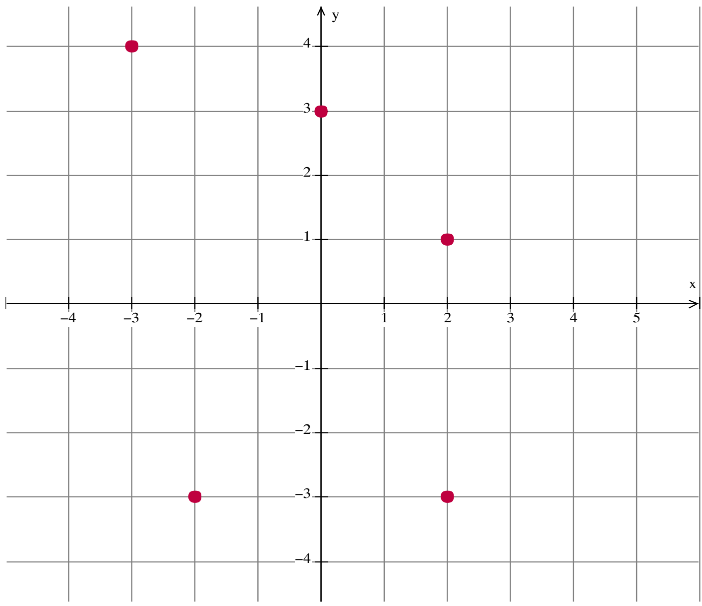
Review for Assessment 1

Section 2.1

1. Graph the following points: (2, 1), (-3, 4), (-2, -3), (0, 3), and (2, -3)



2. Graph the equation y = 2x – 3. Find the x and y intercepts both graphically and algebraically.

y-intercept ➔ x = 0

$y = 2(0) - 3$

$y = -3$

y-intercept: (0, -3)

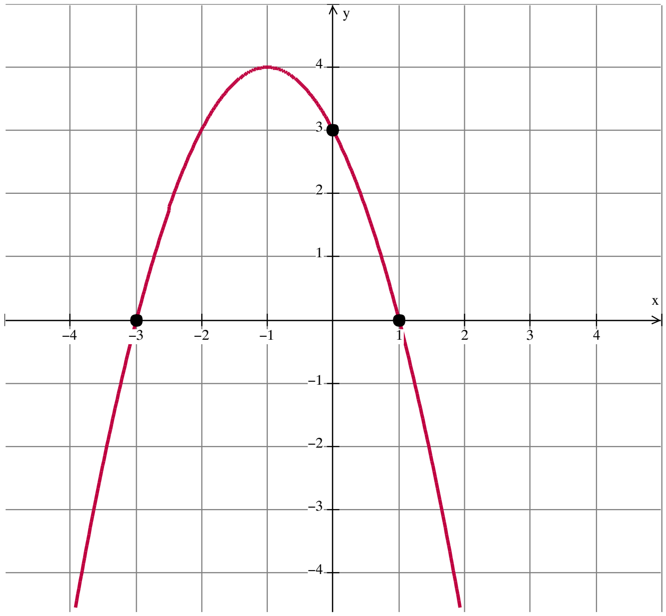
x-intercept ➔ y = 0

$0 = 2x - 3$

$x = \frac{3}{2}$

x-intercept: $(\frac{3}{2}, 0)$

3. Graph the equation $y = 3 - 2x - x^2$. Find the x and y intercepts graphically.



4. Find the distance and the midpoint between (-3, 4) and (2, -5).

Distance:

y-distance: 4 – (-5) = 9

x-distance: 2 – (-3) = 5

Distance between points:

$d^2 = 9^2 + 5^2$

$d = \sqrt{106}$

Midpoint:

y coordinate: -.5

x coordinate: -.5

Midpoint: (-.5, -.5)

Section 2.2

5. Solve the following equations:
   a. $3x + 2 = -2x + 4$

   $5x = 2$

   $x = \frac{2}{5}$

   Check: $3(\frac{2}{5}) + 2 = -2(\frac{2}{5}) + 4$

   $\frac{6}{5} + 2 = \frac{-4}{5} + 4$

   $\frac{16}{5} = \frac{16}{5}$

   b. $\frac{2x+1}{x-2} = 4$

   $2x + 1 = 4(x - 2)$

   $2x + 1 = 4x - 8$

   $9 = 2x$

   $x = \frac{9}{2}$

   Check: $\frac{2\left(\frac{9}{2}\right)+1}{\left(\frac{9}{2}\right)-2} = 4$

   $\frac{9+1}{\frac{5}{2}} = 4$

   $\frac{10(2)}{5} = 4$

   c. $2 + \frac{3x-1}{1-x} = \frac{2}{1-x}$

   $2(1 - x) + (3x - 1) = 2$

   $2 - 2x + 3x - 1 = 2$

   $x + 1 = 2$

   $x = 1$

   Check: $2 + \frac{3(1)-1}{1-1} = \frac{2}{1-1}$

   Dividing by 0! This is not a solution.

