Algebra 12: Final Review 2018-2019

FORMULA SHEET

Key

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-Intercept Form: $y = mx + b$

Point-Slope Form: $(y - y_1) = m(x - x_1)$

Standard Form: $Ax + By = C$

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

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

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

Part 1

Evaluate: *(Section 1.2)*

1. $f(x) = -x - 3$, for $x = -3$

$-(-3) - 3$

$3 - 3$

$= 0$

2. $y = x^2 + 3$, for $x = -2$

$= (-2)^2 + 3$

$= 4 + 3$

$= 7$

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

$-(4)^2 + 5(4) - 8$

$= -16 + 20 - 8$

$= -4$

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

4. $-x + 8 = -12$

$-8 \quad -8$

$-1x = -20$

$x = 20$

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

$x = 60$

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

$9x + 7x = -32$

$\frac{16x}{16} = \frac{-32}{16}$

$x = -2$

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

$3x - 30 = -36$

$+30 \quad +30$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$

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

$5x = \frac{32}{5}$

$x = \frac{32}{5}$

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

$5(2x - 11) = 7(x + 2)$

$10x - 55 = 7x + 14$

$-7x \quad -7x$

$3x - 55 = 14$

$+55 \quad +55$

$\frac{3x}{3} = \frac{69}{3}$

$x = 23$

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

$12 + 12x = 12x + 12$

$0 = 0$

infinite solutions

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

$9x - 36 - 7x = 15x - 10$

$2x - 36 = 15x - 10$

$-15x \quad -15x$

$-13x - 36 = -10$

$+36 \quad +36$

$\frac{-13x}{-13} = \frac{26}{-13}$

$x = -2$

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

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

$-20x \quad -20x$

$\frac{-10y}{-10} = \frac{5 - 20x}{-10}$

$y = \frac{-1}{2} - 2x$

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

$-12x \quad -12x$

$\frac{7y}{7} = \frac{7 - 12x}{7}$

$y = 1 - \frac{12}{7}x$

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

$+5 \quad +5$

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

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

or $\frac{1}{2}(y + 5) = x$

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

$+y \quad +y$

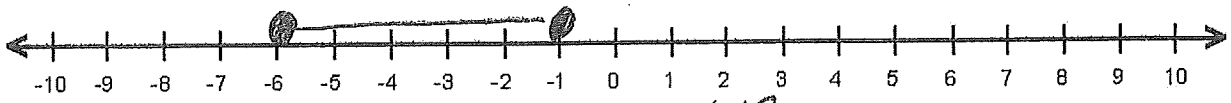
$\frac{3x}{-1} = \frac{-1y}{-1}$

$-3x = y$

Part 2

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

a. $3 \le -x + 2 \le 8$



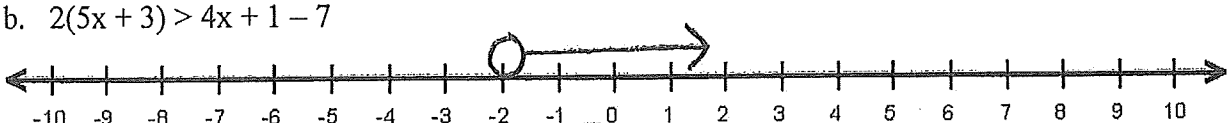
$\frac{3}{-1} \le \frac{-x}{-1} + \frac{2}{-1} \le \frac{8}{-1}$

