Sec. 2.1

1. If $f(x) = 3x^2 - 1$, then $\frac{f(x+h)-f(x)}{h}$ is equal to

   (a) $6x$

   (b) $6x + 3h^2$

   (c) $6x + 3h$

   (d) 6

   (e) h

2. The x-intercept of $f(x) = \left[-3x + \frac{3}{2}\right]$, where $[x]$ denotes the greatest integer functions are:

   (a) $\{0, \frac{1}{2}\}$

   (b) $[0, 1]$

   (c) $[-\frac{1}{3}, 0]$

   (d) $[0, \frac{1}{3}]$

   (e) $(\frac{1}{6}, \frac{1}{2}]$

3. If $(1, 5)$ is the midpoint of a line segment with one end point $(2, 8)$, the other end point is:

   (a) $(-1, 3)$

   (b) $(4, 18)$

   (c) $(-5, 21)$

   (d) $(0, 2)$

   (e) $(5, 21)$

4. Which of the following statement is TRUE

   (a) The y-intercept of the line $3x - 4y = 20$ is -5.

   (b) The line $6y = -5x$ does not pass through the origin.

   (c) The midpoint of $(2a + 1, 2b - 1)$ and $(1, -1)$ is (a, b).

   (d) The slope of a horizontal line is undefined.

   (e) The points $(-2, 6)$, $(8, 0)$ and $(18, -6)$ lie on the same line.

5. If the distance between the center of the circle $x^2 + y^2 - 2y = 5$ and the vertex of the parabola $x = -5y^2 + m$ is $\sqrt{10}$, then m is equal to

   (a) ± 3

   (b) ± 10

   (c) ± 8

   (d) ± 7

   (e) ± 5

6. If the graph of $y = 2x^2 + 3x - 1$ is translated by 1 unit to the left and 3 units upwards, then the equation of the new graph is:

(a) $y = 2x^2 - x - 5$.

(b) $y = 2x^2 + 7x + 7$

(c) $y = 2x^2 + 6x - 5$

(d) $y = 2x^2 + 5x - 4$

(e) $y = 2x^2 + 3x + 5$

7. One of the x-intercept of the graph of the function $f(x) = 3x^2 + kx - 4$ is 4. The second x-intercept is equal to

(a) -4

(b) 1

(c) -11

(d) $-\frac{1}{3}$

(e) $\frac{1}{3}$

8. The domain D and the range R of the function $y = \mid x + 1 \mid -1$ are given by

(a) $D = [0, \infty),\ R = [1, \infty)$

(b) $D = [-2, \infty),\ R = [1, \infty)$

(c) $D = [-2, \infty),\ R = [-1, \infty)$

(d) $D = (-\infty, \infty),\ R = [-1, \infty)$

(e) $D = (-\infty, -2) \cup (-2, \infty),\ R = (-\infty, -1]$

9. The domain D and the range R of the function $f(x) = \frac{\sqrt{4-9x^2}}{2}$ is given by

(a) $D = [-\frac{2}{3}, \frac{2}{3}],\ R = [0, \infty)$

(b) $D = [\frac{2}{3}, \infty),\ R = [0, 1)$

(c) $D = (-\infty, -\frac{2}{3}],\ R = [0, \infty)$

(d) $D = [-\frac{2}{3}, \frac{2}{3}],\ R = [0, 1]$

(e) $D = [-\frac{2}{3}, \frac{2}{3}],\ R = (-\infty, 0]$

10. Consider the function $f(x) = 2 - \mid x \mid$. Find the following

(a) x-intercept(s) (if any)

(b) y-intercept(s) (if any)

(c) Sketch the graph of the function $f(x)$.

(d) Find the domain and the range of $f(x)$.

11. If a point (a, b) lies in the Quadrant II, then the point $(4, ab)$ lies in the

(a) Quadrant I

(b) Quadrant IV

(c) Quadrant III

(d) Quadrant II

12. Let $A = \{(4, 7), (3, 7), (2, 5), (8, -8)\}$ and $B = \{(5, 1), (-3, 4), (-3, 2)\}$, be two sets of ordered pairs of the form (x, y). We can define y as a function of x from

(a) the set B only

(b) the set a only

(c) both sets A and B

(d) neither the set A nor the set B.

13. Find the equation of the circle that has a diameter with end points $(3, -1)$ and $(5, 7)$. Write your answer in the standard form.

14. Let $f(x) = \begin{cases} 3 & \text{if } x \leq -2 \\ x^2 & \text{if } -2 < x \leq 3 \\ -x + 2 & \text{if } 3 < x \leq 7 \end{cases}$

(a) Sketch the graph of $f(x)$.

(b) find the x-intercept(s)

(c) find the y-intercept(s)

(d) The interval where $f(x)$ is increasing.

(e) The interval where $f(x)$ is decreasing.

15. Let $g(x) = \lfloor x \rceil$, where $\lfloor \rceil$ is the greatest integer function. Find the value of

$$\frac{g(x-a) + g(a-x)}{g(x/a)}$$

where $x = 1.5$ and $a = 0.6$.

16. If the center of the circle $x^2 + 4x + y^2 - 6y = -9$ is $(2a + 1, 2b - 1)$, then the value of ab is equal to

(a) $\frac{-3}{4}$

(b) -3

(c) $\frac{-4}{3}$

(d) $\frac{1}{-3}$

(e) $\frac{-2}{3}$

17. The graph of the function $y = f(x)$ is shown in the adjacent figure. The domain D and the range R of the function $y = -f(x + 1) + 2$ are

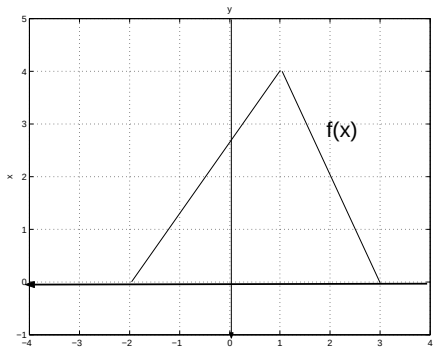

Figure 1: Exc. 17

(a) $D = [0, \infty)$ and $R = (-\infty, \infty)$

(b) $D = [-2, 3]$ and $R = [0, 4]$

(c) $D = [0, 5]$ and $R = [-4, 4]$

(d) $D = [-2, 2]$ and $R = [-3, 2]$

(e) $D = [-3, 2]$ and $R = [-2, 2]$