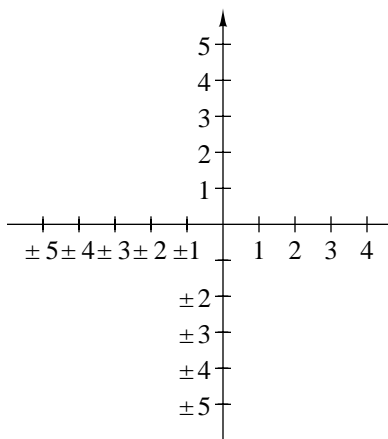


**TEST A**

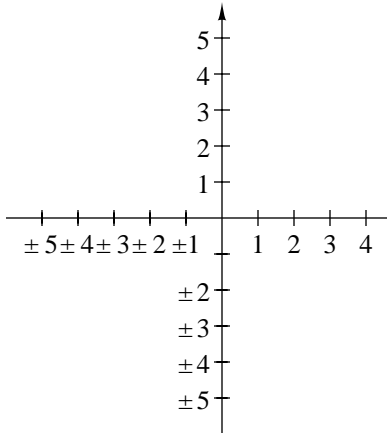
**CHAPTER 7, FUNCTIONS AND GRAPHS**

- \_\_\_\_\_ 1. Find the domain and range of the relation  $R = \{(4, -1), (2, -2), (1, 1)\}$ .
- \_\_\_\_\_ 2. Find the domain and range of the relation  $R = \{(x, y) \mid y = 3x\}$ .
- \_\_\_\_\_ 3. Find the domain and range of the relation  $R = \{(x, y) \mid y < 2x, x \text{ and } y \text{ positive integers less than } 6\}$ .
- \_\_\_\_\_ 4. Which of the following relations is (are) functions?  
a.  $\{(x, y) \mid y^2 = 2x + 1\}$   
b.  $\{(x, y) \mid y = 2x^2 + 1\}$   
c.  $\{(2, 3), (3, 3), (4, 3)\}$
- \_\_\_\_\_ 5. A function is defined by  $f(x) = 2x - x^2$ . Find:  
a.  $f(0)$   
b.  $f(1)$   
c.  $f(-2)$
- \_\_\_\_\_ 6. The daily cost for renting a car (\$20 per day plus \$0.15 per mile) is given by  $C(m) = 20 + 0.15m$ , where  $m$  is the number of miles driven. If a person paid \$53.75 for one day's rental, how many miles did the person drive?

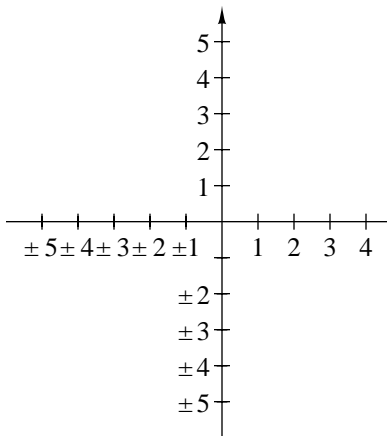


7. Graph the relation  $R = \{(x, y) \mid y = 2x, x \text{ an integer between } -2 \text{ and } 2, \text{ inclusive}\}$ .

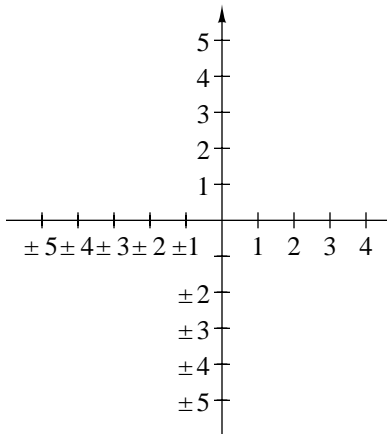
8. Graph the relation  $Q = \{(x,y) \mid x + y \leq 2, x \text{ and } y \text{ nonnegative integers}\}$ .



