

Algebra-8: Review for Final Exam

Formulas

Slope-Intercept Form of a Linear Equation: $y = mx + b$

Standard Form of a Linear Equation: $Ax + By = C$

Point-Slope Form of a Linear Equation: $y - y_1 = m(x - x_1)$

Standard Form of a Quadratic: $y = ax^2 + bx + c$

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Graphing (Vertex) Form of a Quadratic: $y = a(x - h)^2 + k$

Part1:

Evaluate: (*section 1.2*)

1. $f(x) = -x - 3$ for $x = -3$ 2. $f(x) = x^2 + 3$ for $x = -2$ 3. $f(x) = -x^2 + 5x - 8$ for $x = 4$

Solve each equation: (*sections 2.2, 2.3*)

4. $-x + 8 = -12$

5. $\frac{x}{-5} = -12$

6. $9x - (-7x) = -32$

7. $3(x - 10) = -36$

8. $\frac{x}{8} = \frac{4}{5}$

9. $\frac{x+2}{5} = \frac{2x-11}{7}$

10. $3(4 + 4x) = 12x + 12$

11. $9(x - 4) - 7x = 5(3x - 2)$

Solve for the indicated variable: (*section 2.5*)

12. $20x - 10y = 5$ (solve for y)

13. $12x + 7y = 7$ (solve for y)

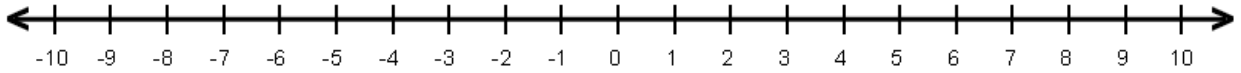
14. $y = 2x - 5$ (solve for x)

15. $3x - y = -2y$ (solve for y)

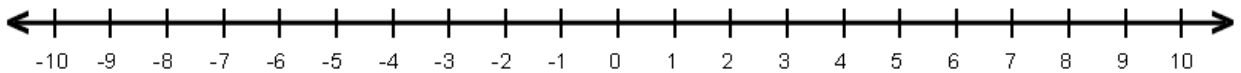
Part 2:

Solve each inequality. Represent your solutions on a number line: (sections 3.2,3.3,3.4)

1. $-x + 2 \leq 8$

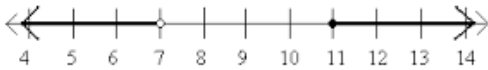


2. $2(5x + 3) > 4x + 1 - 7$

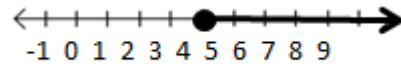


Write an inequality to describe the solutions shown on the number line: (sections 3.1, 3.6)

3.

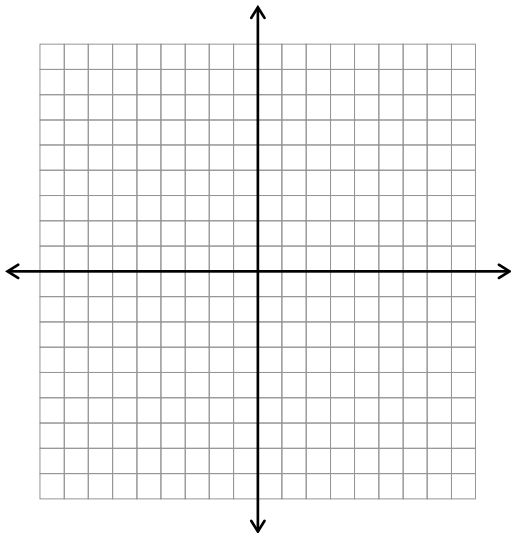


4.

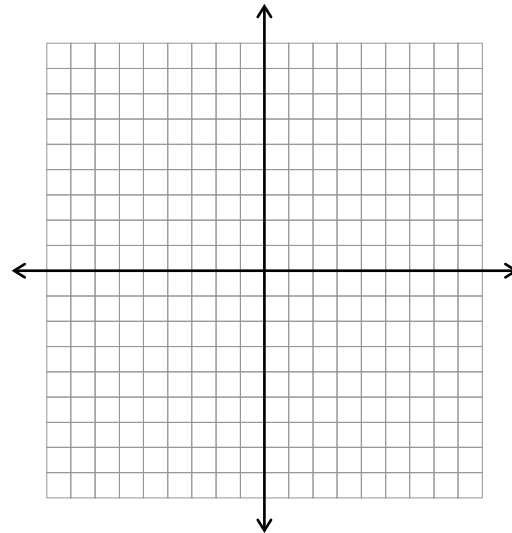


Graph the solution to the inequality: (section 6.5)

