
 - D. $z > x$
- 2 Allen's water bill contains the following information:
- He used 1600 cubic feet of water.
 - The total cost for the water he used is \$34.80.

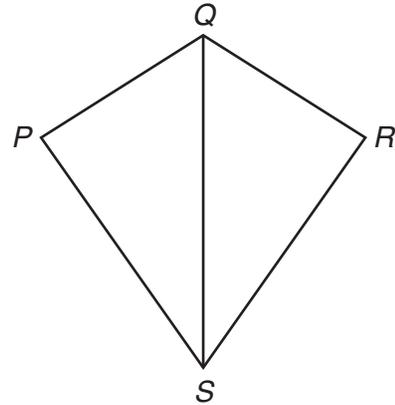
Which price is closest to the **cost per gallon** of water that Allen used?

[1 cubic foot of water = 7.48 gallons of water]

- A. \$0.0029
- B. \$0.0218
- C. \$0.1627
- D. \$0.2908



- 3 Quadrilateral $PQRS$ is shown below.



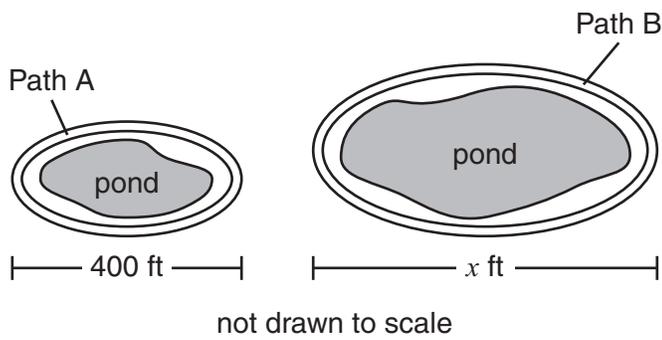
The following statements about quadrilateral $PQRS$ are true:

- Line segment QS bisects angle PSR .
- Line segment PS is congruent to line segment RS ($\overline{PS} \cong \overline{RS}$).

Which mathematical theorem can be used to prove that triangle PQS is congruent to triangle RQS ($\triangle PQS \cong \triangle RQS$)?

- A. SSS theorem
- B. SAS theorem
- C. AAS theorem
- D. ASA theorem

- 4 A parks department built paths around the two ponds shown in this diagram. The paths are geometrically similar.



- Path A is 400 feet from one end to the opposite end.
- The perimeter of Path A is $\frac{1}{4}$ mile.
- The perimeter of Path B is $\frac{5}{8}$ mile.

What is the value of x ?

- 5 Square $WXYZ$ is plotted on a coordinate grid.
- Vertex X is located at $(6, 8)$.
 - The midpoint of the diagonals of $WXYZ$ is located at $(3, 5)$.

Which coordinate pair represents the location of another vertex of square $WXYZ$?

- A. $(0, 2)$
- B. $(3, 2)$
- C. $(6, 1)$
- D. $(8, 0)$



- 6 This list shows the first four terms of a geometric sequence.

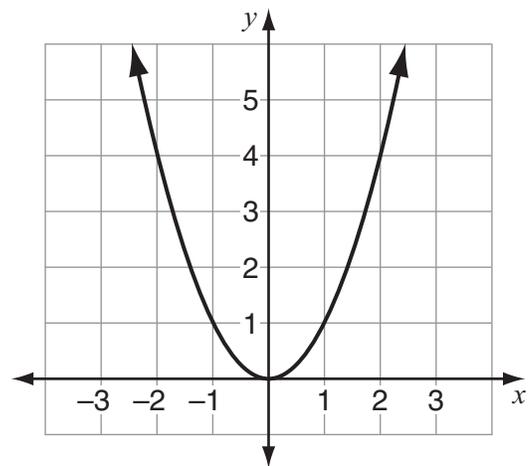
$$4, 2, 1, \frac{1}{2}, \dots$$

Which function can be used to determine the n th term of this sequence?