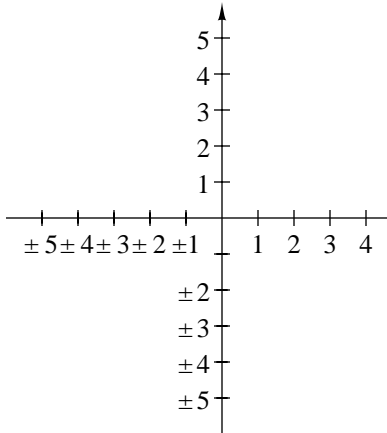
9. Graph the function defined by  $g(x) = x^2 - 2$ ,  $x$  an integer and  $-2 \leq x \leq 2$ .



10. Graph the function defined by  $f(x) = 2 - 2x$



11. Graph the equation  $2x - 3y = -6$ .



12. Find the distance between the two points:

\_\_\_\_\_

\_\_\_\_\_

- a.  $(1, 0), (3, -4)$   
b.  $(7, -2), (7, -12)$

\_\_\_\_\_ 13. Find the slope of the line that goes through the two points  $(-2, 1)$  and  $(-4, -5)$ .

\_\_\_\_\_ 14. Find the general equation of the line in Problem 13.

\_\_\_\_\_ 15. a. Find the slope-intercept form of the equation of the line that goes through the point  $(-2, 4)$  and has slope  $-3$ .

\_\_\_\_\_ b. Find the slope-intercept form of the line  $3x + 4y = 8$ . What is the slope and what is the y-intercept?

16. Determine whether or not the two given lines are parallel. If they are not parallel, find the coordinates of the point of intersection.

\_\_\_\_\_

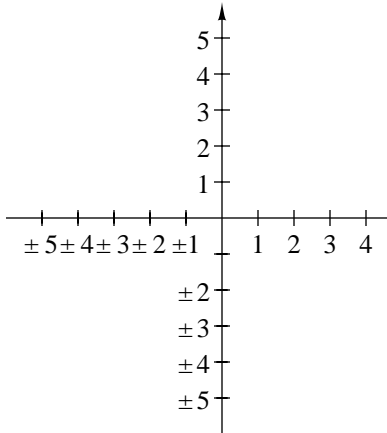
\_\_\_\_\_

- a.  $2x - y = 7, 3y = 6x - 15$   
b.  $y = 4 - 2x, 6x + 2y = 9$

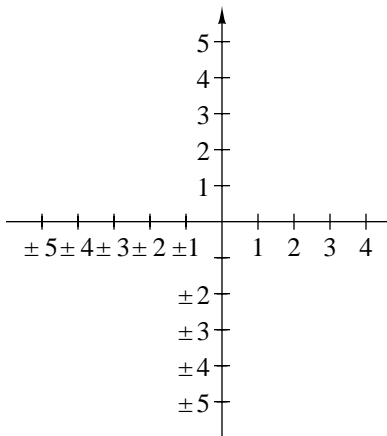
\_\_\_\_\_ 17. Find the general equation of the line that passes through the point  $(3, 4)$  and is parallel to the line  $2x + y = -4$ .

\_\_\_\_\_ 18. Find the point of intersection of the lines  $x + y = 6$  and  $2x - y = 0$ .

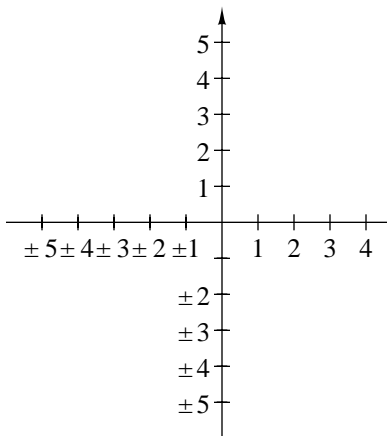
19. Graph the solution set of the inequality  $2y - 3x \leq 6$ .