$-1 \ge x \ge -6$

rewrite

$-6 \le x \le -1$

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



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

$10x + 6 > 4x - 6$

$-4x \quad -4x$

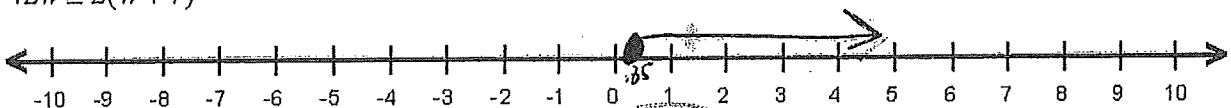
$6x + 6 > -6$

$-6 \quad -6$

$\frac{6x}{6} > \frac{-12}{6}$

$x > -2$

c. $42w \ge 2(w+7)$



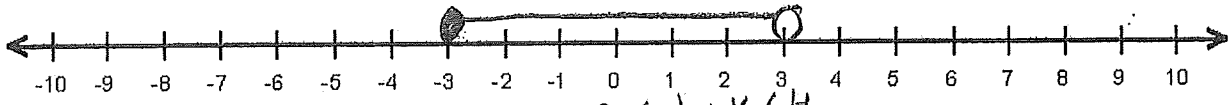
$42w \ge 2(w+7)$

$42w \ge 2w + 14$

$-2w \quad -2w$

$\frac{40w}{40} \ge \frac{14}{40}$ → $w \ge \frac{7}{20} \to .35$

d. $-2 \le d + 1 < 4$

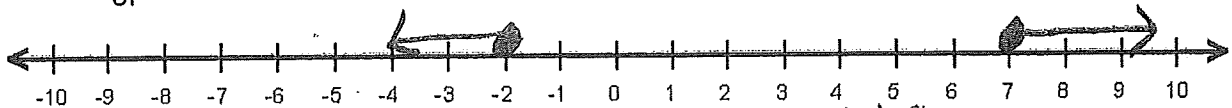


$-2 \le d + 1 < 4$

$-1 \quad -1$

$-3 \le d < 3$

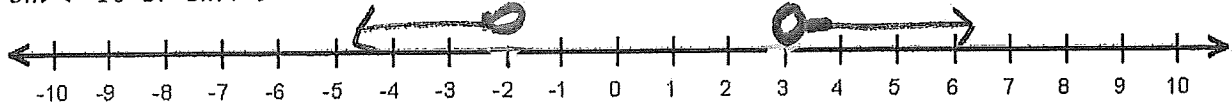
e. $2t \le -4$ or $7t \ge 49$



$\frac{2t}{2} \le \frac{-4}{2}$ or $\frac{7t}{7} \ge \frac{49}{7}$

$t \le -2$ or $t \ge 7$

f. $5m < -10$ or $3m > 9$

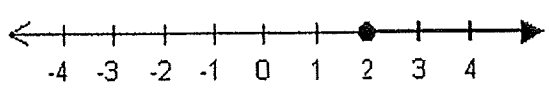


$\frac{5m}{5} < \frac{-10}{5}$ or $\frac{3m}{3} > \frac{9}{3}$

$m < -2$ $\quad m > 3$

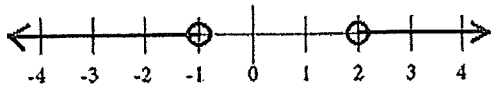
Write an inequality to describe the solutions shown on the number line: *(Sections 3.1, 3.6)*

2.



$x \geq 2$

3.



