Review for test 2
Sections 1.3-2.4

Section 1.3

1. The bus fare in a city is $1.25. People who use the bus have the option of purchasing a monthly coupon book for $15. With the coupon book, the fare is reduced to $0.75. Determine the number of times in a month the bus must be used so that the total monthly cost without the coupon book is the same as the total monthly cost with the coupon book. **30 times**

2. Including 8% sales tax, an inn charges $162 per night. Find the inn’s nightly cost before the tax is added. **$150**

3. The selling price of a refrigerator is $584. If the markup is 25% of the dealer’s cost, what is the dealer’s cost of the refrigerator? **$467.20**

4. The length of a rectangular pool is 6 meters less than twice the width. If the pool’s perimeter is 126, what are its dimensions? **23X40**

Section 1.4

Perform the indicated operation and give you answer in standard form

1. \((-2 + 6i) + (4 - i) = 2 + 5i\)

2. \((-7 + 5i) - (-9 - 11i) = 2 + 16i\)

3. \((-4 - 8i)(3 + i) = -4 - 28i\)

4. \((-5 + i)(-5 - i) = 26\)

5. \((5 - 2i)^2 = 21 - 20i\)

6. \(\frac{5i}{2 - i} = -1 + 2i\)

7. \(\frac{2 + 3i}{2 + i} = \frac{7}{5} + \frac{4}{5}i\)
8. \( 5\sqrt{-8} + 3\sqrt{-18} = 19\sqrt{2} \)

9. \( (−2 + \sqrt{-11})^2 = −7 − 4\sqrt{11} \)

Section 1.5

Solve each of the following
1. \( 2x^2 − x = 1 \) \( x = -1/2, 1 \)
2. \( 3x^2 = 60 \) \( x = ±2\sqrt{5} \)
3. \( (3x−4)^2 − 16 = 0 \) \( x = 8/3, 0 \)
4. \( x^2 = 4x − 7 \) \( x = 2 ± i\sqrt{3} \)
5. \( 2x^2 − 7x = 0 \) \( x = 7/2, 0 \)

Section 1.6

Solve each of the following
1. \( \sqrt{x+10} = x−2 \) \( x = 6 \)
2. \( \sqrt{x+5} − \sqrt{x−3} = 2 \) \( x = 4 \)
3. \( \sqrt{2x−3} − \sqrt{x−2} = 1 \) \( x = \) No Solution
4. \( (x−4)^{3/2} = 27 \) \( x = 13 \)
5. \( 8x^{3/2} − 24 = 0 \) \( x = 3^{1/3} = \sqrt[3]{27} \)
6. \( x^4 − 5x^2 + 4 = 0 \) \( x = ±1, ±2 \)
7. \( x−13\sqrt{x} + 40 = 0 \) \( x = 25,64 \)
8. \( x^{2/3} − x^{1/3} − 6 = 0 \) \( x = −8,27 \)
9. \( |2x−1| = 5 \) \( x = −2,3 \)
10. \( 2 \left| \frac{x−5}{2} \right| + 6 = 18 \) \( x = \frac{−4}{5},4 \)

Section 1.7

Solve each of the following and give your answer as an interval and graph the solution.
1. \( 8x−11 < −3(x+2) \) \( (−∞, \frac{5}{11}) \)
2. \( \frac{x−3}{4} ≤ \frac{x}{2} + 1 \) \( [−10, ∞) \)
3. \( \frac{x−4}{6} ≥ \frac{x−2}{9} + \frac{5}{18} \) \( [13, ∞) \)
4. $|3x - 8| > 7 \quad \left( -\infty, \frac{1}{3} \right) \cup (5, \infty)$

5. $\left| 3 - \frac{2}{3}x \right| \leq 5 \quad [-3, 12]$

6. $-2|x - 4| \geq -4 \quad [2, 6]$

Section 2.1

State whether each of the following are functions or not

1. $\{(1, 2), (3, 4), (5, 5)\} \quad \text{yes}$

2. $\{(3, -2), (5, -2), (7, 1), (4, 9)\} \quad \text{yes}$

3. $x + y = 7 \quad \text{yes}$

4. $x^2 - y = 3 \quad \text{yes}$

5. $y = \sqrt{x + 4} \quad \text{yes}$

6. $x^2 - y^2 = 4 \quad \text{no}$

7. $y^2 = 4x \quad \text{no}$

8. $f(x) = 3x + 7$ find each of the following
   a. $f(4) = 19$
   b. $f(x + 1) = 3x + 10$
   c. $f(-x) = -3x + 7$