20. Graph the solution set of the system of inequalities:  $3x + y \geq 6$  and  $x + y \geq 2$



21. Graph the solution set of the system of inequalities:  $x + y \leq 3$ ,  $x \geq y$ ,  $y \geq 0$



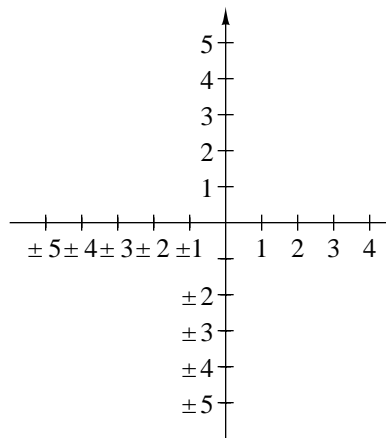
22. Solve the following system if possible. If not possible, explain why

$$\begin{aligned} y &= 3x - 3 \\ 9x - 3y &= 6 \end{aligned}$$

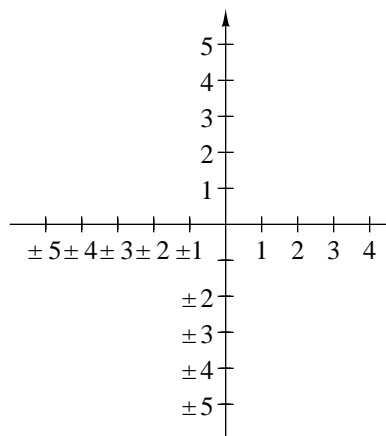
\_\_\_\_\_ 23. Find the maximum value of  $C = 3x + 2y$   
subject to the constraints:  
 $x + 2y \geq 6$ ,  $0 \leq x \leq 2$ , and  $0 \leq y \leq 4$

\_\_\_\_\_ 24. Find the minimum value of  $P = x - 2y$   
subject to the constraints:  
 $x - y \leq 2$ ,  $x + y \leq 4$ ,  $x \geq 0$ ,  $0 \leq y \leq 2$

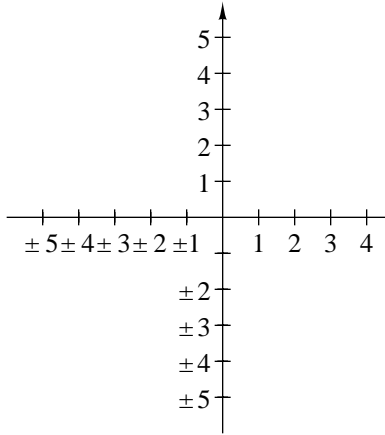
\_\_\_\_\_ 25. Two machines produce the same item. Machine A can produce 10 items per hour and machine B can produce 12 items per hour. At least 420 of the items must be produced each 40-hour week, but the machines cannot be operated at the same time. If it costs \$30 per hour to operate A and \$40 per hour to operate B, determine how many hours per week to operate each machine to meet the production requirement at minimum machine cost.



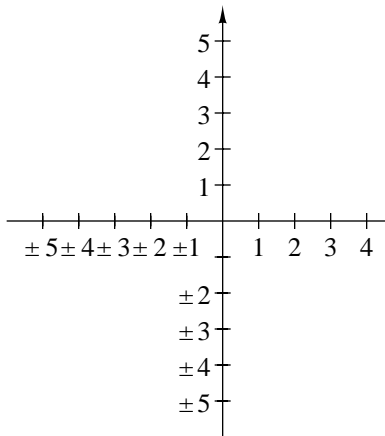
26. Graph  $y = -(x + 1)^2 - 2$



27. Graph  $y = x^2 + 2x + 2$  and give the coordinates of the vertex



28. Graph  $f(x) = 4^x$  and  $g(x) = \left(\frac{1}{4}\right)^x$  on the same coordinate axes

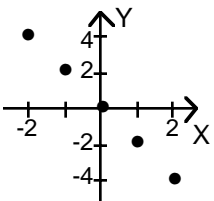
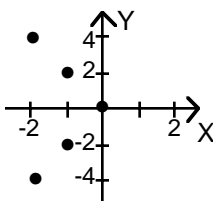
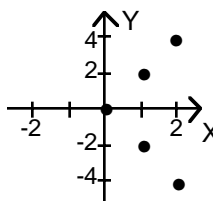
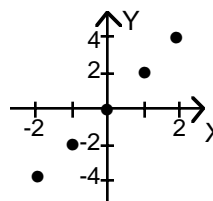


29. Graph  $f(x) = e^x$  and  $g(x) = \ln x$  on the same coordinate axes

\_\_\_\_\_ 30. P dollars accumulate to the amount  $A = Pe^{rt}$  when invested at a rate r for t years. If the interest rate is 10%, how long would it take for the money to double?