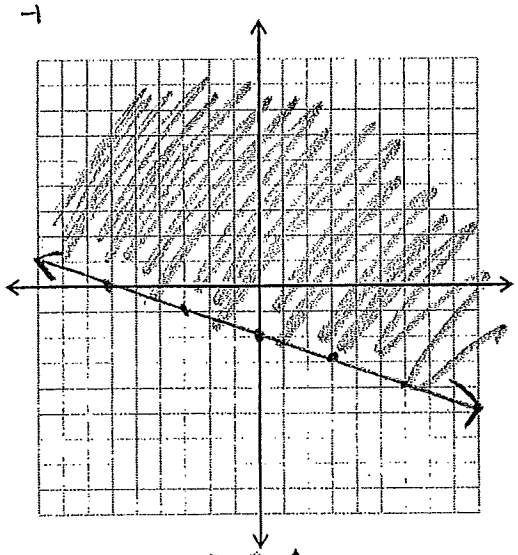
$x < -1$ or $x > 2$

Graph the solution to the inequality: *(Section 6.5)*

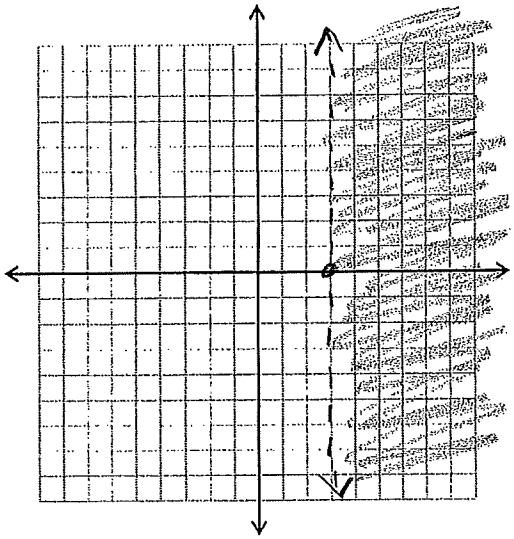
4. $-y \leq \frac{1}{3}x + 2$

$-1 \quad -1 \quad -1$

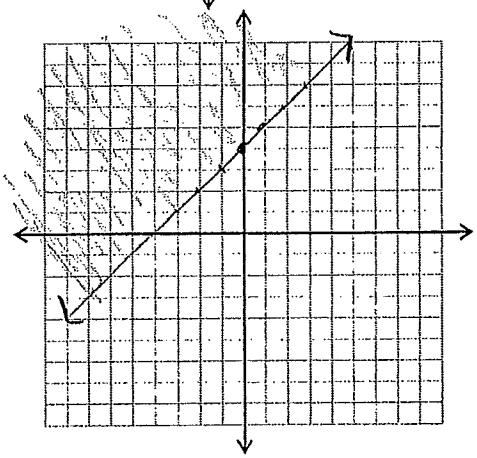
$y \geq -\frac{1}{3}x - 2$



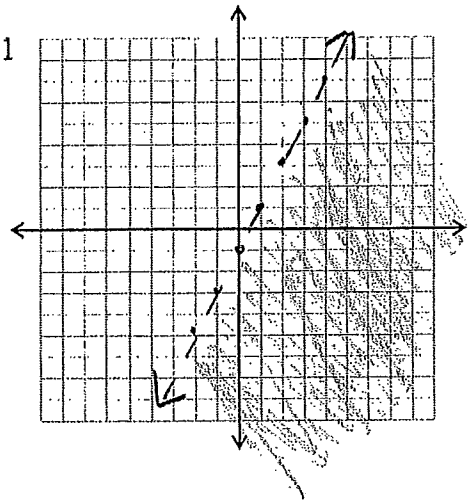
5. $x > 3$



6. $y \geq x + 4$

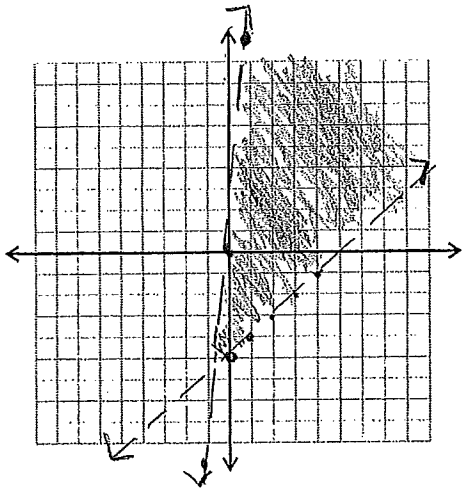


7. $y < 2x - 1$

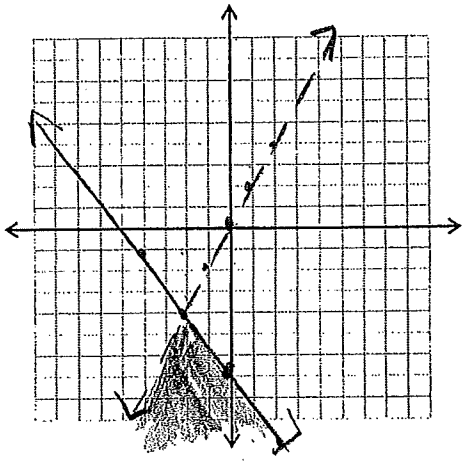


8. Solve each system of linear inequalities by graphing.

a. $y < 10x$
$y > x - 5$

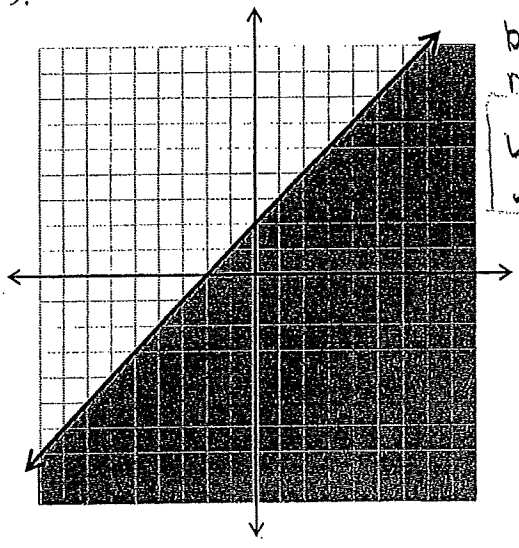


b. $2x - y > 0 \rightarrow y < 2x$
$3x + 2y \leq -14 \rightarrow y \leq -\frac{3}{2}x - 7$



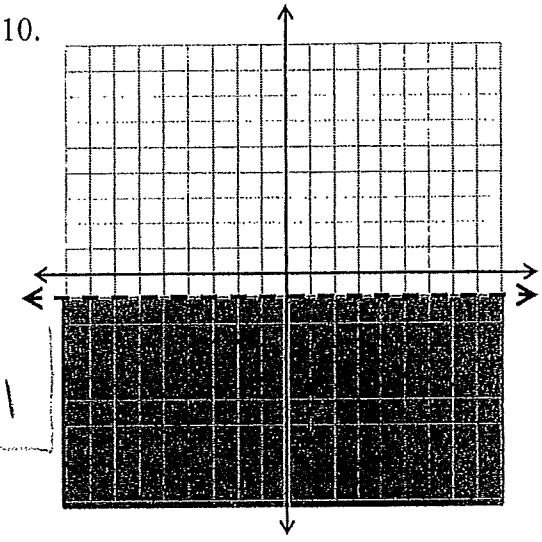
Write an inequality to describe the solution shown in the graph: *(Section 6.5)*