- A. $f(n) = 4 - 2^n$
- B. $f(n) = 4 - 2^{n-1}$
- C. $f(n) = 4\left(\frac{1}{2}\right)^n$
- D. $f(n) = 4\left(\frac{1}{2}\right)^{n-1}$



- 7 Look at this graph of a function.



What is the domain of the function?

- A. all real numbers
- B. all real numbers greater than or equal to 0
- C. all real numbers between 0 and 4
- D. all real numbers between -2 and 2



- 8 Look at this expression.

$$|-49 + 5x^3|$$

What is the value of the expression when $x = -2$?

- A. 9
- B. 19
- C. 79
- D. 89



- 9 Which expression is equivalent to

$$\frac{x^2 - 16}{x^2 - 9x + 20} \text{ for } x \neq 4?$$

- A. $\frac{x+4}{x+5}$
- B. $\frac{x+4}{x-5}$
- C. $\frac{x-4}{x+5}$
- D. $\frac{x-4}{x-5}$

- 10 Shelley spends \$10 on hamburger meat every week.

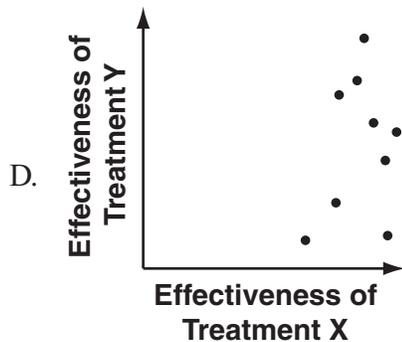
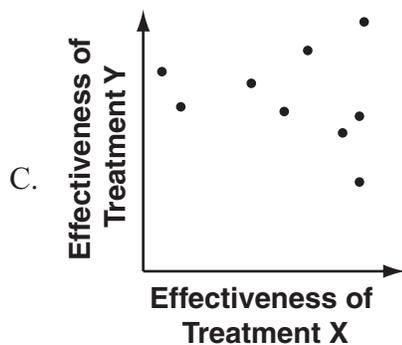
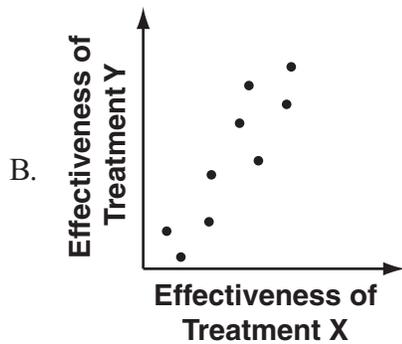
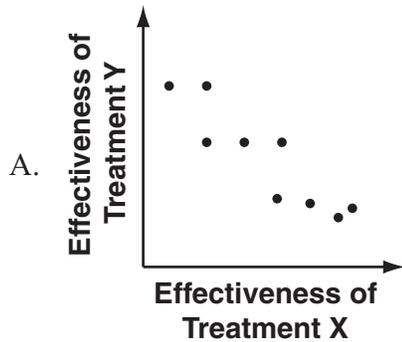
- Let x represent the price, in dollars, for 1 pound of hamburger meat.
- Let y represent the number of pounds of hamburger meat Shelley buys.

Which equation shows the relationship between x and y ?

- A. $y = 10x$
- B. $y = 10 - x$
- C. $y = \frac{x}{10}$
- D. $y = \frac{10}{x}$



- 11 While studying medical treatments, scientists noticed a relationship between two of the treatments when applied together. As Treatment X became more effective, Treatment Y became less effective. Which scatter plot best demonstrates this relationship?



- 12 Each student at a math fair will be given a gift bag. Each bag contains one gift.
- $\frac{1}{5}$ of the bags contain a calculator.
 - $\frac{2}{5}$ of the bags contain a protractor.
 - $\frac{2}{5}$ of the bags contain a pencil case.

What is the probability that a randomly chosen gift bag contains a calculator **or** a protractor?