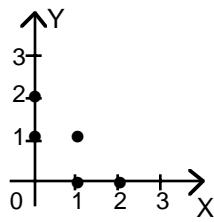
**TEST B**

**CHAPTER 7, FUNCTIONS AND GRAPHS**

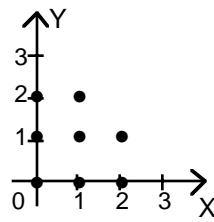
1. The domain of the relation  $R = \{(1, 1), (2, -2), (4, -1)\}$  is
  - a.  $\{-2, -1, 1\}$
  - b.  $\{1, 2, 4\}$
  - c.  $\{-2, -1, 1, 2, 4\}$
  - d.  $\{-2, -1, 1, 1, 2, 4\}$
  - e. None of these
  
2. The range of the relation  $R = \{(x, y) \mid y = 3x\}$  is
  - a. The positive real numbers
  - b. The positive integers
  - c. The integers
  - d. The real numbers
  - e. None of these
  
3. The range of the relation  $\{(x, y) \mid y \leq 2x, \text{ } x \text{ and } y \text{ positive integers less than } 6\}$  is
  - a.  $\{1, 2, 3, 4, 5\}$
  - b.  $\{1, 2, 3, 4\}$
  - c.  $\{1, 2, 3\}$
  - d.  $\{1, 2\}$
  - e.  $\{1\}$
  
4. Which of the following relations are functions?
  - a.  $\{(x, y) \mid y^2 = 2x + 1\}$
  - b.  $\{(x, y) \mid y = 2x^2 + 1\}$
  - c.  $\{(2, 3), (3, 3), (4, 3)\}$
  - a. a only
  - b. b only
  - c. b and c only
  - d. a and b only
  - e. None of these
  
5. If a function is defined by  $f(x) = 2x - x^2$ , then  $f(2)$  equals
  - a. 6
  - b. 2
  - c. 8
  - d.  $4x - x^2$
  - e. 0
  
6. The daily cost of renting a car is  $C(m) = 20 + 0.15m$  dollars, where  $m$  is the number of miles driven. If a person paid \$53.75 for one day's rental, the number of miles the person drove is
  - a. 175
  - b. 472
  - c. 205
  - d. 225
  - e. 200
  
7. The graph of  $R = \{(x, y) \mid y = -2x, \text{ } x \text{ an integer between } -2 \text{ and } 2, \text{ inclusive}\}$  is
  - a. 
  - b. 
  - c. 
  - d. 
  - e. None of these

8. The graph of the relation  $Q = \{ (x,y) \mid x + y \leq 2, x \text{ and } y \text{ nonnegative integers} \}$  is

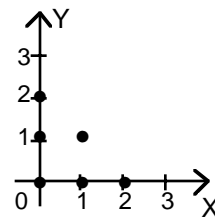
a.



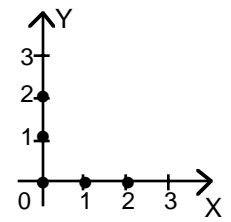
b.



c.



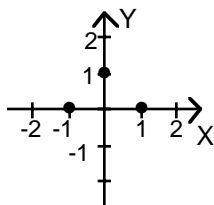
d.



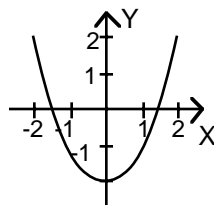
e. None of these

9. The graph of the function defined by  $g(x) = x^2 - 2$ ,  $x$  an integer and  $-2 \leq x \leq 2$  is

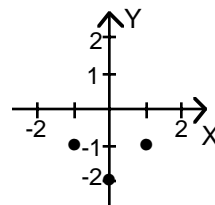
a.



