



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
2010**

**Grade 11  
Mathematics**

# Mathematics

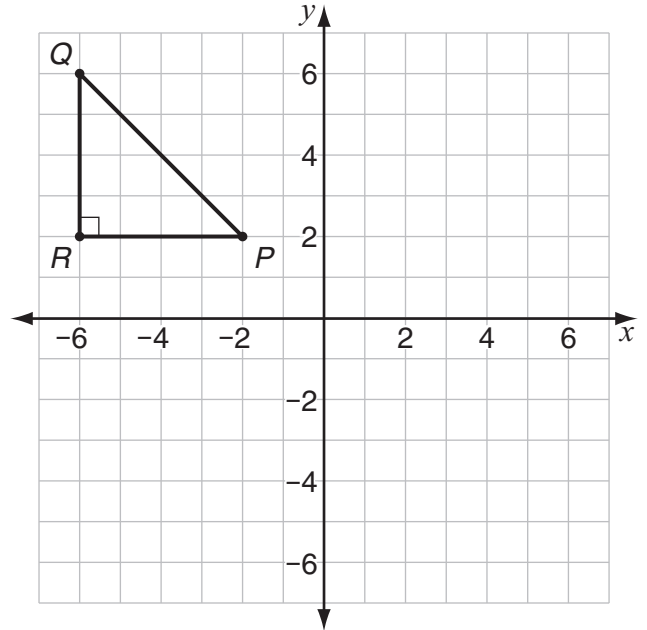


Items with this symbol were selected from Session One—no calculators or other mathematics tools allowed.

1 The athletic director of a school will distribute money from the budget to fall sports, winter sports, and spring sports in a ratio of 4:3:2, respectively. The total budget for the three sport seasons is \$180,000. How much money will go to **spring sports**?

- A. \$40,000
- B. \$60,000
- C. \$80,000
- D. \$90,000

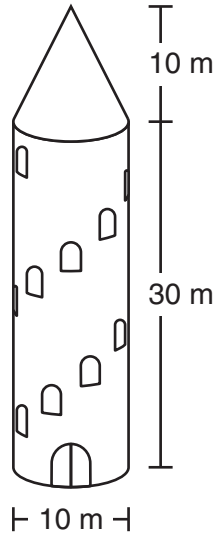
2 Look at  $\triangle PQR$  on this grid.



What are the coordinates of the image of point  $R$  after a  $90^\circ$  counterclockwise rotation about the origin?

- A.  $(-6, -2)$
- B.  $(-2, -6)$
- C.  $(6, -2)$
- D.  $(6, 2)$

- 3 This diagram represents a tower. The tower is in the shape of a cone on top of a cylinder.



Which measurement is closest to the total volume of the tower?

- A. 2,200 cubic meters
- B. 2,600 cubic meters
- C. 9,400 cubic meters
- D. 10,500 cubic meters

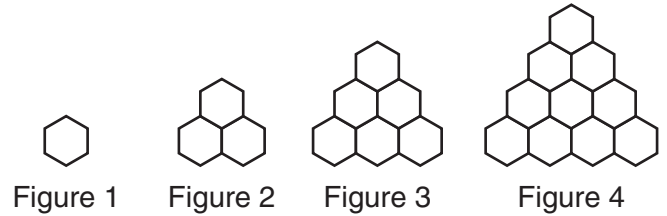


- 4 Circle  $C$  has its center at the coordinates  $(3, 8)$ . The coordinates of one point on the circle are  $(-1, 6)$ . What are the coordinates of another point on the circle?

- A.  $(-1, 5)$
- B.  $(0, 0)$
- C.  $(5, 4)$
- D.  $(6, -1)$



- 5 Look at this pattern.



If this pattern continues, Figure 20 will have 210 hexagons. How many hexagons will Figure 21 have?

- A. 220
- B. 230
- C. 231
- D. 232

- 6 A rug store is going out of business. The price of every rug will be reduced each week by 10% of the previous week's price. One rug has an original price of \$500. This table shows the price of that rug during the first three weeks of the sale.

**Rug Sale**

Week	Sale Price of Rug
0	\$500.00
1	\$450.00
2	\$405.00
3	\$364.50

During which week will the price of this rug be less than 50% of its original price?

- A. Week 4
- B. Week 5
- C. Week 6
- D. Week 7



- 7 The table below shows the relationship between  $x$  and  $f(x)$  for the linear function  $f(x)$ .

$x$	$f(x)$
0	10
2	2
4	-6
6	-14

What is the slope of  $f(x)$ ?