Section 3.1

6. Is y a function of x in the relation R. Why or why not?
   $R = \{(2, 3), (3, 3), (-2, 4), (2, 7)\}$

   No. the x value 2 is associated with the y value 3 and the y value 7.

7. Is this a graph of a function? Why or why not?

No. A vertical line at any x between -2 and -1 will cross the graph in two places.

8. Are the following equations functions? Why or why not?
   a. $y = 3x - 3$

      Yes. Each x value will give only one y value.

   b. $-3x + 7y = 14$

      $7y = 3x + 14$ Yes. Each x value will give only one y value.

      $y = \frac{3}{7}x + 2$

   c. $3x = y^2$

      $y = \pm\sqrt{3x}$ No. each x value gives 2 y values.

9. Let $g(x) = 3x^2 + 2$. Find the following values:
   a. $g(2)$

      $g(2) = 3(2)^2 + 2$

      $= 12 + 2$

      $= 14$

b. g(0)

$g(0) = 3(0)^2 + 2$

$= 0 + 2$

$= 2$

c. g(-3)

$g(-3) = 3(-3)^2 + 2$

$= 27 + 2$

$= 29$

10. Let h(x) = 5x + 3. Solve the following equations:

a. h(x) = 0

$0 = 5x + 3$

$x = \frac{-3}{5}$

Check: $h(\frac{-3}{5}) = 5(\frac{-3}{5}) + 3 = 0$

b. h(x) = -5

$-5 = 5x + 3$

$-8 = 5x$

$x = \frac{-8}{5}$

Check: $h(\frac{-8}{5}) = 5(\frac{-8}{5}) + 3 = -5$

c. h(x) = 7

$7 = 5x + 3$

$4 = 5x$

$x = \frac{4}{5}$

Check: $h(\frac{4}{5}) = 5(\frac{4}{5}) + 3 = 7$

Section 3.2

11. Find the domain and range of the function F.
    F = {(0, 1), (-2, 3), (-23, -42), (3, 7), (25, 3.4)}

    Domain: {0, -2, -23, 3, 25}

    Range: { 1, 3, -42, 7, 3.4}

12. Find the domain and range of the graphed function.

    Domain: (-∞, 4]
    or $x \leq 4$

    Range: (-∞, 3]
    or $y \leq 3$

13. Find the domain for the following functions.

    a. f(x) = $\frac{3}{4}x + 2$

    All real numbers

    b. g(x) = $\frac{x^2 + 4}{x+3}$

    We can't divide by 0, so what x will give us 0 in the denominator?

    x + 3 = 0 Domain: $x \neq -3$

    x = -3

c. h(x) = $\sqrt{3x - 4}$

We can't take the square root of a negative number, so what x's will give us non negative numbers under the radical?

3x – 4 ≥ 0

3x ≥ 4 Domain: x ≥ $\frac{4}{3}$

x ≥ $\frac{4}{3}$

d. f(x) = $\frac{x+4}{2x-7} + \sqrt{3x + 1}$

2x – 7 = 0 3x + 1 ≥ 0

2x = 7 3x ≥ -1 Domain: x ≠ $\frac{7}{2}$ and x ≥ $\frac{-1}{3}$

x = $\frac{7}{2}$ x ≥ $\frac{-1}{3}$

14. Let $f(x) = \begin{cases} 3x & x < -1 \\ 2x + 1 & -1 \le x < 4 \\ x - 2 & 4 \le x \end{cases}$ Find the following values:

a. f(5)

Bottom rule

f(5) = 5 – 2 = 3

b. f(0)

Middle rule

f(0) = 2(0) + 1 = 1

c. f(-3)