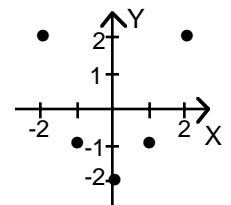
b.



c.



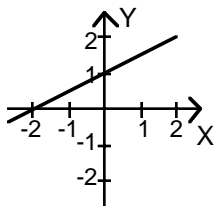
d.



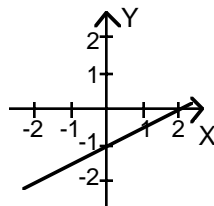
e. None of these

10. The graph of  $f(x) = 2 - 2x$  is

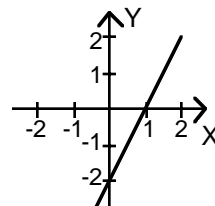
a.



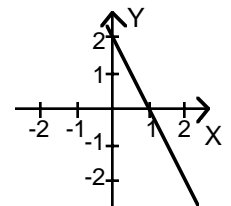
b.



c.



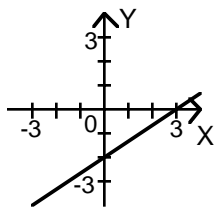
d.



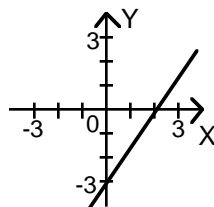
e. None of these

11. The graph of the equation  $2x - 3y = -6$  is

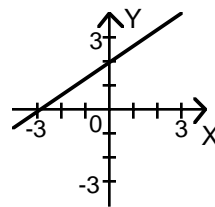
a.



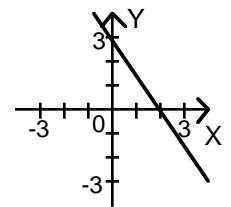
b.



c.

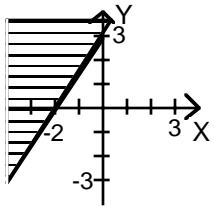
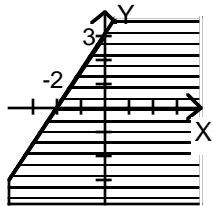
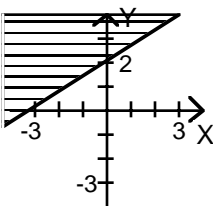
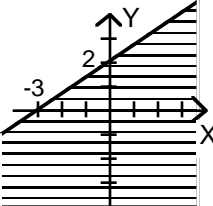


d.



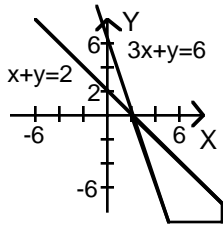
e. None of these



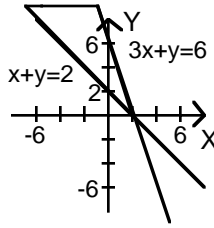
12. The distance between (1, 0) and (3, -4) is  
 a.  $3\sqrt{2}$                       b. 8                      c.  $\sqrt{-6}$   
 d.  $2\sqrt{5}$                       e. None of these
13. The slope of the line through (-2, 1) and (-4, -5) is  
 a.  $1/3$                       b.  $-1/3$                       c. 3  
 d. -3                      e. None of these
14. The general equation of the line through (1, 2) and (-5, 4) is  
 a.  $-x - 3y = 7$                       b.  $x + 3y = 7$                       c.  $x + 3y = -7$   
 d.  $x - 3y = 7$                       e. None of these
15. The slope and the y-intercept of the line  $3x - 4y = -12$  are, respectively,  
 a.  $4/3, -3$                       b.  $3/4, -3$                       c.  $3/4, 3$   
 d.  $4/3, 3$                       e. None of these
16. Which of the following lines are parallel?  
 1.  $y = 4 - 4x$                       2.  $6x - 2y = 9$                       3.  $8x + 2y = 9$   
 a. 1 and 2 only                      b. 1 and 3 only                      c. 2 and 3 only  
 d. All three are parallel.                      e. None of these
17. The general equation of the line passing through the point (3, 4) and parallel to the line  $2x - y = -4$  is:  
 a.  $y - 4 = 2(x - 3)$                       b.  $y = 2x$                       c.  $2x - y = 2$   
 d.  $y - 4 = -2(x - 3)$                       e.  $-2x + y = -8$
18. Find the point of intersection (if there is one) of the lines  $2x - y = 7$  and  $3y = 6x - 15$   
 a. (2, 3)                      b. (-2, 3)                      c. (-2, -3)  
 d. (2, -3)                      e. There is none.
19. The graph of the solution set of  $2y - 3x \leq 6$  is  
 a.                       b.                       c.                       d.   
 e. None of these

