

## Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

Use this space for  
computations.

1 Which expression is equivalent to  $16x^2 - 36$ ?

- (1)  $4(2x - 3)(2x - 3)$                       (3)  $(4x - 6)(4x - 6)$   
(2)  $4(2x + 3)(2x - 3)$                       (4)  $(4x + 6)(4x + 6)$

2 What is the solution set of the equation  $(x - 2)(x - a) = 0$ ?

- (1)  $-2$  and  $a$                                       (3)  $2$  and  $a$   
(2)  $-2$  and  $-a$                                       (4)  $2$  and  $-a$

3 Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of  $-0.524$ . Which statement best summarizes this result?

- (1) There is a strong positive correlation between the variables.  
(2) There is a strong negative correlation between the variables.  
(3) There is a moderate positive correlation between the variables.  
(4) There is a moderate negative correlation between the variables.

4 Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula  $P_1V_1 = P_2V_2$ . When the formula is solved for  $P_2$ , the result is

- (1)  $P_1V_1V_2$                                       (3)  $\frac{P_1V_1}{V_2}$   
(2)  $\frac{V_2}{P_1V_1}$                                       (4)  $\frac{P_1V_2}{V_1}$



**Use this space for  
computations.**

**7** Which expression is equivalent to  $2(3g - 4) - (8g + 3)$ ?

(1)  $-2g - 1$

(3)  $-2g - 7$

(2)  $-2g - 5$

(4)  $-2g - 11$

**8** In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1)  $a_1 = 49; a_n = a_{n-1} + 21$

(2)  $a_1 = 0; a_n = 49a_{n-1} + 21$

(3)  $a_1 = 21; a_n = a_{n-1} + 49$

(4)  $a_1 = 0; a_n = 21a_{n-1} + 49$

**9** A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation  $D = 280 - 59t$  can be used to represent the distance,  $D$ , from Buffalo after  $t$  hours. In this equation, the 59 represents the

(1) car's distance from Albany

(2) speed of the car

(3) distance between Buffalo and Albany

(4) number of hours driving

**10** Faith wants to use the formula  $C(f) = \frac{5}{9}(f - 32)$  to convert degrees Fahrenheit,  $f$ , to degrees Celsius,  $C(f)$ . If Faith calculated  $C(68)$ , what would her result be?

(1) 20° Celsius

(3) 154° Celsius

(2) 20° Fahrenheit

(4) 154° Fahrenheit

- 11** Which scenario represents exponential growth?
- (1) A water tank is filled at a rate of 2 gallons/minute.
  - (2) A vine grows 6 inches every week.
  - (3) A species of fly doubles its population every month during the summer.
  - (4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.
- 12** What is the *minimum* value of the function  $y = |x + 3| - 2$ ?
- (1)  $-2$
  - (2)  $2$
  - (3)  $3$
  - (4)  $-3$
- 13** What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?
- (1) positive correlation, but not causal
  - (2) positive correlation, and causal
  - (3) negative correlation, but not causal
  - (4) negative correlation, and causal
- 14** A computer application generates a sequence of musical notes using the function  $f(n) = 6(16)^n$ , where  $n$  is the number of the note in the sequence and  $f(n)$  is the note frequency in hertz. Which function will generate the same note sequence as  $f(n)$ ?
- (1)  $g(n) = 12(2)^{4n}$
  - (2)  $h(n) = 6(2)^{4n}$
  - (3)  $p(n) = 12(4)^{2n}$
  - (4)  $k(n) = 6(8)^{2n}$

**Use this space for  
computations.**

**15** Which value of  $x$  is a solution to the equation  $13 - 36x^2 = -12$ ?

(1)  $\frac{36}{25}$

(3)  $-\frac{6}{5}$

(2)  $\frac{25}{36}$

(4)  $-\frac{5}{6}$

**16** Which point is a solution to the system below?

$$2y < -12x + 4$$

$$y < -6x + 4$$

(1)  $\left(1, \frac{1}{2}\right)$

(3)  $\left(-\frac{1}{2}, 5\right)$

(2)  $(0, 6)$

(4)  $(-3, 2)$

**17** When the function  $f(x) = x^2$  is multiplied by the value  $a$ , where  $a > 1$ , the graph of the new function,  $g(x) = ax^2$

(1) opens upward and is wider

(2) opens upward and is narrower

(3) opens downward and is wider

(4) opens downward and is narrower

**18** Andy has \$310 in his account. Each week,  $w$ , he withdraws \$30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

(1)  $310 - 8w$

(3)  $310w - 30$

(2)  $280 + 30(w - 1)$

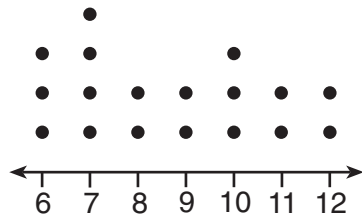
(4)  $280 - 30(w - 1)$

Use this space for computations.

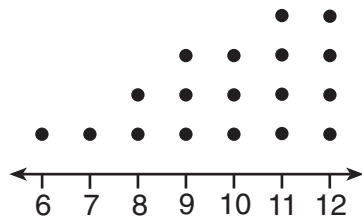
19 The daily cost of production in a factory is calculated using  $c(x) = 200 + 16x$ , where  $x$  is the number of complete products manufactured. Which set of numbers best defines the domain of  $c(x)$ ?

- (1) integers
- (2) positive real numbers
- (3) positive rational numbers
- (4) whole numbers

20 Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.



Soccer Players' Ages



Basketball Players' Ages

Which statement about the given data sets is correct?

- (1) The data for soccer players are skewed right.
- (2) The data for soccer players have less spread than the data for basketball players.
- (3) The data for basketball players have the same median as the data for soccer players.
- (4) The data for basketball players have a greater mean than the data for soccer players.