

## 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 When solving the equation  $12x^2 - 7x = 6 - 2(x^2 - 1)$ , Evan wrote  $12x^2 - 7x = 6 - 2x^2 + 2$  as his first step. Which property justifies this step?
- (1) subtraction property of equality
  - (2) multiplication property of equality
  - (3) associative property of multiplication
  - (4) distributive property of multiplication over subtraction
- 2 Jill invests \$400 in a savings bond. The value of the bond,  $V(x)$ , in hundreds of dollars after  $x$  years is illustrated in the table below.

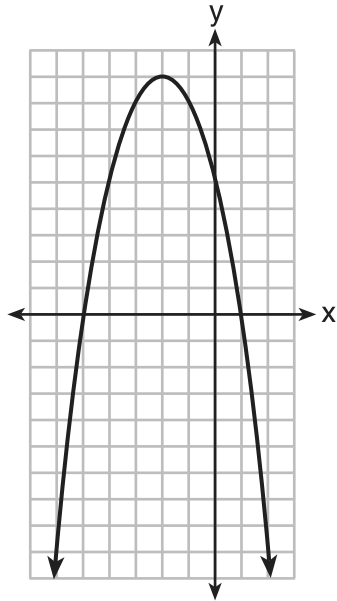
| $x$ | $V(x)$ |
|-----|--------|
| 0   | 4      |
| 1   | 5.4    |
| 2   | 7.29   |
| 3   | 9.84   |

Which equation and statement illustrate the approximate value of the bond in hundreds of dollars over time in years?

- (1)  $V(x) = 4(0.65)^x$ , and it grows.
  - (2)  $V(x) = 4(0.65)^x$ , and it decays.
  - (3)  $V(x) = 4(1.35)^x$ , and it grows.
  - (4)  $V(x) = 4(1.35)^x$ , and it decays.
- 3 Alicia purchased  $H$  half-gallons of ice cream for \$3.50 each and  $P$  packages of ice cream cones for \$2.50 each. She purchased 14 items and spent \$43. Which system of equations could be used to determine how many of each item Alicia purchased?
- (1)  $3.50H + 2.50P = 43$   
 $H + P = 14$
  - (2)  $3.50P + 2.50H = 43$   
 $P + H = 14$
  - (3)  $3.50H + 2.50P = 14$   
 $H + P = 43$
  - (4)  $3.50P + 2.50H = 14$   
 $P + H = 43$

Use this space for  
computations.

4 A relation is graphed on the set of axes below.



Based on this graph, the relation is

- (1) a function because it passes the horizontal line test
  - (2) a function because it passes the vertical line test
  - (3) not a function because it fails the horizontal line test
  - (4) not a function because it fails the vertical line test
- 5 Ian is saving up to buy a new baseball glove. Every month he puts \$10 into a jar. Which type of function best models the total amount of money in the jar after a given number of months?
- (1) linear
  - (2) exponential
  - (3) quadratic
  - (4) square root
- 6 Which ordered pair would *not* be a solution to  $y = x^3 - x$ ?
- (1)  $(-4, -60)$
  - (2)  $(-3, -24)$
  - (3)  $(-2, -6)$
  - (4)  $(-1, -2)$

7 Last weekend, Emma sold lemonade at a yard sale. The function  $P(c) = .50c - 9.96$  represented the profit,  $P(c)$ , Emma earned selling  $c$  cups of lemonade. Sales were strong, so she raised the price for this weekend by 25 cents per cup. Which function represents her profit for this weekend?

- (1)  $P(c) = .25c - 9.96$                       (3)  $P(c) = .50c - 10.21$   
(2)  $P(c) = .50c - 9.71$                       (4)  $P(c) = .75c - 9.96$

8 The product of  $\sqrt{576}$  and  $\sqrt{684}$  is

- (1) irrational because both factors are irrational  
(2) rational because both factors are rational  
(3) irrational because one factor is irrational  
(4) rational because one factor is rational

9 Which expression is equivalent to  $y^4 - 100$ ?

- (1)  $(y^2 - 10)^2$                                   (3)  $(y^2 + 10)(y^2 - 10)$   
(2)  $(y^2 - 50)^2$                                   (4)  $(y^2 + 50)(y^2 - 50)$

10 The graphs of  $y = x^2 - 3$  and  $y = 3x - 4$  intersect at approximately

- (1)  $(0.38, -2.85)$ , only                      (3)  $(0.38, -2.85)$  and  $(2.62, 3.85)$   
(2)  $(2.62, 3.85)$ , only                      (4)  $(0.38, -2.85)$  and  $(3.85, 2.62)$

11 The expression  $-4.9t^2 + 50t + 2$  represents the height, in meters, of a toy rocket  $t$  seconds after launch. The initial height of the rocket, in meters, is

- (1) 0    (3) 4.9  
(2) 2    (4) 50

12 If the domain of the function  $f(x) = 2x^2 - 8$  is  $\{-2, 3, 5\}$ , then the range is

- (1)  $\{-16, 4, 92\}$                                   (3)  $\{0, 10, 42\}$   
(2)  $\{-16, 10, 42\}$                                   (4)  $\{0, 4, 92\}$