5. $-y \leq \frac{1}{3}x + 2$

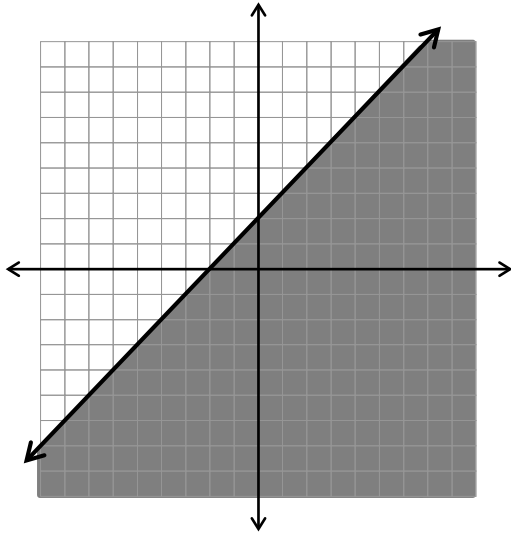


6. $x > 3$

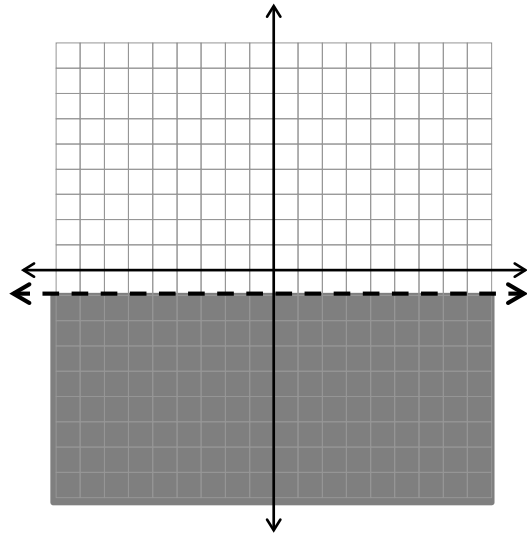


Write an inequality to describe the solution shown in the graph. (section 6.5)

7.

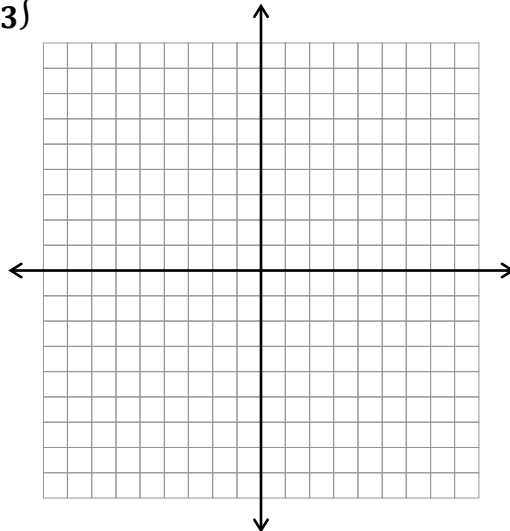


8.



Graph the solution to the system below: (section 6.6)

9.
$$\begin{cases} 2x - 6y \geq -18 \\ y > x^2 + 2x - 3 \end{cases}$$



Part 3:

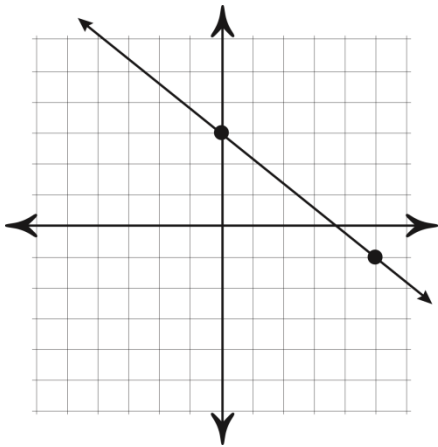
Find the slope of the line going through the two points: (*section 5.1*)

