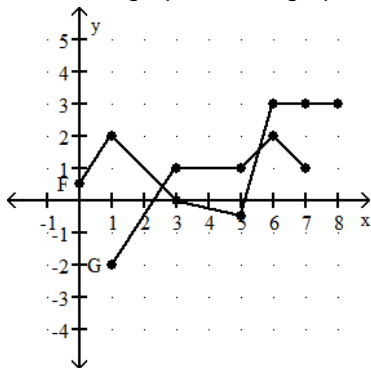


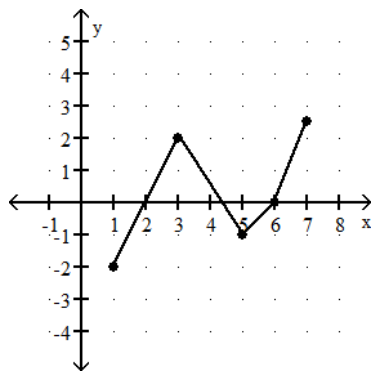
1) Find a linear function, h , given $h(-1) = -3$ and $h(1) = 1$.

- A) $h(x) = -2x + 1$
- B) $h(x) = -2x - 1$
- C) $h(x) = 1x - 2$
- D) $h(x) = 2x - 1$
- E) None of the above

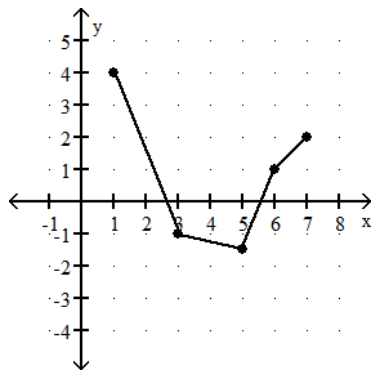
2) Given the graph below, graph F - G.



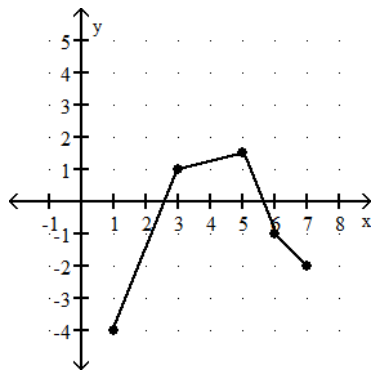
A)



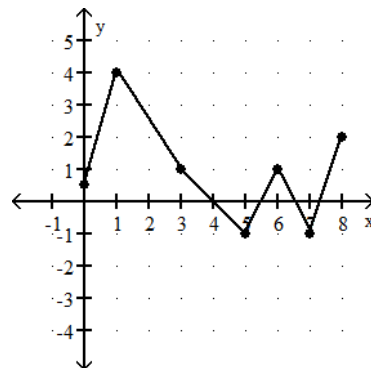
B)



C)

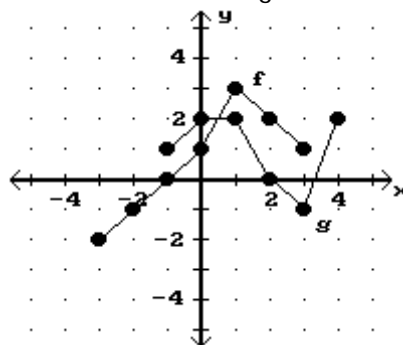


D)



E) None of the above

3) What is the domain of g/f ?



- A) $[-3, 4]$
- B) $[-3, 3]$
- C) $[-1, 2) \cup (2, 3]$
- D) $(-1, 3]$
- E) None of the above

4) Given $f(x) = -5x + 5$ and $g(x) = 2x + 3$, find $(g \circ f)(x)$.

- A) $-10x + 20$
- B) $-10x + 13$
- C) $10x + 13$
- D) $-10x - 7$
- E) None of the above

5) Find a polynomial function of degree 3 with $-1, 3, 5$ as zeros.

- A) $f(x) = x^3 - 7x^2 + 7x + 15$
- B) $f(x) = x^3 + 7x^2 + 7x - 15$
- C) $f(x) = x^3 + 9x^2 + 7x - 3$
- D) $f(x) = 3x^3 + 7x^2 + 7x - 15$
- E) None of the above

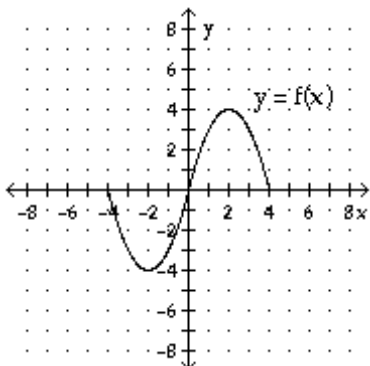
6) The distance an object falls when dropped from a tower varies directly as the square of the time it falls. If the object falls 144 feet in 3 seconds, how far will it fall in 10 seconds?

