7

$$m = \frac{\left(\frac{r}{1{,}200}\right)\left(1+\frac{r}{1{,}200}\right)^{N}}{\left(1+\frac{r}{1{,}200}\right)^{N}-1}P$$

The formula above gives the monthly payment m needed to pay off a loan of P dollars at r percent annual interest over N months. Which of the following gives P in terms of m, r, and N ?

A) $P = \frac{\left(\frac{r}{1{,}200}\right)\left(1+\frac{r}{1{,}200}\right)^{N}}{\left(1+\frac{r}{1{,}200}\right)^{N}-1}m$

B) $P = \frac{\left(1+\frac{r}{1{,}200}\right)^{N}-1}{\left(\frac{r}{1{,}200}\right)\left(1+\frac{r}{1{,}200}\right)^{N}}m$

C) $P = \left(\frac{r}{1{,}200}\right)m$

D) $P = \left(\frac{1{,}200}{r}\right)m$

9

$$3x + 4y = -23$$
$$2y - x = -19$$

What is the solution (x, y) to the system of equations above?

A) $(-5, -2)$

B) $(3, -8)$

C) $(4, -6)$

D) $(9, -6)$

10

$$g(x) = ax^2 + 24$$

For the function g defined above, a is a constant and $g(4) = 8$. What is the value of $g(-4)$?

A) 8

B) 0

C) -1

D) -8

8

If $\frac{a}{b} = 2$, what is the value of $\frac{4b}{a}$?

A) 0

B) 1

C) 2

D) 4

18

$$x + y = -9$$
$$x + 2y = -25$$

According to the system of equations above, what is the value of x ?

11

Which of the following numbers is NOT a solution of the inequality $3x - 5 \geq 4x - 3$?

A) -1

B) -2

C) -3

D) -5

18

$$y < -x + a$$
$$y > x + b$$

In the xy-plane, if $(0, 0)$ is a solution to the system of inequalities above, which of the following relationships between a and b must be true?

A) $a > b$

B) $b > a$

C) $|a| > |b|$

D) $a = -b$

11

$$b = 2.35 + 0.25x$$

$$c = 1.75 + 0.40x$$

In the equations above, b and c represent the price per pound, in dollars, of beef and chicken, respectively, x weeks after July 1 during last summer. What was the price per pound of beef when it was equal to the price per pound of chicken?

A) $2.60

B) $2.85

C) $2.95

D) $3.35

36

$$h(x) = \frac{1}{(x-5)^2 + 4(x-5) + 4}$$

For what value of x is the function h above undefined?

7

If $\frac{x^{a^2}}{x^{b^2}} = x^{16}$, $x > 1$, and $a + b = 2$, what is the value of $a - b$?

A) 8

B) 14

C) 16

D) 18

10

Which of the following equations has a graph in the xy-plane for which y is always greater than or equal to -1 ?

A) $y = |x| - 2$

B) $y = x^2 - 2$

C) $y = (x-2)^2$

D) $y = x^3 - 2$

6

$$2x - 3y = -14$$
$$3x - 2y = -6$$

If (x, y) is a solution to the system of equations above, what is the value of $x - y$?

A) -20

B) -8

C) -4

D) 8

7

x	$f(x)$
0	3
2	1
4	0
5	-2

The function f is defined by a polynomial. Some values of x and $f(x)$ are shown in the table above. Which of the following must be a factor of $f(x)$?

A) $x - 2$

B) $x - 3$

C) $x - 4$

D) $x - 5$

9

$$kx - 3y = 4$$
$$4x - 5y = 7$$

In the system of equations above, k is a constant and x and y are variables. For what value of k will the system of equations have no solution?

A) $\frac{12}{5}$

B) $\frac{16}{7}$

C) $-\frac{16}{7}$

D) $-\frac{12}{5}$

13

$$h = -16t^2 + vt + k$$

The equation above gives the height h, in feet, of a ball t seconds after it is thrown straight up with an initial speed of v feet per second from a height of k feet. Which of the following gives v in terms of h, t, and k ?

A) $v = h + k - 16t$

B) $v = \frac{h - k + 16}{t}$

C) $v = \frac{h + k}{t} - 16t$

D) $v = \frac{h - k}{t} + 16t$

36

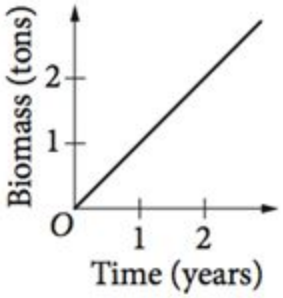
$$y \leq -15x + 3000$$
$$y \leq 5x$$

In the xy-plane, if a point with coordinates (a, b) lies in the solution set of the system of inequalities above, what is the maximum possible value of b ?

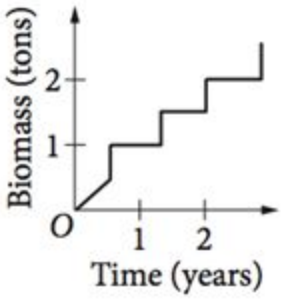
20

The mass of living organisms in a lake is defined to be the biomass of the lake. If the biomass in a lake doubles each year, which of the following graphs could model the biomass in the lake as a function of time? (Note: In each graph below, O represents $(0, 0)$.)

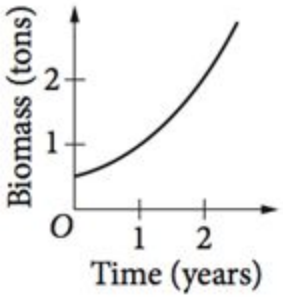
A)



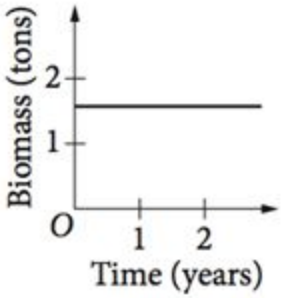
B)



C)



D)



18

$$x^3 - 5x^2 + 2x - 10 = 0$$

For what real value of x is the equation above true?

10

If $\frac{t+5}{t-5} = 10$, what is the value of t ?

A) $\frac{45}{11}$

B) 5

C) $\frac{11}{2}$

D) $\frac{55}{9}$

9

$$\sqrt{x-a} = x - 4$$

If $a = 2$, what is the solution set of the equation above?

A) $\{3, 6\}$

B) $\{2\}$

C) $\{3\}$

D) $\{6\}$

6

If $\frac{a-b}{b} = \frac{3}{7}$, which of the following must also be true?

A) $\frac{a}{b} = -\frac{4}{7}$

B) $\frac{a}{b} = \frac{10}{7}$

C) $\frac{a+b}{b} = \frac{10}{7}$

D) $\frac{a-2b}{b} = -\frac{11}{7}$