1. $(-6, 2)$ and $(4, 7)$ 2. $(-8, 5)$ and $(-3, 5)$ 3. $(1, 0)$ and $(1, -4)$

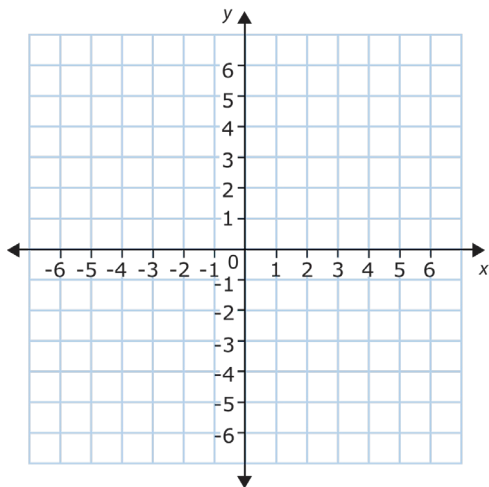
Write an equation of the line (in slope-intercept form) with the following criteria: (*section 5.3*)

4. slope of $\frac{2}{3}$ and y-intercept of -3
5. slope of -4 and y-intercept of 10.
6. slope of 5 and passing through $(-2, 5)$.
7. slope of $\frac{-1}{3}$ and passing through $(6, 6)$.
8. going through points $(5, 4)$ and $(7, 8)$.
9. going through points $(3, 7)$ and $(3, -1)$.
10. horizontal line through point $(6, 2)$.
11. vertical line through point $(-3, -5)$.

12. Write an equation for the line in the graph below: (section 5.3)



13. Sketch the line $y = -\frac{2}{3}x - 1$



14. Examine the graph below. Explain what real-world quantities the slope and y -intercepts represent. Then find the slope and y -intercept. (section 5.3)

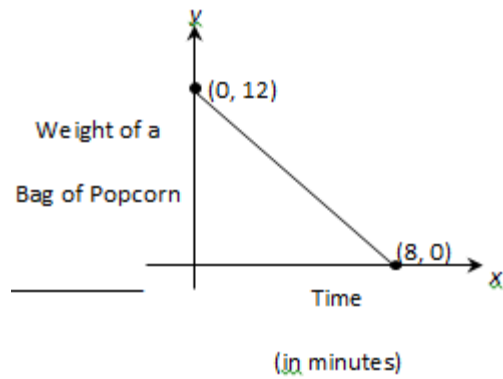
a) What is the slope? _____

b) Complete the sentence below:

As time goes on, the weight of a bag of popcorn:

c) What is the y -intercept? _____

d) What does the y -intercept represent? Explain.



Find the x -intercept and the y -intercept of the line: (section 5.5)

15. $-6x + 12y = 18$

16. $x - 3y = -9$

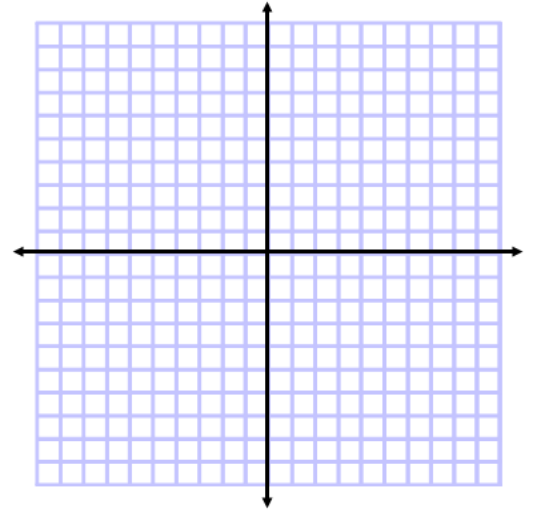
Part 5: (all problems are sections 6.1-6.4)

1. List the three different methods to solve a system of equations.

2. Solve the system of equations shown at right. $\begin{cases} y = 3x + 2 \\ 6x - 2y = 8 \end{cases}$

a. Describe what happened when you tried to solve the system.

b. Graph the system of equations. How does the graph of the system explain what happened with the equations?