- A) 1800 ft
- B) 1400 ft
- C) 1600 ft
- D) 160 ft

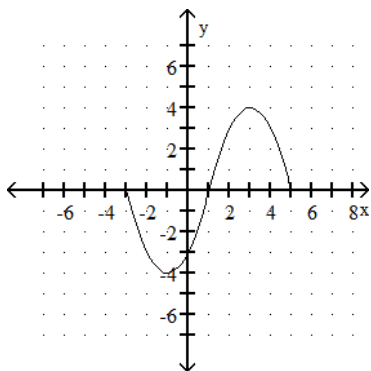
7) Rewrite: $\ln 31 = 3.434$

- A) $e^{3.434} = \ln 31$ B) $e^{31} = 3.434$
 C) $e^{3.434} = 31$ D) $e^{3.434} = 1$

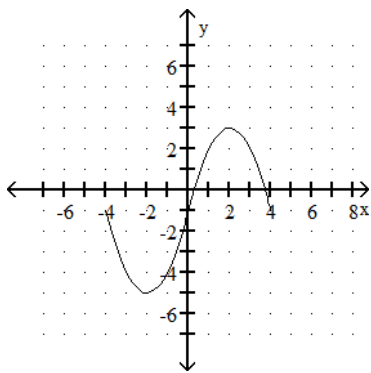
8) Given the graph below, graph $g(x) = f(x-1)$



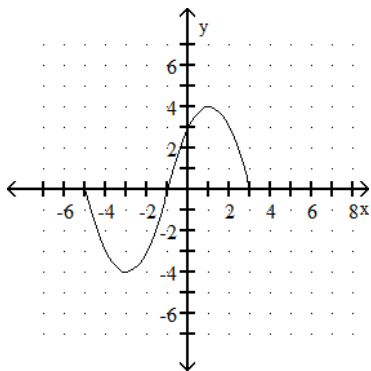
A)



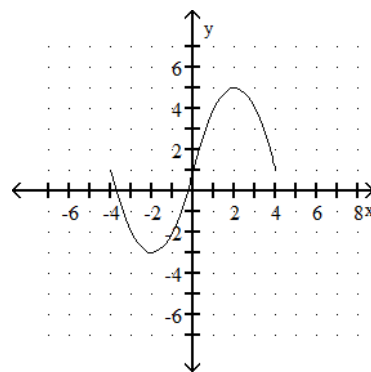
B)



C)



D)



E) None of the above

9) Which is equal to $\frac{8+i}{-2-7i}$?

- A) $-\frac{23}{53} - \frac{54}{53}i$ B) $-\frac{23}{53} + \frac{54}{53}i$
 C) $-\frac{23}{53}$ D) $\frac{54}{53}i$

10) Given the point $(-1, 4)$, find a point symmetric with respect to the origin.

- A) $(1, -4)$ B) $(1, 4)$
 C) $(4, -1)$ D) $(-1, -4)$

11) Solve the system below.

$$x + 2y = -15$$

$$x = y - 6$$

- A) $(11, 2)$
 B) $(-9, -3)$
 C) No solution
 D) Infinitely many solutions

12) Solve the system.

$$x + 7y = 13$$

$$9x + 63y = 117$$

- A) $(0, 0)$
 B) $(9, 9)$
 C) No solution
 D) Infinitely many solutions

13) The population growth of an animal species is described by $F(t) = 400 \log(2t + 3)$ where t is the number of months since the species was introduced. Find the population of this species in an area 6 months after the species is introduced.

- A) 240 B) 74
 C) 704 D) 470

14) Bob wants to fence in a rectangular garden in his yard. He has 90 feet of fencing to work with and wants to use it all. If the garden is to be x feet wide, express the area of the garden as a function of x .