9. $f(x) = x^2 - 10x - 3$ find each of the following
   a. $f(-1) = 8$
   b. $f(x + 2) = x^2 - 6x - 19$
   c. $f(-x) = x^2 + 10x - 3$

10. Use the vertical line test to determine if each of the following are functions or not
    Yes No No

11. For each of the following graphs find each of the following.
    a. Domain
    b. Range
    c. X-intercepts
    d. Y-intercepts
    e. Function values below the graphs

   a) (-6, 0] \quad a) (-\infty, \infty) \quad a) \{-5, -2, 0, 1, 4\}
   b) [-3, 4) \quad b) (-\infty, 4] \quad b) \{-2\}
   c) -4 \quad c) -3, 1 \quad c) none
   d) 0 \quad d) 3 \quad d) -2
   e) 2 \quad e) 3, -5 \quad e) -4

Section 2.2
Find \( \frac{f(x+h) - f(x)}{h} \) for each of the following

1. \( f(x) = 6x + 1 \) \( = 6 \)
2. \( f(x) = 2x^2 - x + 3 \) \( = 4x + 2h - 1 \)
3. \( f(x) = \begin{cases} 6x - 1 & \text{if } x < 0 \\ 7x + 3 & \text{if } x \geq 0 \end{cases} \) find each of the following
   a. \( f(-3) = -19 \)
   b. \( f(0) = 3 \)
   c. \( f(4) = 31 \)
4. \( f(x) = \begin{cases} \frac{x^2 - 9}{x - 3} & \text{if } x \neq 3 \\ 6 & \text{if } x = 3 \end{cases} \) find each of the following
   a. \( f(-3) = 0 \)
   b. \( f(0) = 3 \)
   c. \( f(3) = 6 \)
5. For each of the graphs below determine
   a. Intervals on which the function is increasing, if any
   b. Intervals on which the function is decreasing, if any
   c. Intervals on which the function is constant, if any

   a) (−2, 4) a) (−∞, 0) and (3/2, 3) a) (−∞, −1)
   b) none b) (0, 3/2) and (3, ∞) b) none
   c) (−∞, −2) and (4, ∞) c) none c) (−1, ∞)

6. Determine whether each of the following are even, odd, or neither
   a. \( f(x) = 4x^3 - 2x \) odd
   b. \( f(x) = 7x^4 + 17x^2 + 3 \) even
   c. \( f(x) = x^2 - 3x + 2 \) neither

**Section 2.3**

Find the equation of the line with the following properties

1. slope = -3 and passing through (-2, -3) \( y = -3x - 9 \)
2. slope = 6 and passing through (-2, 5) \( y = 6x + 17 \)
3. Passing through (3, 5) and (8, 15) \( y = 2x - 1 \)
4. Passing through (-3, -1) and (4, -1) \( y = -1 \)
5. x-intercept = 4 and y-intercept = -2 \( y = \frac{1}{2} x - 2 \)
6. \( 3x + y - 5 = 0 \)
a. Rewrite the given equation in slope-intercept form  \( y = -3x + 5 \)

b. Give the slope and y-intercept  \( m = -3, \ b = 5 \)

c. Use the slope and y-intercept to graph the linear function  graph goes through 5 on y-axis and the point (1, 2)

7.  \( 2x + 3y + 6 = 0 \) Use intercepts to graph the equation  graph goes through -2 on y-axis and -3 on x-axis

**Section 2.4**

Find the equation of the line with the following properties

1. Passing through (-2, -7) and parallel to the line whose equation is  \( y = -5x + 4 \)
   \( y = -5x - 17 \)

2. Passing through (-4, 2) and perpendicular to the line whose equation is  \( y = \frac{1}{3}x + 7 \)
   \( y = -3x - 10 \)

3. Passing through (-1, 3) and parallel to the line whose equation is  \( 3x - 2y - 5 = 0 \)
   \( y = \frac{3}{2}x + \frac{9}{2} \)

4. Passing through (5, -9) and perpendicular to the line whose equation is  \( x + 7y - 12 = 0 \)
   \( y = 7x - 44 \)