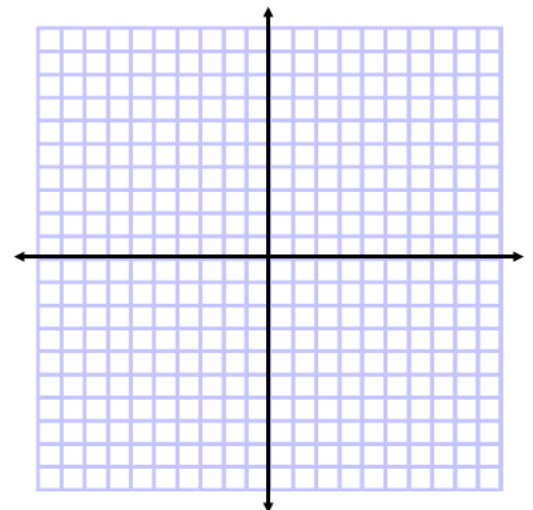


3. Solve the system of equations shown at right.

$$\begin{cases} 18x - 3y = 9 \\ y = 6x - 3 \end{cases}$$

a. Describe what happened when you tried to solve the system.

b. Graph the system of equations. How does the graph of the system explain what happened with the equations?



4. Solve the following systems using the method of your choice. Check your solutions.

a) $\begin{cases} y = 3x + 7 \\ y = -4x + 21 \end{cases}$

b) $\begin{cases} 3x - y = 17 \\ -x + y = -7 \end{cases}$

c) $\begin{cases} x = 3y - 5 \\ 2x + 12y = -4 \end{cases}$

d) $\begin{cases} y = 2x - 3 \\ -y = 2x - 1 \end{cases}$

e) $\begin{cases} y = -7 + 5x \\ 4x + 8y = -12 \end{cases}$

f) $\begin{cases} 21x + 28y = 14 \\ 9x + 12y = 6 \end{cases}$

g) $\begin{cases} 2x - 3y = 12 \\ -x - 3y = -6 \end{cases}$

f) $\begin{cases} 2x - 3y = 1 \\ -2x + 3y = 1 \end{cases}$

5. Bob climbed down a ladder from his roof, while Roy climbed up another ladder next to him.

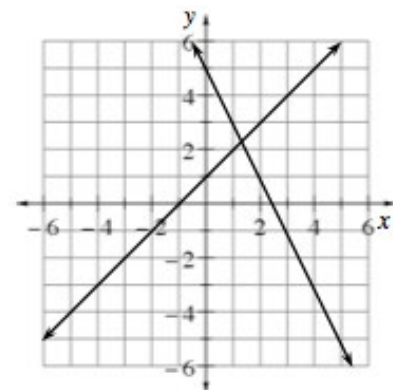
Each ladder had 30 rungs. Their friend Jill recorded the following information about Bob and Roy:

Bob went down 2 rungs every second.

Roy went up 1 rung every second.

At some point, Bob and Roy were at the same height. Which rung were they on?

6. Leo solved a system of equations by graphing, shown at right.
- Estimate the solution from the graph.



- What is the equation of each line in the system?
- Solve the system algebraically. How accurate was your estimate?

7. Earl solved a system of equations using substitution. Did he do it correctly? How do you know? If he did not, find his error.

System:

$$\begin{aligned}x + y &= 3 \\ 2y - 3x &= 16\end{aligned}$$

Earl's solution:

$$\begin{aligned}2(3 - x) - 3x &= 16 \\ 6 - x - 3x &= 16 \\ 6 - 4x &= 16 \\ 6 - 6 - 4x &= 16 - 6 \\ -4x &= 10 \\ \frac{-4x}{-4} &= \frac{10}{-4} \\ x &= -2.5 \quad y = 5.5\end{aligned}$$

8. Adrian is in Algebra. He solved the system: $y = 5x - 2$ **and got the solution (2, 8),**
 $-3x + 6y = -12$

but he's not feeling very confident. Decide whether or not he is correct and convince him of your position.

9. As treasurer of his school's FFA club, Kenny wants to buy gifts for all 18 members. He can buy t-shirts for \$9 and sweatshirts for \$15. The club has only \$180 to spend. If Kenny wants to spend all of the club's money, how many of each type of gift can he buy?

- a. Write a system of equations representing this problem.

- b. Solve your system of equations and figure out how many of each type of gift Kenny should buy.

10. The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of \$38. The school took in \$52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

11. Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of \$203. The cost of the large box is \$6 more than the cost of a small box. Find the cost of a large box and the cost of a small box.