- A) $A(x) = 46x - x^2$
- B) $A(x) = 44x - x^2$
- C) $A(x) = 45x - x^2$
- D) $A(x) = 47x^2 - x$
- E) None

15) Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

$$h(x) = \frac{8}{x^2} + 2$$

- A) $f(x) = x + 2, g(x) = \frac{8}{x^2}$
- B) $f(x) = \frac{8}{x^2}, g(x) = 2$
- C) $f(x) = \frac{1}{x}, g(x) = \frac{8}{x} + 2$
- D) $f(x) = x, g(x) = \frac{8}{x} + 2$
- E) None of the above

16) Find the vertex of $f(x) = 4x^2 + 8ax$

- A) $(-1, 4-8a)$
- B) $(2, 32)$
- C) $(-2a, 16a^2-16a)$
- D) $(-a, 4a^2-8a)$

17) Determine if i , $-i$, and 3 are zeros of

$$f(x) = x^3 - 3x^2 + x - 3$$

- A) No; no; no
- B) Yes; yes; yes
- C) No; no; yes
- D) Yes; yes; no

18) Jon has 1141 points in his math class. He must have 88% of the 1400 points possible by the end of the term to receive credit for the class. What is the minimum number of additional points he must earn by the end of the term to receive credit for the class?

- A) 259 points
- B) 1004 points
- C) 1232 points
- D) 91 points

19) Rewrite: $\sqrt{-32}$

- A) $4\sqrt{2}i$
- B) $-4\sqrt{2}i$
- C) $2\sqrt{4}i$
- D) $8i$

20) Simplify: $(-6 + 2i)^2$

- A) $32 + 24i$
- B) $40 + 24i$
- C) $40 - 24i$
- D) $32 - 24i$

21) Find the line going through $(8, 4)$ and perpendicular to $y = -1$

- A) $x = 8$
- B) $x = -1$
- C) $y = -1$
- D) $y = 4$

22) The number of bacteria growing in an incubation culture increases with time according to $B = 9900(5)^x$, where x is time in days. Find the number of bacteria when $x = 0$ and $x = 2$.

- A) 9900, 30,937,500
- B) 49,500, 247,500
- C) 9900, 247,500
- D) 9900, 99,000

23) If an object is dropped from a tower of unknown height, the velocity of the object after t seconds can be obtained by multiplying t by 32 and adding 10 to the result. Therefore, you can express V as a linear function of t . Find the domain of this function.

- A) $[0, \infty)$
- B) $(-\infty, \infty)$
- C) $[1, 4]$
- D) $(-1, \infty)$

24) Let $a = 1$, $b = 2$, and $f(x) = 9x^3 - 9x - 1$.

Which of the following is true?

- A) $f(1)$ and $f(2)$ have opposite signs, therefore f does not have a real zero between 1 and 2.
- B) $f(1)$ and $f(2)$ have opposite signs, so f has a real zero between 1 and 2.
- C) $f(1)$ and $f(2)$ have the same sign, so f does not have a real zero between 1 and 2.
- D) $f(1)$ and $f(2)$ have the same sign, therefore the intermediate value theorem cannot be used to determine whether f has a real zero between 1 and 2.

25) Rewrite as a sum of logs: $\log_2(4 \cdot 8)$

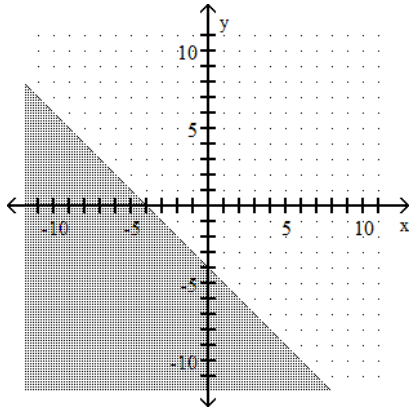
- A) $\log_2 4 + \log_2 8$
- B) $\log_4 2 + \log_8 2$
- C) $\log_2 2 + \log_2 3$
- D) $\log_2 4 + \log_2 8 + \log_2 2$
- E) None of the above

26) Simplify: $(5 + \sqrt{-16})(4 + \sqrt{-49})$

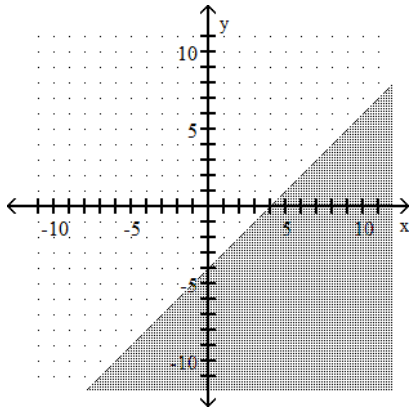
- A) $99i$
- B) $804 + 309i$
- C) $-8 + 51i$
- D) 99