- A. -8
- B. -4
- C. 4
- D. 8



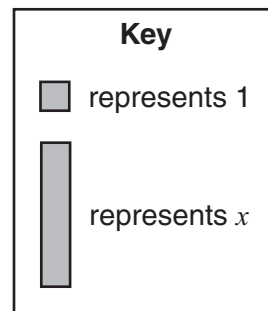
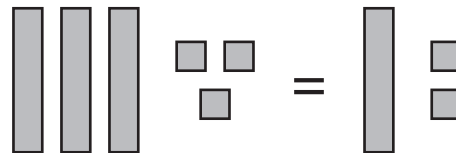
- 8 Which expression is equivalent to  $(6x^2 - 9x) - (2x - 3)$ ?
- A.  $(3x - 1)(2x - 3)$
  - B.  $(3x + 1)(x - 4)$
  - C.  $(4x - 1)(x - 2)$
  - D.  $(6x + 1)(x - 3)$

- 9 This month Doris is scheduled to work 5 fewer hours than twice the number of hours she worked last month. Last month Doris worked  $h$  hours. Which expression represents the number of hours Doris is scheduled to work this month?

- A.  $2h - 5$
- B.  $5 - 2h$
- C.  $2(h - 5)$
- D.  $2(5 - h)$



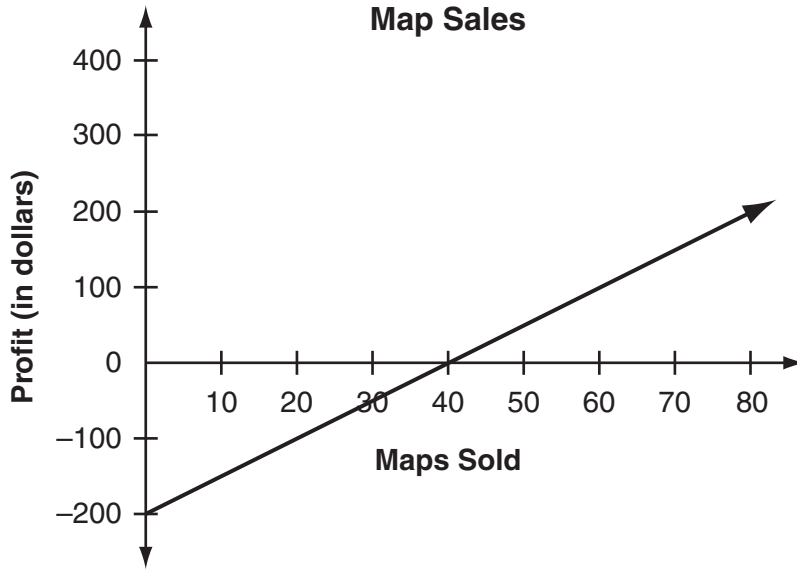
- 10 Look at these tiles.



Which equation is modeled by the tiles?

- A.  $x + 3 = x + 2$
- B.  $x + 3 = 2x + 1$
- C.  $3x + 3 = x + 2$
- D.  $3x + 3 = 2x + 1$

- 11 Brian started a business selling maps of hiking trails. His initial expense was \$200. The graph below shows Brian's profit from selling different numbers of maps. [profit = revenue – expense]



What does the **x-intercept** of the graph represent?

- A. the amount of revenue before any maps were sold
- B. the amount of revenue when all the maps were sold
- C. the number of maps sold when the revenue was equal to the expense
- D. the number of maps sold when the revenue was greater than the expense

12 Brenda must create a password according to these rules:

- The password must consist of 2 letters followed by 2 digits.
- There are a total of 26 letters and 10 digits that she may use.
- The letters may be repeated.
- The digits may **not** be repeated.

How many different passwords are possible?

- A. 4680
- B. 5148
- C. 60,840
- D. 66,924



13 Look at the inequality below.

$$0 < b^c < \left(\frac{1}{2}\right)^0$$

Write a value for  $b$  and a value for  $c$  that will make the inequality true. Write your answer in the form  $b^c$ .



14 Sketch a right triangle in which  $\tan \theta = \frac{5}{12}$ , where  $\theta$  represents the measure of an angle of the triangle. Be sure to label  $\theta$  and the right angle in your sketch.

- 15 Look at this pattern.

$$36, \underline{\quad}, 16, \frac{32}{3}, \frac{64}{9}, \frac{128}{27}, \dots$$

What is the missing number in the pattern?



- 16 This table shows a relationship between  $x$  and  $y$ .

$x$	$y$
-1	0
1	4
3	16
5	36

Write an equation that shows the relationship between  $x$  and  $y$ .

- 17 Look at this expression.

$$\frac{x^7 y^{-5}}{x^3 y}$$

Simplify the expression so that each variable is written once and all exponents are positive.



- 18 Look at this equation.

$$5p - 1 = 9 + 3(p - 6)$$

What value of  $p$  makes this equation true?

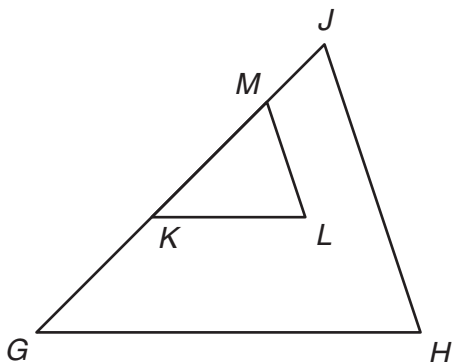
- 19 Look at the equation below.

$$|x + 6| = 4$$

For what values of  $x$  is the equation true? Show your work or explain how you know.