9.



b = 2
m = 1
$y \leq 1x + 2$

10.

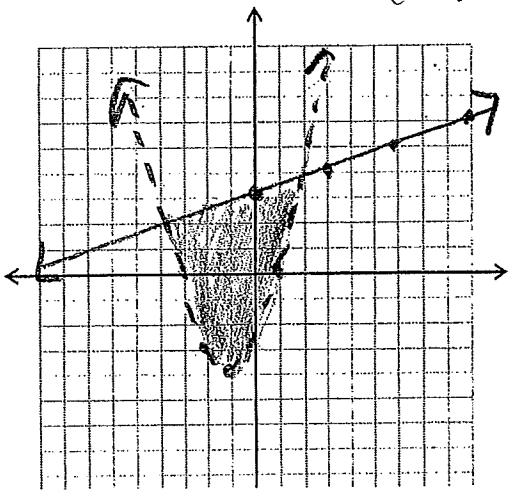


$y < -1$

Graph the solution to the system below: *(Section 6.6)*

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

(Systems of inequalities w/quadratics not on final exam)



$y \leq \frac{1}{3}x + 3$

$\frac{-2}{2} = (-1, -4)$

$(-1)^2 + 2(-1) - 3$

x	y
-2	-3
-3	0
0	-3

Part 3

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

1. (-6, 2) and (4, 7)

$\frac{7-2}{4--6} = \frac{7-2}{4+6} = \frac{5}{10} = \frac{1}{2}$

2. (-8, 5) and (-3, 5)

0

3. (1, 0) and (1, -4)

undefined

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

$y = mx + b$

4. slope of $\frac{2}{3}$ and y-intercept of -3

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

5. slope of -4 and y-intercept of 10.

