11 Which statement best describes the solutions of a two-variable equation?
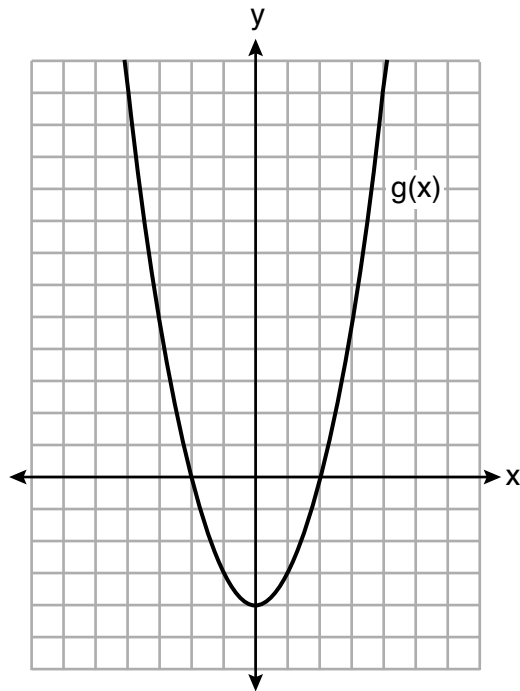
(1) The ordered pairs must lie on the graphed equation.

(2) The ordered pairs must lie near the graphed equation.

(3) The ordered pairs must have $x = 0$ for one coordinate.

(4) The ordered pairs must have $y = 0$ for one coordinate.

12 The expression $x^2 - 10x + 24$ is equivalent to

(1) $(x + 12)(x - 2)$ (3) $(x + 6)(x + 4)$

(2) $(x - 12)(x + 2)$ (4) $(x - 6)(x - 4)$

13 Which statement is true about the functions $f(x)$ and $g(x)$, given below?

$f(x) = -x^2 - 4x - 4$

(1) The minimum value of $g(x)$ is greater than the maximum value of $f(x)$.

(2) $f(x)$ and $g(x)$ have the same y-intercept.

(3) $f(x)$ and $g(x)$ have the same roots.

(4) $f(x) = g(x)$ when $x = -4$.

14 The equation $V(t) = 12{,}000(0.75)^t$ represents the value of a motorcycle t years after it was purchased. Which statement is true?

(1) The motorcycle cost $9000 when purchased.

(2) The motorcycle cost $12,000 when purchased.

(3) The motorcycle's value is decreasing at a rate of 75% each year.

(4) The motorcycle's value is decreasing at a rate of 0.25% each year.

15 The solutions to $(x + 4)^2 - 2 = 7$ are

(1) $-4 \pm \sqrt{5}$ (3) -1 and -7

(2) $4 \pm \sqrt{5}$ (4) 1 and 7

16 Which expression is *not* equivalent to $-4x^3 + x^2 - 6x + 8$?

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

(2) $x(-4x^2 - x + 6) + 8$ (4) $-4(x^3 - 2) + x(x - 6)$

17 Which situation could be modeled as a linear equation?

(1) The value of a car decreases by 10% every year.

(2) The number of fish in a lake doubles every 5 years.

(3) Two liters of water evaporate from a pool every day.

(4) The amount of caffeine in a person's body decreases by $\frac{1}{3}$ every 2 hours.

18 The range of the function $f(x) = |x + 3| - 5$ is

(1) $[-5, \infty)$ (3) $[3, \infty)$

(2) $(-5, \infty)$ (4) $(3, \infty)$

19 A laboratory technician used the function $t(m) = 2(3)^{2m + 1}$ to model her research. Consider the following expressions:

$\quad$ I. $6(3)^{2m}$ $\quad$ II. $6(6)^{2m}$ $\quad$ III. $6(9)^{m}$

The function $t(m)$ is equivalent to

(1) I, only $\qquad\qquad$ (3) I and III

(2) II, only $\qquad\qquad$ (4) II and III

20 Which system of equations has the same solutions as the system below?

$$3x - y = 7$$
$$2x + 3y = 12$$

(1) $6x - 2y = 14$ $\qquad\qquad$ (3) $-9x - 3y = -21$
$\quad -6x + 9y = 36$ $\qquad\qquad\quad$ $2x + 3y = 12$

(2) $18x - 6y = 42$ $\qquad\qquad$ (4) $3x - y = 7$
$\quad 4x + 6y = 24$ $\qquad\qquad\qquad$ $x + y = 2$

21 A population of paramecia, P, can be modeled using the exponential function $P(t) = 3(2)^t$, where t is the number of days since the population was first observed. Which domain is most appropriate to use to determine the population over the course of the first two weeks?

(1) $t \geq 0$ $\qquad\qquad$ (3) $0 \leq t \leq 2$

(2) $t \leq 2$ $\qquad\qquad$ (4) $0 \leq t \leq 14$