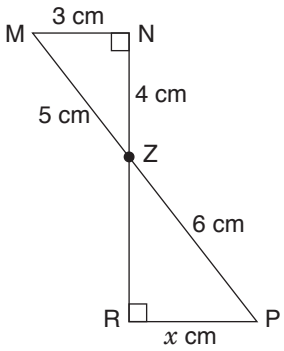
SAMPLE PROBLEMS FOR
GRADE 9 MATHEMATICS

GRADE 9

DIRECTIONS: This section provides sample mathematics problems for the Grade 9 test forms. These problems are based on material included in the New York City curriculum for Grade 8. (The Grade 8 problems on sample forms A and B cover mathematics material through Grade 7.) General directions for how to answer math questions are located on pages 52 and 90. There is no sample answer sheet for this section; mark your answers directly on this page or on a separate piece of paper.

1.



In the figure above, all lines are straight. $\overline{MP}$ and $\overline{RN}$ intersect at point Z. What is the value of x?

A. 3

B. $3\frac{3}{5}$

C. 4

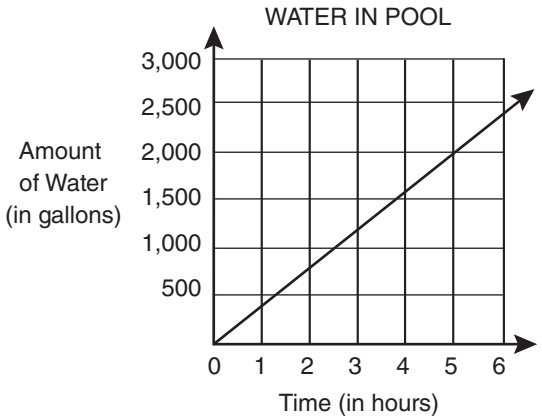
D. $4\frac{4}{5}$

E. 5

2. The translation of point P (3, 5) to P′ (5, $^{-}3$) is equivalent to rotating point P by which of the following clockwise rotations about the origin?

F. 45°
G. 90°
H. 135°
J. 180°
K. 225°

3.



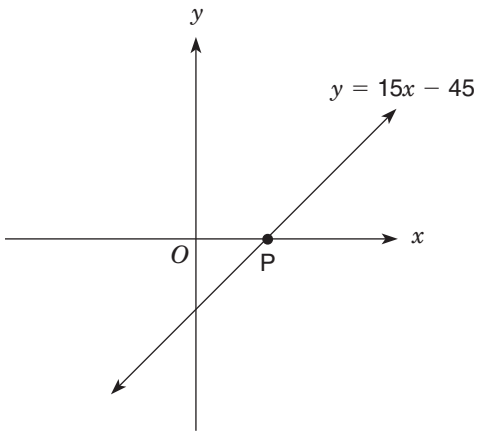
A swimming pool is being filled with water at a constant rate. The figure above is a portion of a graph that shows how the number of gallons of water in the pool changes over time. Starting with an empty pool, at the end of hour 5 there are 2,000 gallons in the pool. If the pool continues to fill at this rate, how much water will be in the pool at the end of hour 20? (Assume that the pool holds a total of 100,000 gallons.)

A. 5,600 gal.
B. 6,000 gal.
C. 8,000 gal.
D. 40,000 gal.
E. 80,000 gal.

4. If $(4^3)(8^2) = 2^x$, what is the value of x?

F. 12
G. 10
H. 7
J. 6
K. 5

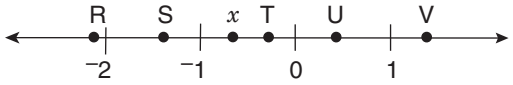
5.



The line defined by the equation $y = 15x - 45$ intercepts the x-axis at point P as shown above. What are the coordinates of point P?

A. (45, 0)
B. (3, 0)
C. $(^{-}3, 0)$
D. $(0, ^{-}3)$
E. $(0, ^{-}45)$

6.