$y = -4x + 10$

6. slope of 5 and passing through (-2, 5).

$y - 5 = 5(x - -2)$

$y - 5 = 5x + 10$

$+5 \quad +5$

$y = 5x + 15$

7. slope of $\frac{-1}{3}$ and passing through (6, 6).

$y - 6 = \frac{-1}{3}(x - 6)$

$y - 6 = \frac{-1}{3}x + 2$

$+6 \quad +6$

$y = \frac{-1}{3}x + 8$

8. going through points (5, 4) and (7, 8).

$\frac{8-4}{7-5} = \frac{4}{2} = 2 = m$

$y - 4 = 2(x - 5)$

$y - 4 = 2x - 10$

$+4 \quad +4$

$y = 2x - 6$

9. going through points (3, 7) and (3, -1).

$x = 3$

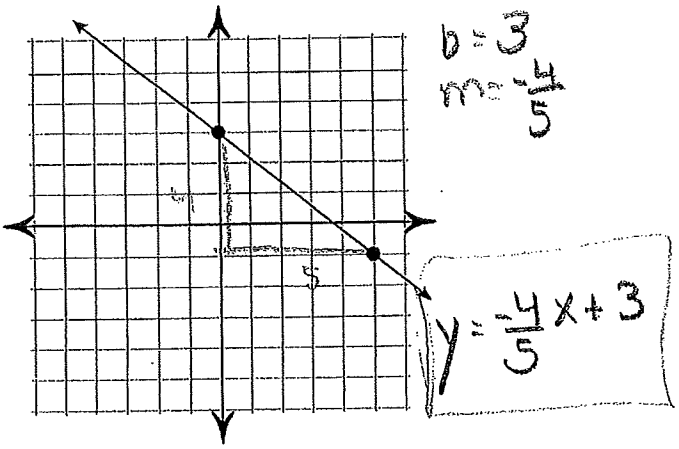
10. horizontal line through point (6, 2).

$y = 2$

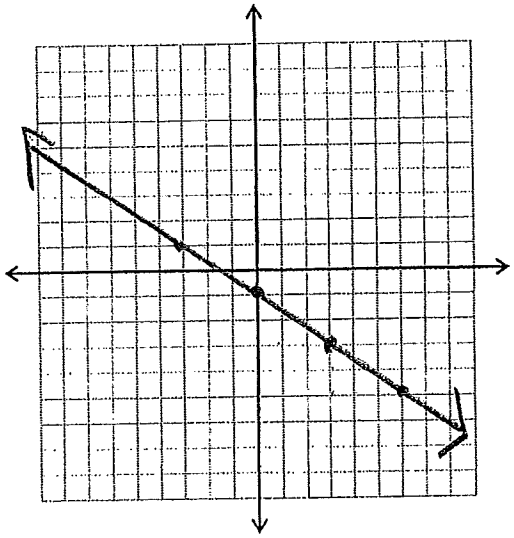
11. vertical line through point (-3, -5).

$x = -3$

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? $\frac{-1.5\text{ oz}}{1\text{ min}}$

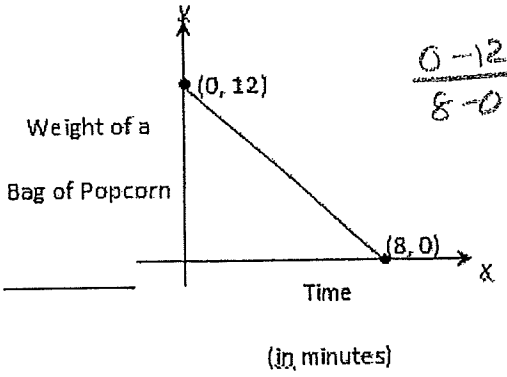
b) Complete the sentence:

Each minute, the weight of a bag of popcorn decreases 1.5 oz.

c) What is the y-intercept? (0, 12)

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

The bag of popcorn weighs 12 oz before you eat any.