Top rule

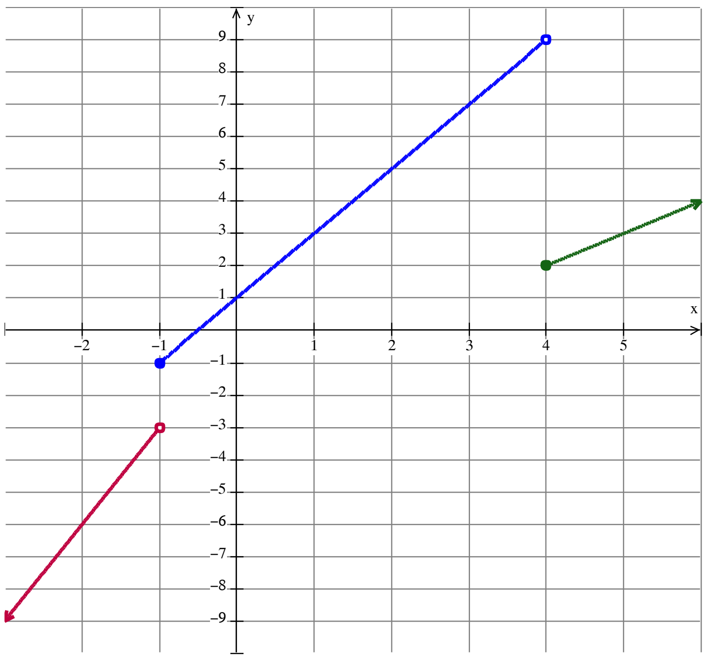
f(-3) = 3(-3) = -9

d. f(4)

bottom rule

f(4) = 4 – 2 = 2

e. Sketch a graph of f(x)



15. The height above the water of a ball dropped from a bridge is given by the function $h(t) = -9.8t^2 + 60$, where h(t) is in meters and t is in seconds.

a. Find and interpret h(2).

$h(2) = -9.8(2)^2 + 60$

$= 20.8$

The ball is 20.8 meters above the water at 2 seconds.

b. Solve and interpret h(x) = 0.

$0 = -9.8t^2 + 60$

$9.8t^2 = 60$

$t = \pm\sqrt{\frac{60}{9.8}} = 2.47$ or -2.47

The ball is 60 meters above the water after falling for 2.47 seconds.

c. How high is the ball after 1 second?

$h(1) = -9.8(1)^2 + 60 = 50.2$

The ball is 50.2 meters above the water after falling for 1 second.

d. When is the ball 30 meters above the water?

$30 = -9.8t^2 + 60$

$9.8t^2 = 30$

$t = \pm\sqrt{\frac{30}{9.8}} = 1.75 \text{ or } -1.75$

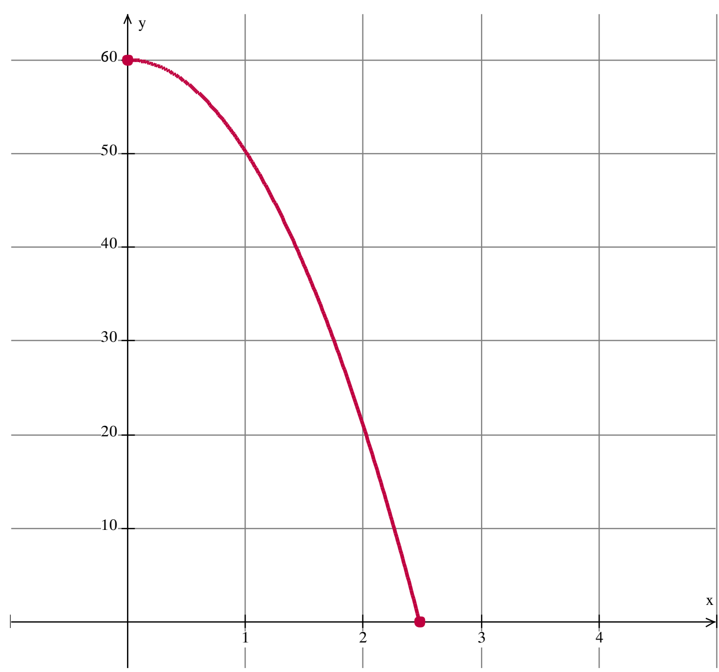
The ball will be 30 meters above the water after falling for 1.75 seconds.

e. What is a reasonable domain for h(t)?

The t value must be greater than or equal to 0 and stop when h(t) = 0 (part b)

Domain: [0, 2.47]

f. Sketch a graph of h(t).



16. The cost of a data plan is modeled by the following function

$$C(d) = \begin{cases} 30 & 0 \leq d \leq 1 \\ 15(d-1)+30 & d > 1 \end{cases}$$

Where C(d) is the cost per month in dollars and d is the amount of data in gigabytes.

a. Find and interpret C(2).

Bottom rule

C(2) = 15(2 – 1) + 30 = 45

It costs $45 to use 2 GB per month.

b. Solve and interpret C(d) = 200.

As 200 ≠ 30, we must use the bottom rule.

200 = 15(d – 1) + 30

170 = 15d – 15

185 = 15d

d = $\frac{37}{3}$

Using 12.3 GB in a month will cost $200.

c. How much would it cost to use 5 GB in a month?

Bottom rule

C(5) = 15(5 – 1) + 30 = 90

It would cost $90 to use 5 GB in a month.

d. How much data can you use for $60?

As 60 ≠ 30, we use the bottom rule.

60 = 15(d – 1) + 30

30 = 15d – 15

45 = 15d

d = 3

For $60, you can use 3GB of data.

e. Sketch a graph of C(d).