20. The graph of the solution set of the system of inequalities  $3x + y \geq 6$  and  $x + y \geq 2$  is:

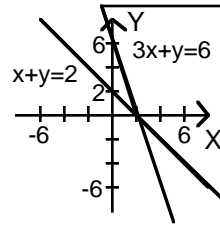
a.



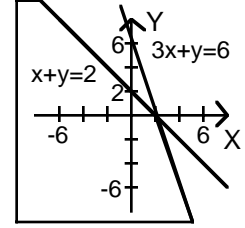
b.



c.



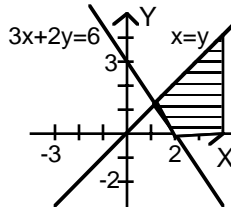
d.



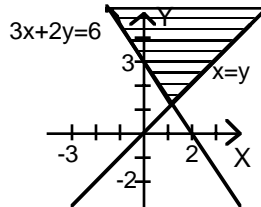
e. None of these

21. The graph of the solution set of the system of inequalities  $3x + 2y \geq 6$ ,  $x \geq y$ , and  $y \geq 0$  is

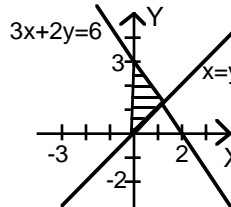
a.



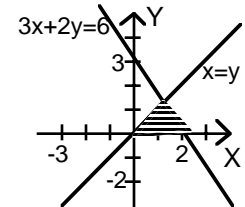
b.



c.



d.



e. None of these

22. Which system of equations has no solution:

a.  $x + 2y = 9$   
 $x + 2y = 7$

b.  $x + 2y = 9$   
 $4x + 8y = 36$

c.  $x + 2y = 9$   
 $x - 2y = 7$

d.  $x - 2y = 9$   
 $x + 2y = 9$

e. All of the systems have solutions

23. The maximum value of  $C = 3x + 2y$  subject to the constraints  $x + 2y \geq 6$ ,  $0 \leq x \leq 2$ , and  $0 \leq y \leq 4$  is

a. 12

b. 14

c. 10

d. 4

e. None of these

24. The minimum value of  $P = x - 2y$  subject to the constraints  $x - y \leq 2$ ,  $x + y \leq 4$ ,  $x \geq 0$ , and  $0 \leq y \leq 2$  is