$\frac{0-12}{8-0} = \frac{-12}{8} = -1.5/1$

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

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

x-int
(-3, 0)
$\frac{-6x + 12(0) = 18}{-6 \quad -6}$
$x = -3$

y-int
(0, 1.5)
$\frac{-6(0) + 12y = 18}{12 \quad 12}$
$y = 1.5$

16. $x - 3y = -9$

x-int
(-9, 0)

y-int
(0, 3)

Part 4

(all problems are sections 6.1-6.4)

1. List the **three** different methods to solve a system of equations. graphing, elimination, substitution

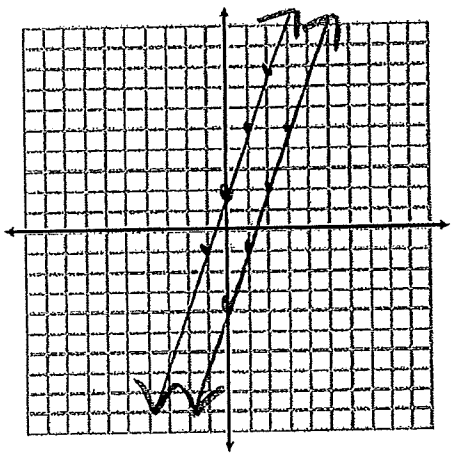
2. Solve the system of equations. $\begin{cases} y = (3x + 2) \\ 6x - 2y = 8 \end{cases}$

$6x - 2(3x + 2) = 8$
$6x - 6x - 4 = 8$
$-4 = 8$ no solution

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

no solution

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



$6x - 2y = 8$ $-6x$
$-6x$
$\frac{-2y}{-2} = \frac{-6x}{-2} + \frac{8}{-2}$
$y = 3x - 4$

lines are parallel.
no intersection
so no solution.

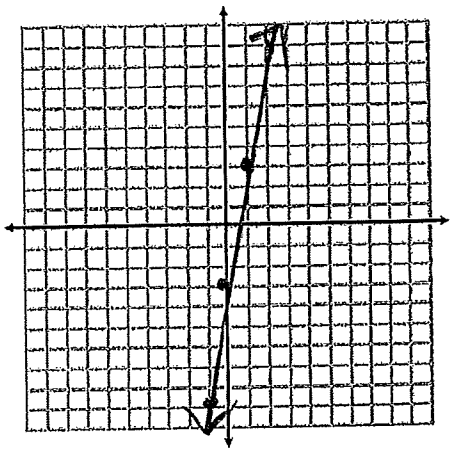
3. Solve the system of equations. $\begin{cases} 18x - 3y = 9 \\ y = (6x - 3) \end{cases}$

$18x - 3(6x - 3) = 9$
$18x - 18x + 9 = 9$
$9 = 9$

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

inf. solutions

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



same line so all points intersect.

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

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

(2, 13)

$3x + 7 = -4x + 21$

$+4x \quad +4x$

$7x + 7 = 21$

$-7 \quad -7$

$\frac{7x}{7} = \frac{14}{7}$

$x = 2$

$y = 3(2) + 7$

$y = 13$

Substitution method

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

$2x = 10$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5$

$3(5) - y = 17$

$15 - y = 17$

$-15 \quad -15$

$-y = 2$

$y = -2$

(5, -2)

Elimination method

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

$2(3y - 5) + 12y = -4$

$6y - 10 + 12y = -4$

$18y - 10 = -4$

$+10 \quad +10$

$\frac{18y}{18} = \frac{6}{18} = \frac{1}{3}$

$x = 3 \cdot \frac{1}{3} - 5$

$x = -4$

$(-4, \frac{1}{3})$

substitution method

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

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

$+2x \quad +2x$

$4x - 3 = 1$

$+3 \quad +3$

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

$x = 1$

$y = 2(1) - 3$

(1, -1)