- 20 Triangle  $KLM$  is similar to triangle  $GHJ$  ( $\triangle KLM \sim \triangle GHJ$ ).



The perimeter of triangle  $KLM$  is 16 centimeters. The perimeter of triangle  $GHJ$  is 40 centimeters.

a. What is the ratio of side  $\overline{ML}$  to side  $\overline{JH}$ ?

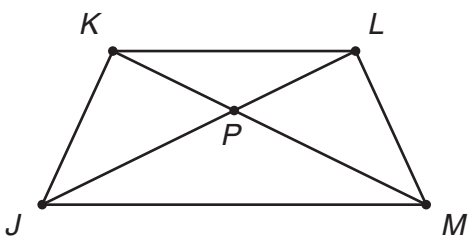
b. What is the ratio of the area of triangle  $KLM$  to the area of triangle  $GHJ$ ?



- 21 What are the coordinates of the point where the lines  $y = 2x - 1$  and  $y = 4x + 13$  intersect? Show your work or explain how you know.



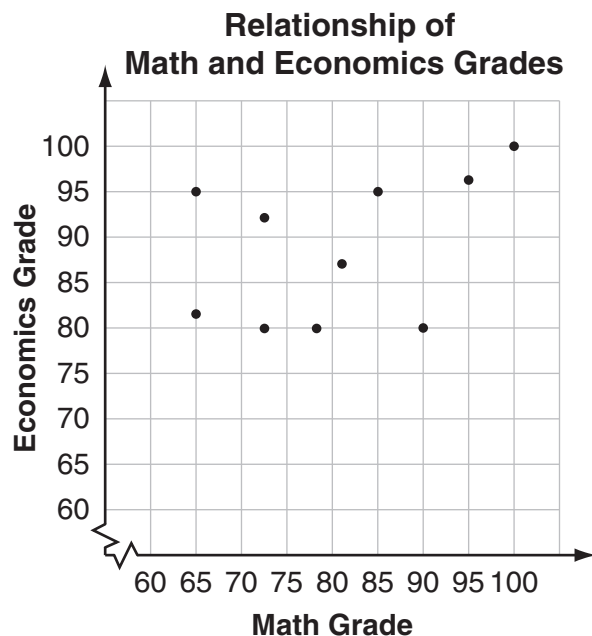
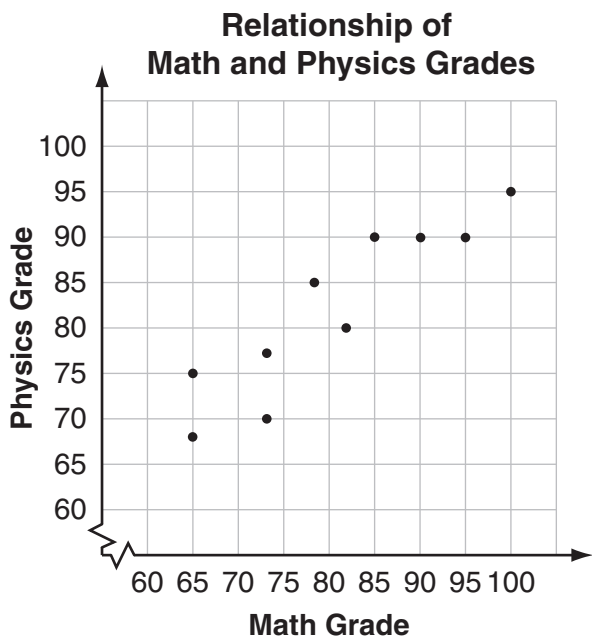
- 22 Quadrilateral  $JKLM$  has diagonals  $\overline{JL}$  and  $\overline{KM}$  that intersect at point  $P$ , as shown below.



Quadrilateral  $JKLM$  is an isosceles trapezoid with  $\overline{KL}$  parallel to  $\overline{JM}$ .

- Given  $\angle LKM$  is congruent to  $\angle KLJ$ , what other angle is congruent to  $\angle LKM$ ? Use geometric reasoning to explain how you know.
- Use geometric reasoning to explain why triangle  $KPL$  is similar to triangle  $MPJ$  ( $\triangle KPL \sim \triangle MPJ$ ).

- 23 A guidance counselor compared the final grades in a math class with the final grades in both a physics class and an economics class for the same group of students. The scatter plots below show the relationships between the final grades.



- Based on the data in the first scatter plot, what is the mode of the final grades in the physics class?
- Based on the data in the second scatter plot, how much greater is the range of the final grades in the math class than the range of the final grades in the economics class? Show your work or explain how you know.

The guidance counselor wants to determine whether the final grade in the math class is a better predictor of the final grade in the physics class or the economics class.

- Based on the data in the two scatter plots, explain whether the final grade in the math class is a better predictor of the final grade in the physics class or the economics class.