27) Graph $x + y < -4$

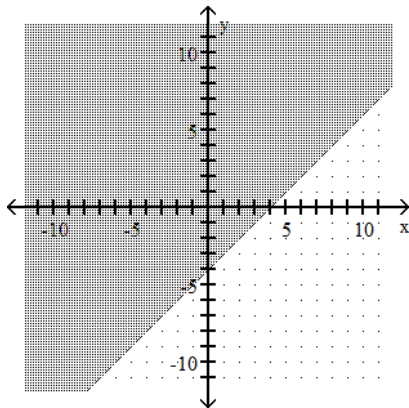
A)



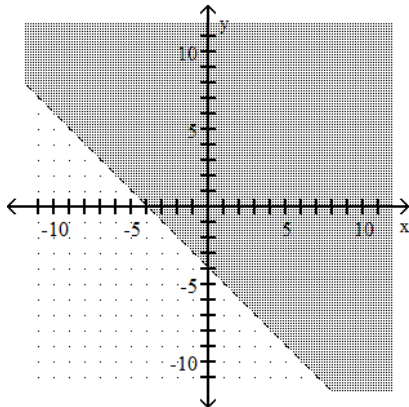
B)



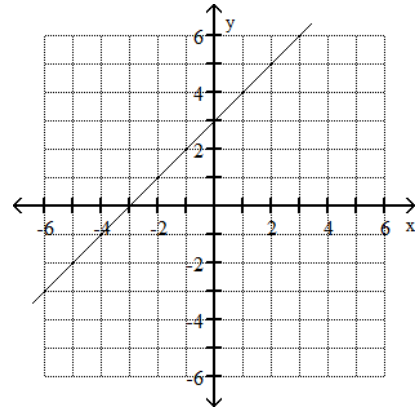
C)



D)



28) Write an equation for the line.



A) $y = x - 3$

B) $y = x + 3$

C) $y = -x - 3$

D) $y = -x + 3$

29) Simplify: i^{14}

A) i

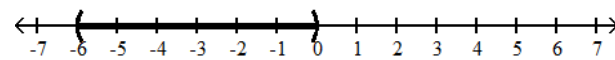
B) 1

C) -1

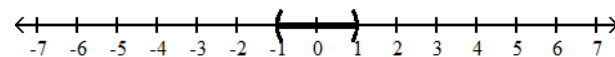
D) $-i$

30) Solve $\left| \frac{x+3}{3} \right| < 1$

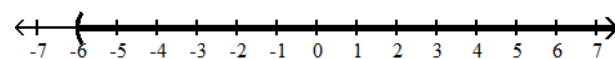
A)



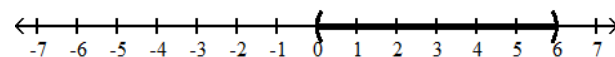
B)



C)



D)



31) How can the graph of $f(x) = -5|x|$ be obtained from the graph of $y = |x|$?

A) Stretch it vertically by multiplying each y-coordinate by -5 . Reflect it across the y axis.

B) Stretch it vertically by multiplying each y-coordinate by 5 . Reflect it across the x axis.

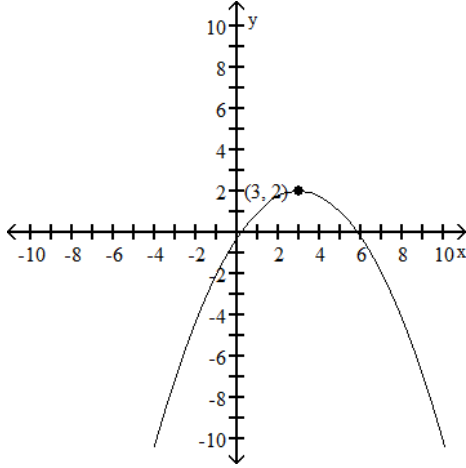
C) Stretch it vertically by multiplying each y-coordinate by 5 . Reflect it across the y axis.

D) Stretch it vertically by multiplying each y-coordinate by -5 . Reflect it across the x axis.