Part 6:

1. Multiply the expressions and simplify (section 8.3)

a. $(6x - 11)(2x + 5)$

b. $(3 - 5x)(2 + x)$

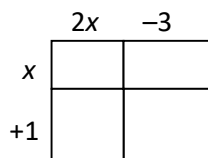
c. $(12x + 1)(x - 2)$

d. $(-2x)(5x - 3)$

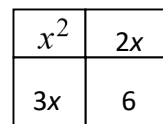
e. $4y(y^2 - 2y + 3)$

2. Write an algebraic equation for each figure to express the relationship. "Area as a product equals area as a sum."

a.



b.



3. Factor each expression completely. (Write the area as a product). (sections 8.5, 8.6)

a) $x^2 - x - 42$

b) $3x^2 + 19x + 20$

c) $x^2 - 14x + 33$

d) $9x^2 - 100$

e) $4x^2 - 4x + 1$

f) $-3x^2 - 15x - 18$

4. What is the greatest common factor of the expression $16x^2 - 4xy - 2y$? (section 8.8)

Part 7:

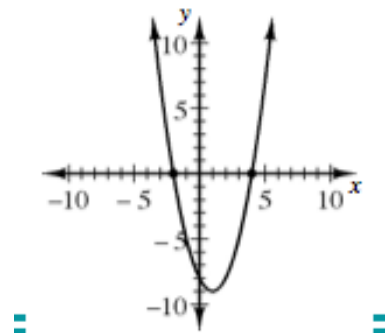
1. Complete the following table for the expression $y = x^2 - 3x + 7$

X	Y
-2	
-1	
0	
1	
2	

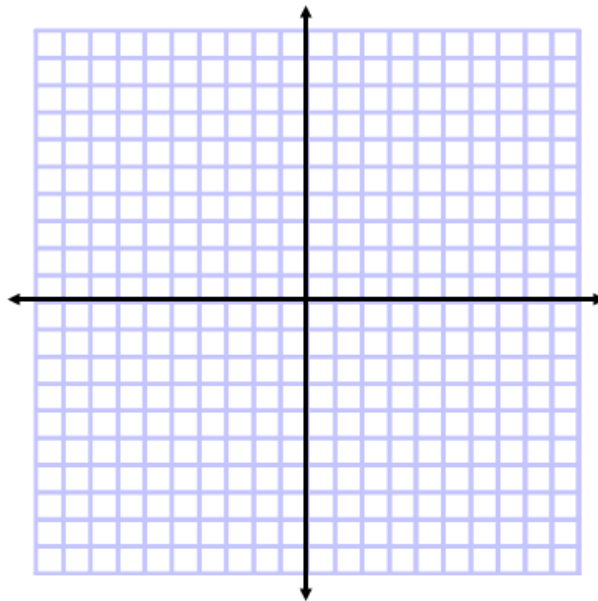
2. What is the value of y in the equation $y = 2x^2 - 3x$ when $x = -2$?

3. Describe the graph by answering the following questions. (*section 9.1*)

- What type of graph is this?
- Where is the vertex?
- Does the graph have a maximum or minimum?
- Does the graph have x-intercepts? If so, where?
- Does the graph have a y-intercept? If so, where?
- Draw the line of symmetry on the graph.
- What is the domain?
- What is the range?



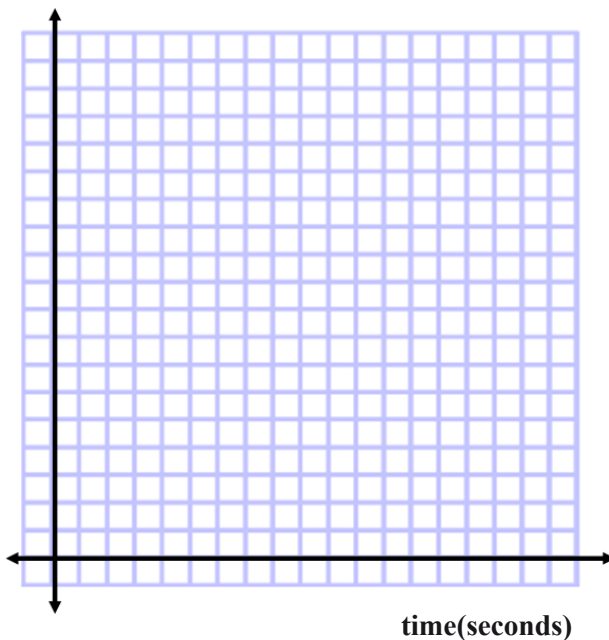
4. Graph the following quadratic equation: (section 9.2) $y = x^2 - 6x + 4$