Substitution method

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

$4x + 8(-7 + 5x) = -12$

$4x - 56 + 40x = -12$

$44x - 56 = -12$

$+56 \quad +56$

$\frac{44x}{44} = \frac{44}{44}$

$x = 1$

(1, -2)

substitution method

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

$-189x - 252y = -126$

$189x + 252y = 126$

$0 = 0$

elimination method

infinite solutions

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

$2x - 3y = 12$

$-2x - 6y = -12$

$-9y = 0$

$y = 0$

(6, 0)

elimination method

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

$0 = 1$

no solution

elimination method

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?

Bob: $y = -2x + 30$ Roy: $y = 1x$

$-2x + 30 = 1x$
$+2x \quad +2x$
$30 = 3x$
$\frac{30}{3} = \frac{3x}{3}$
$10 = x$

10th rung
at 10 seconds

6. Is the ordered pair **(1, -1)** a solution to the following system of equation? **Explain.** Show your work!

$y = 3x - 4$

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

$-1 = 3(1) - 4$
$-1 = 3 - 4$
$-1 = -1$ ✓

$-1 = -\frac{1}{2}(1) + 3$
$-1 = -\frac{1}{2} + 3$
$-1 \neq 2.5$
X

no, it is not a solution because it doesn't make both equations true.

---

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:

$x + y = 3$
$2y - 3x = 16$

Earl's solution:

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

error: distributive prop.

check in both equations
* not a solution

check:
$-2.5 + 5.5 = 3$ ✓
$2(5.5) - 3(-2.5) = 16$
$11 + 7.5 \neq 16$

8. Adrian is in Algebra. He solved the system: $\begin{cases} y = 5x - 2 \\ -3x + 6y = -12 \end{cases}$ and got the solution (2, 8), but he's not feeling very confident. Decide whether or not he is correct and convince him of your position.

x y

$8 = 5(2) - 2 \rightarrow 8 = 8$ ✓

$-3(2) + 6(8) = -12 \rightarrow 42 \neq -12$

It is not a solution in both equations so not a solution to the system.

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?

x = # t-shirts
y = # sweatshirts

a. Write a system of equations representing this problem.

$x + y = 18$
$9x + 15y = 180$

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

elimination $-9(x + y = 18) \rightarrow -9x - 9y = -162$
$9x + 15y = 180$

$6y = 18$
$y = 3$

3 sweatshirts
15 t-shirts

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.

x = cost senior ticket
y = cost child ticket

$-1(3x + 1y = 38) \rightarrow -3x - 1y = -38$
$3x + 2y = 52$

$y = 14$

$3x + 14 = 38$
$-14 \quad -14$
$3x = 24$
$x = 8$

child's ticket = $14
senior ticket = $8

11. Matt and Mary 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.

x = cost small box
y = cost lg. box

$3x + 14(y) = 203$
$y = (6 + x)$

$3x + 14(6 + x) = 203$
$3x + 84 + 14x = 203$
$17x + 84 = 203$
$17x = 119$

lg box = $13
small box = $7

Part 5

1. What is the greatest common factor of the expression? *(Section 8.2)*

   a) $-16x^2 + 8x - 4$

   4

   b) $18x^3 + 12x^2 - 27x$

   $3x$

2. Add or subtract the polynomials (Write answers in standard form). *(Section 8.1)*

   a. $(2x^2 + 120x) + (-5x^2 - 80)$

   $-3x^2 + 120x - 80$

   b. $(x^3 - 3x^2 + 5x) - (6x^3 + 5x^2 + 12)$

   $1x^3 - 3x^2 + 8x - 6x^3 - 5x^2 + 12$

   $-5x^3 - 8x^2 + 5x - 12$

3. **Complete the table.** *(Section 8.1)*

	Degree	Classify by Degree	Number of Terms	Classify by Number of terms
$2x^3 + 5x^2 - 7x + 1$	3	cubic	4	polynomial
$3x + 8x^4 + 7$	4	4th	3	trinomial
$2x - 3 + 8x^2$	2	quadratic	3	trinomial
$3x + 4$	1	linear	2	binomial
12	0	constant	1	monomial
$8x^2$	2	quadratic	1	monomial
$4m^3$	3	cubic	1	monomial