- 32) Solve for x : $|x + a| - 3 = 11$
 A) $14+a$ B) $14-a$
 C) $-14-a, 14+a$ D) $14-a, -14-a$

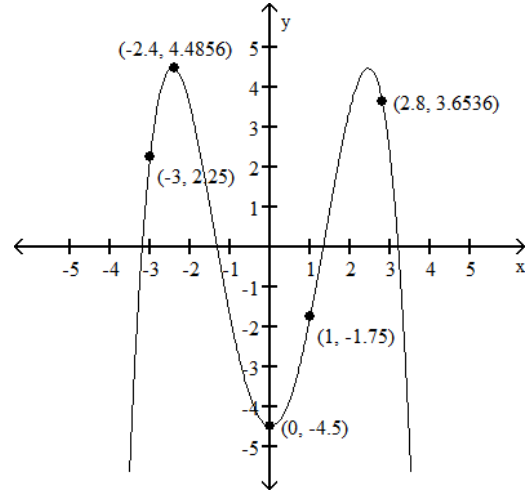
- 37) Solve for x . $3^{(1+2x)} = 243$
 A) 6 B) 2 C) 81 D) -2

- 33) Find the vertex, axis of symmetry, and max/min value of the function.



- A) $(3, 2)$; $x = 3$; maximum: 2
 B) $(2, -3)$; $x = 2$; maximum: 3
 C) $(-3, -2)$; $x = 3$; maximum: 2
 D) $(2, 3)$; $x = 2$; maximum: 3

- 38) A graph of a function g is shown below. Find $g(1)$.



- A) -4.5 B) 2.25
 C) 1 D) -1.75

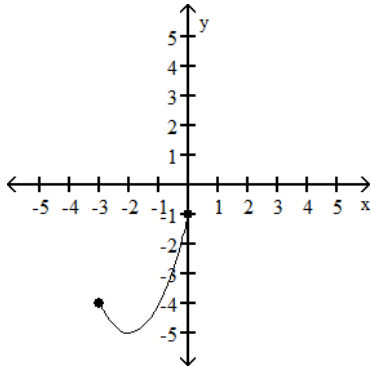
- 34) A man earned \$3000 the first year he worked. If he received a raise of \$600 at the end of each year, what was his salary during the 15th year?
 A) \$12,000 B) \$3000
 C) \$8400 D) \$11,400

- 39) Write as a quotient and remainder $(2x^4 - x^3 - 15x^2 + 3x) \div (x + 3)$
 A) $Q(x) = (2x^3 - 5x^2 + 3)$; $R(x) = 9$
 B) $Q(x) = (2x^3 + 5x^2 + 3)$; $R(x) = 9$
 C) $Q(x) = (2x^3 - 7x^2 + 6x - 15)$; $R(x) = -45$
 D) $Q(x) = (2x^3 - 7x^2 + 6x - 15)$; $R(x) = 45$
 E) None

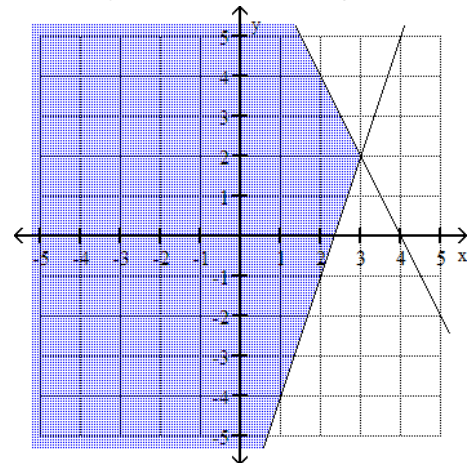
- 35) If $1 + i$ is a zero of $f(x) = x^3 + 6x^2 - 14x + 16$, find the other zeros.
 A) $1 - i, -8$ B) $1 - i, 8i$
 C) $1 - i, 8$ D) $-8, 8$

- 40) Which system describes the graph?

- 36) Find the domain and range of the graph.



- A) Domain: $[-3, 0]$; Range: $[-5, -1]$
 B) Domain: $[-5, -1]$; Range: $[-3, 0]$
 C) Domain: $[0, 3]$; Range: $(-\infty, -1]$
 D) Domain: $(-\infty, -1]$; Range: $[0, 3]$
 E) None of the above



- A) $y \geq -2x + 8$
 $y \leq 3x - 7$
 B) $y \leq -2x + 8$
 $y \geq 3x - 7$
 C) $y \leq -2x + 8$
 $y \geq 3x + 11$
 D) $y \leq -2x - 4$
 $y \geq 3x - 7$