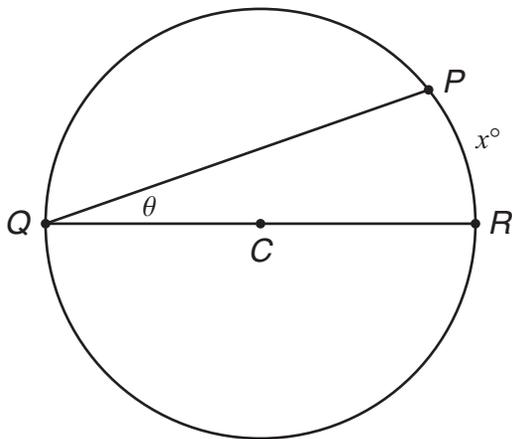
- A. 0.2
B. 0.4
C. 0.6
D. 0.8



- 13 A store donated \$45,000 to a local college. This amount was 1% of the store's profit, in dollars. What was the store's profit, in dollars?



- 14 Look at circle C .



The measure of minor arc PR is x degrees. Write an expression that represents the measure, in degrees, of angle θ .

- 15 Jeremy won the long-jump event at a track meet with a jump of 24 feet. What distance, in **meters**, did Jeremy jump? Round your answer to the nearest 0.1 meter.

[1 foot = 12 inches; 1 inch = 2.54 centimeters; 1 meter = 100 centimeters]



- 16 Andrew uses this expression to compute his total earnings, in dollars, each week, where h represents the number of hours he worked and s represents the amount, in dollars, of his sales.

$$8h + 0.03s$$

Last week, Andrew worked 35 hours and his sales were \$5100. What were Andrew's total earnings, in dollars, last week?



- 17 Look at this equation.

$$3(x + 6) - 5(x - 2) = 10$$

What value of x makes the equation true?



- 18 This list shows the ages of 12 actors in a video.

17, 16, 20, 20, 14, 19, 16, 74, 15, 17, 18, 16

How many years older than the median age is the actor represented by the outlier of the data?



19 This list shows the amounts, in dollars, three companies earned from sales last year.

- company X: 1.5×10^9
- company Y: 6.4×10^8
- company Z: 5.98×10^8

a. Write an inequality statement that orders the amounts earned from sales from least to greatest.

Company P earned \$716 million from sales last year.

b. Compare the amount company P earned from sales with the amounts companies X, Y, and Z earned from sales.



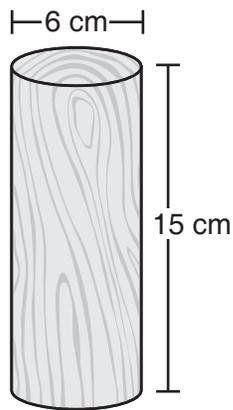
20 On Friday, Earl drove his truck 232 miles.

- His truck gets 16 miles per gallon in the city.
- His truck gets 20 miles per gallon on the highway.

On Friday, the truck used a total of 12 gallons of gas. The truck used c gallons of gas in the city and h gallons of gas on the highway. How many gallons of gas did Earl's truck use Friday when traveling on the highway? Show your work or explain how you know.

- 21 An identification code uses the digits 1, 2, and 3.
- How many 3-digit identification codes are possible if each digit can be used only once?
 - How many 3-digit identification codes are possible if each digit can be used more than once?

- 22 Rachel is using this solid piece of wood to make a toy. The piece of wood is in the shape of a cylinder.



- What is the area, in square centimeters, of the base of the cylinder? Write your answer in terms of π .
- What is the volume, in cubic centimeters, of the cylinder? Write your answer in terms of π .

Rachel will drill a hole straight through the center of the base. The diameter of the hole she drills will be equal to one-half the diameter of the original cylinder.

- What fraction of the original volume will **remain** after Rachel drills the hole? Show your work or explain how you know.



23 Glen made this table to represent a linear function.

x	$y = f(x)$
0	-2
1	0
2	2
3	4

a. What is the y -intercept of Glen's function?

Stacy wrote this equation to represent a different linear function.

$$g(x) = 3x + 12$$

b. What is the x -intercept of Stacy's function? Show your work or explain how you know.

Glen and Stacy will each graph their linear functions on the same coordinate plane.

c. Who will graph the steeper line, Glen or Stacy? Show your work or explain how you know.