On the number line above, which letter could represent the location of x^2 ?

F. R
G. S
H. T
J. U
K. V

7. If $(12.6 \times 10^{18}) - (1.1 \times 10^{17}) = k \times 10^{19}$, what is the value of k?

A. 0.016
B. 1.150
C. 1.249
D. 11.500
E. 16.000

8.

STUDENTS OWNING PETS

Number of Pets Owned	Number of Students
0	5
1	7
2	3
3	4
4	0
5	1

There are 20 students in a class. The frequency table above shows the number of these students that own 0, 1, 2, 3, 4, or 5 pets. What is the mean number of pets owned per student in this class?

F. $1\frac{1}{2}$
G. 3
H. $3\frac{1}{3}$
J. 4
K. 5

9. The temperature inside an oven when it is off is 60°F. When Gail turns the oven on, it heats at a constant rate, reaching a temperature of 350°F in 5 minutes. Which equation indicates the temperature (y) of the oven x minutes after it is turned on?

A. $y = 5x + 60$
B. $y = 60x + 350$
C. $y = 58x + 60$
D. $y = 70x + 60$
E. $y = 350x + 58$

10.

$$|x - 1| < 3$$
$$|x + 2| < 4$$

How many integer values of x satisfy both inequalities shown above?

F. 0
G. 1
H. 3
J. 4
K. 5

11. $\frac{p}{q},\ p+q,\ p-q,\ p^2+q^2,\ \frac{p^2}{q^2}$

If $p = q = \frac{1}{\sqrt{2}}$, which one of the expressions above does **not** represent a rational number?

A. $\frac{p}{q}$

B. $p+q$

C. $p-q$

D. p^2+q^2

E. $\frac{p^2}{q^2}$

12. Let $(x, y) \rightarrow (x+10, y-10)$. Using that rule, if $(n, r) \rightarrow (100, 100)$, what is (n, r)?

F. (90, 90)
G. (90, 110)
H. (100, 100)
J. (110, 90)
K. (110, 110)

13. Seven consecutive integers are arranged in increasing order. Their sum is $7k$. What is the value of the second integer in terms of k?

A. $k-6$
B. $k-2$
C. k
D. $k+1$
E. $7k-6$

14. Define the operation ◘ as follows:

$a \text{ ◘ } \left(\frac{b}{c}\right) = \frac{a}{\left(\frac{b}{c}\right)}$, where b and c are not zero.

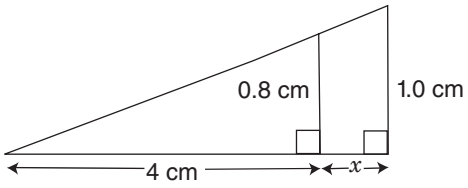
If $2 \text{ ◘ } \left(\frac{4}{x}\right) = \frac{3}{2}$, what is the value of x?

F. 1
G. 2
H. 3
J. 6
K. 12

15. Raul has two containers. One is a cylinder with an inner radius of 4 inches and an inner height of 8 inches. The other is a cube with inner height, width, and length each equal to 8 inches. The cylinder is filled with water and the cube is empty. If Raul pours the contents of the cylinder into the cube, how deep will the water be in the cube?

A. 2 in.
B. $\frac{2}{3}\pi$ in.
C. 4 in.
D. 2π in.
E. 4π in.

16.



In the figure above, what is the value of x?

F. 1 cm
G. 1.2 cm
H. 3.2 cm
J. 4 cm
K. 5 cm

17. Straight line k passes through the point $(-3, 4)$ with an x-intercept of 3. What is the equation of line k?

A. $y = -\frac{3}{2}x + 3$
B. $y = -\frac{2}{3}x - 3$
C. $y = -\frac{2}{3}x + 2$
D. $y = -\frac{1}{3}x + 3$
E. $y = \frac{2}{3}x - 2$