

## 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 The number of bacteria grown in a lab can be modeled by  $P(t) = 300 \cdot 2^{4t}$ , where  $t$  is the number of hours. Which expression is equivalent to  $P(t)$ ?

- (1)  $300 \cdot 8^t$  (3)  $300^t \cdot 2^4$   
(2)  $300 \cdot 16^t$  (4)  $300^{2t} \cdot 2^{2t}$

- 2 During physical education class, Andrew recorded the exercise times in minutes and heart rates in beats per minute (bpm) of four of his classmates. Which table best represents a linear model of exercise time and heart rate?

Student 1

Exercise Time (in minutes)	Heart Rate (bpm)
0	60
1	65
2	70
3	75
4	80

(1)

Student 3

Exercise Time (in minutes)	Heart Rate (bpm)
0	58
1	65
2	70
3	75
4	79

(3)

Student 2

Exercise Time (in minutes)	Heart Rate (bpm)
0	62
1	70
2	83
3	88
4	90

(2)

Student 4

Exercise Time (in minutes)	Heart Rate (bpm)
0	62
1	65
2	66
3	73
4	75

(4)

**Use this space for computations.**

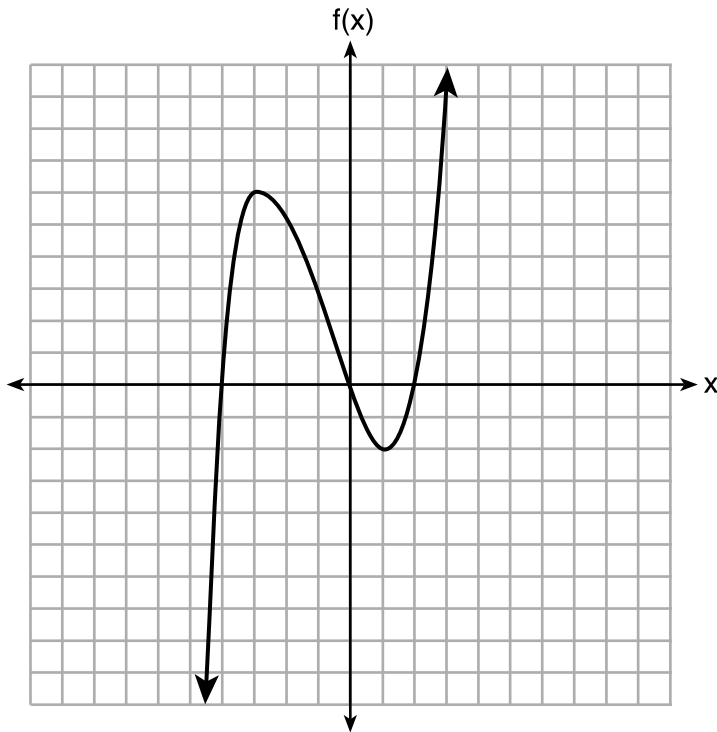
3 David correctly factored the expression  $m^2 - 12m - 64$ . Which expression did he write?

- (1)  $(m - 8)(m - 8)$                       (3)  $(m - 16)(m + 4)$   
(2)  $(m - 8)(m + 8)$                       (4)  $(m + 16)(m - 4)$

4 The solution to  $-2(1 - 4x) = 3x + 8$  is

- (1)  $\frac{6}{11}$     (3)  $-\frac{10}{7}$   
(2) 2    (4) -2

5 The graph of  $f(x)$  is shown below.



What is the value of  $f(-3)$ ?

- (1) 6    (3) -2  
(2) 2    (4) -4

**Use this space for  
computations.**

**6** If the function  $f(x) = x^2$  has the domain  $\{0, 1, 4, 9\}$ , what is its range?

(1)  $\{0, 1, 2, 3\}$

(3)  $\{0, -1, 1, -2, 2, -3, 3\}$

(2)  $\{0, 1, 16, 81\}$

(4)  $\{0, -1, 1, -16, 16, -81, 81\}$

**7** The expression  $4x^2 - 25$  is equivalent to

(1)  $(4x - 5)(x + 5)$

(3)  $(2x + 5)(2x - 5)$

(2)  $(4x + 5)(x - 5)$

(4)  $(2x - 5)(2x - 5)$

**8** Compared to the graph of  $f(x) = x^2$ , the graph of  $g(x) = (x - 2)^2 + 3$  is the result of translating  $f(x)$

(1) 2 units up and 3 units right

(2) 2 units down and 3 units up

(3) 2 units right and 3 units up

(4) 2 units left and 3 units right

**9** Lizzy has 30 coins that total \$4.80. All of her coins are dimes,  $D$ , and quarters,  $Q$ . Which system of equations models this situation?

(1)  $D + Q = 4.80$

(3)  $D + Q = 30$

$.10D + .25Q = 30$

$.25D + .10Q = 4.80$

(2)  $D + Q = 30$

(4)  $D + Q = 4.80$

$.10D + .25Q = 4.80$

$.25D + .10Q = 30$

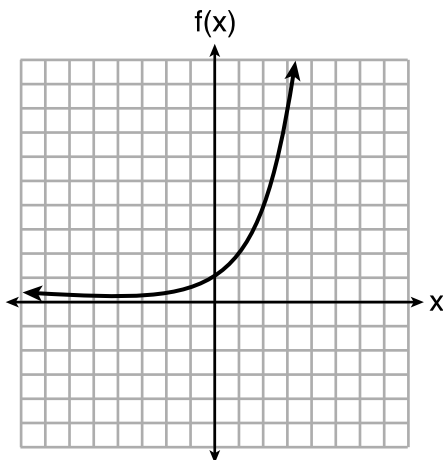
Use this space for computations.

- 10 Gretchen has \$50 that she can spend at the fair. Ride tickets cost \$1.25 each and game tickets cost \$2 each. She wants to go on a minimum of 10 rides and play at least 12 games.

Which system of inequalities represents this situation when  $r$  is the number of ride tickets purchased and  $g$  is the number of game tickets purchased?

- (1)  $1.25r + 2g < 50$   
 $r \leq 10$   
 $g > 12$
- (2)  $1.25r + 2g \leq 50$   
 $r \geq 10$   
 $g \geq 12$
- (3)  $1.25r + 2g \leq 50$   
 $r \geq 10$   
 $g > 12$
- (4)  $1.25r + 2g < 50$   
 $r \leq 10$   
 $g \geq 12$

- 11 Three functions are shown below.



$$g(x) = 3^x + 2$$

$x$	$h(x)$
-5	30
-4	14
-3	6
-2	2
-1	0
0	-1
1	-1.5
2	-1.75

Which statement is true?

- (1) The  $y$ -intercept for  $h(x)$  is greater than the  $y$ -intercept for  $f(x)$ .
- (2) The  $y$ -intercept for  $f(x)$  is greater than the  $y$ -intercept for  $g(x)$ .
- (3) The  $y$ -intercept for  $h(x)$  is greater than the  $y$ -intercept for both  $g(x)$  and  $f(x)$ .
- (4) The  $y$ -intercept for  $g(x)$  is greater than the  $y$ -intercept for both  $f(x)$  and  $h(x)$ .