a. 0

b. 2

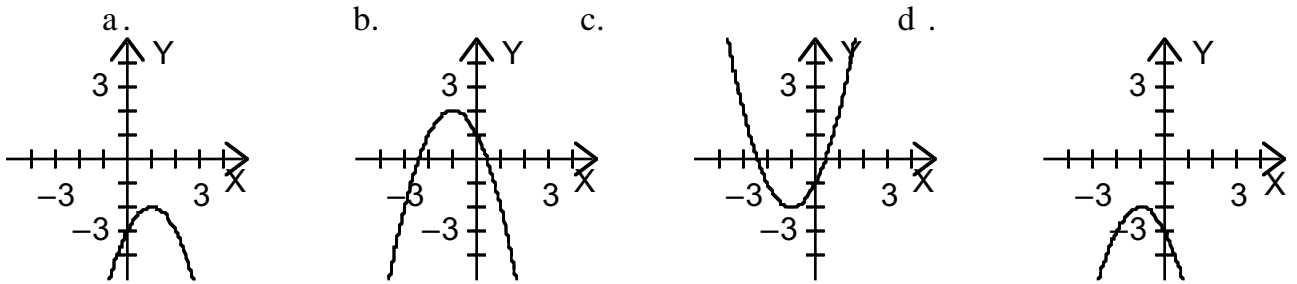
c. -2

d. -4

e. None of these

25. Two machines produce the same items. Machine A can produce 10 items per hour and machine B can produce 12 items per hour. At least 420 of the items must be produced each 40-hour week, but the machines cannot be operated at the same time. If it costs \$30 per hour to operate A and \$40 per hour to operate B, find the number of hours per week machines A and B, respectively, should be operated to minimize the cost.
- a. 10 and 30      b. 30 and 10      c. 40 and 0  
d. 0 and 35      e. None of these

26. The graph of  $y = -(x + 1)^2 - 2$  is:

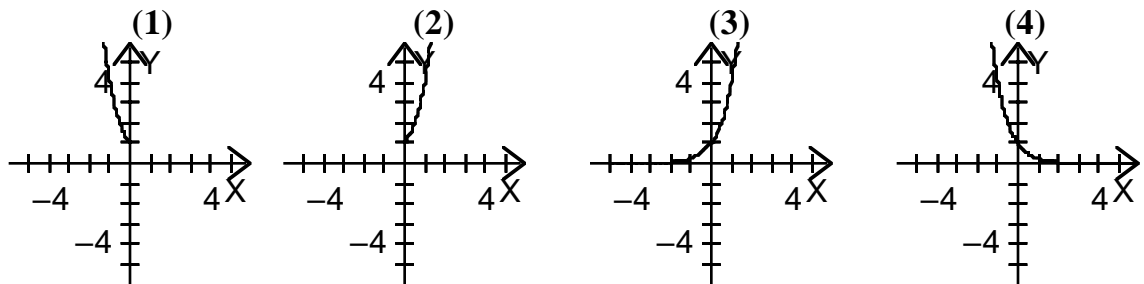


e. None of these

27. The coordinates of the vertex of  $y = x^2 + 2x + 2$  are:

- a. (-1, 1)      b. (-1, -1)      c. (1, -1)  
d. (-2, -2)      e. None of these

28. The graphs of  $f(x) = 4^x$  and  $g(x) = \left(\frac{1}{4}\right)^x$  are, respectively,



- a. (1) and (4)      b. (3) and (4)      c. (1) and (4)  
d. (1) and (3)      e. None of these

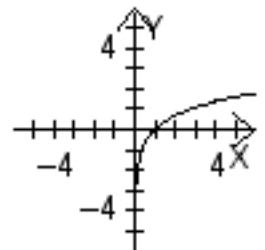
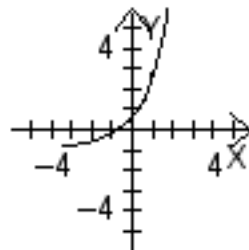
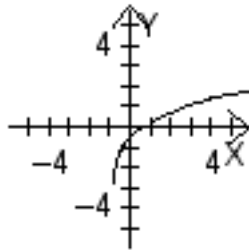
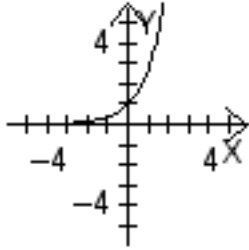
29. The graphs of  $f(x) = e^x$  and  $g(x) = \ln x$  are, respectively,

(1)

(2)

(3)

(4)



- a. (1) and (4)    b. (2) and (4)    c. (2) and (3)  
 d. (1) and (3)    e. None of these

30. How long would it take for  $P$  dollars to **double** if they are invested at 10%? Hint:  $A = Pe^{rt}$ , where  $P$  is the principal,  $r$  the rate,  $t$  the time in years.

- a.  $\frac{\ln 2}{0.10}$                       b.  $\frac{\ln 2}{10}$                       c.  $\frac{2}{0.10}$   
 d.  $\frac{\ln 2}{\ln 0.10}$                       e. None of these