5. Graph and answer the questions for the problem below: (section 9.2)

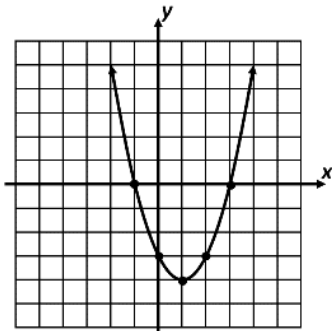
A punter kicked the football into the air with an upward velocity of 62 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 62t + 2$.

height(ft)



- What is the maximum height the ball reaches?
- How long will it take the football to reach the maximum height?
- How long does it take for the ball to hit the ground?

6. What are the x-intercepts of the graph below: (section 9.3)



7. What is the y-intercept of the parabola? $y = 5x^2 + 2x - 3$

8. Solve the following expression: (section 9.4)

$$(2x - 1)(5x + 2) = 0$$

9. What number will you add to both sides in order to complete the square? (section 9.5)

$$y = x^2 - 8x + 1$$

10. Write the function in graphing (vertex) form by completing the square. (section 9.5)

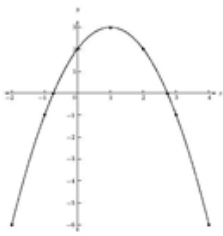
$$y = x^2 + 5x - 4$$

11. Use the quadratic formula to solve the equation: $-2x^2 + 3x + 10 = 0$ (section 9.6)

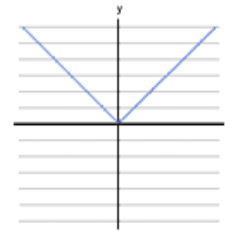
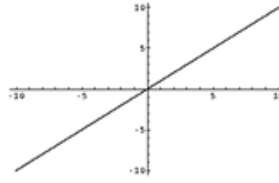
12.

Label each graph as linear, quadratic, absolute value or exponential.

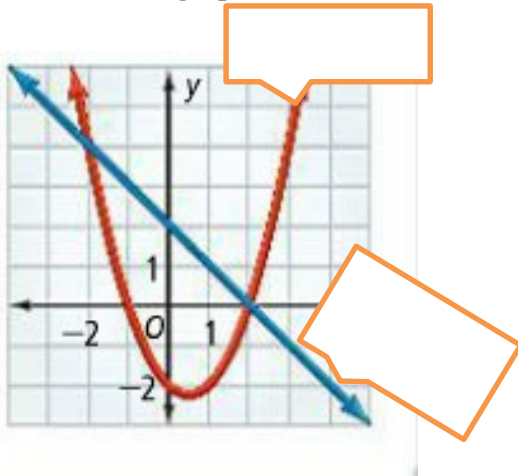
8.



9.



13. Refer to the graph below of the following system: $\begin{cases} y = x^2 - x - 2 \\ y = -x + 2 \end{cases}$



- Match each equation with its graph on the coordinate plane.
- Identify the points of intersection.

Part 8

1. Simplify the following expressions.

a. $(3x^3y)^2$

b. $-(4x)^2$

c. $(-2x)^3(-3y)^2$

d. $(x^4y^3)^{-2}$

e. $-(5x^5)^2(2x^3)$

f. $(-x)^3(-9x^4)^2$

g. $\frac{m^{-4}}{m^2}$

h. $\left(\frac{x^4}{y^5}\right)^3$

i. $\frac{4x^{-5}y^7z}{(6xy^2)^2}$

j. $\left(\frac{6x^{-1}}{2y^0}\right)^2$

k. $\left(\frac{2x^2y^4}{4xy}\right)^2$

l. $\frac{y^7}{y^{15}}$

2. Rewrite the following in decimal form.

a. 3.65×10^4
 2.008×10^{-6}

b. 4.92×10^0

c. 7.36×10^{-4}

d.

3. Rewrite in scientific notation.

a. 46.8
0.0005712

b. 572.976

c. 79, 340, 062

d.

4. Evaluate the following – write in scientific notation.

a. $(5 \times 10^{-2})(3 \times 10^6)$

b. $(3 \times 10^5)(7 \times 10^{-3})$

c. $\frac{1.4 \times 10^{-1}}{3.5 \times 10^{-4}}$

d. $(3 \times 10^{-2})^4$