4. **Multiply the expressions and simplify** *(Section 8.3)*

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

   $12x^2 + 30x - 22x - 55$

   $12x^2 + 8x - 55$

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

   $-5x^2 - 10x + 3x + 6$

   $-5x^2 - 7x + 6$

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

   $12x^2 - 24x + 1x - 2$

   $12x^2 - 23x - 2$

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

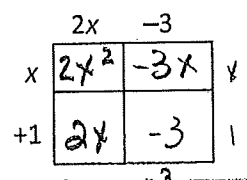
   $-10x^2 + 6x$

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

   $4y^3 - 8y^2 + 12y$

5. **Write an algebraic equation for each figure to express the area of the rectangle in standard form and in factored form.**

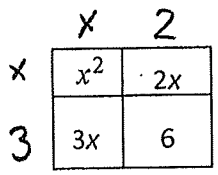
a.



$y = 2x^2 - x - 3$

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

b.



$y = (x+3)(x+2)$

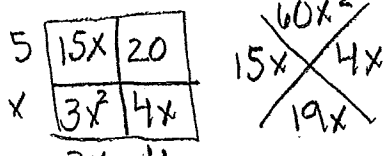
$y = x^2 + 5x + 6$

6. **Factor each expression completely.** *(Sections 8.5, 8.6)*

a) $x^2 - x - 42$

$(x-7)(x+6)$

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



$(x+5)(3x+4)$

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

$(x-11)(x-3)$

d) $9x^2 - 100$

$(3x-10)(3x+10)$

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

$(2x-1)^2$

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

$-3 \quad -3 \quad -3$

$-3(x^2 + 5x + 6)$

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

g) $\frac{2x^2}{2} + \frac{6x}{2} - \frac{36}{2}$

$2(x^2 + 3x - 18)$

$2(x+6)(x-3)$

h) $\frac{2x^3}{2x^2} + \frac{12x^2}{2x^2} - \frac{5x}{-5} - \frac{30}{-5}$

$2x^2(x+6) - 5(x+6)$

$(2x^2 - 5)(x+6)$

i) $\frac{2x^3}{2x^2} + \frac{6x^2}{2x^2} + \frac{3x}{3} + \frac{9}{3}$

$2x^2(x+3) + 3(x+3)$

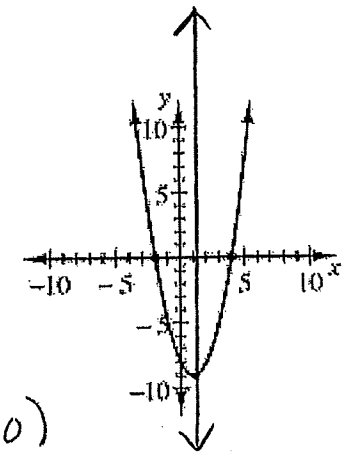
$(2x^2 + 3)(x+3)$

Part 6

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

x	-2	-1	0	1	2
y	17	11	7	5	5

2. **Describe the graph by answering the following questions.** *(Section 9.1)*



a) What type of function does the graph represent? quadratic

b) What is the graph of this function called? parabola

c) Where is the vertex? (1.5, 9)

d) Does the graph have a maximum or minimum? min.

e) Does the graph x-intercepts? If so, where? yes (-2,0) and (4,0)

f) Does the graph have a y-intercept? If so, where? yes (0, -8)

g) Draw the line of symmetry on the graph. Write the equation for the axis of symmetry. x = 1.5

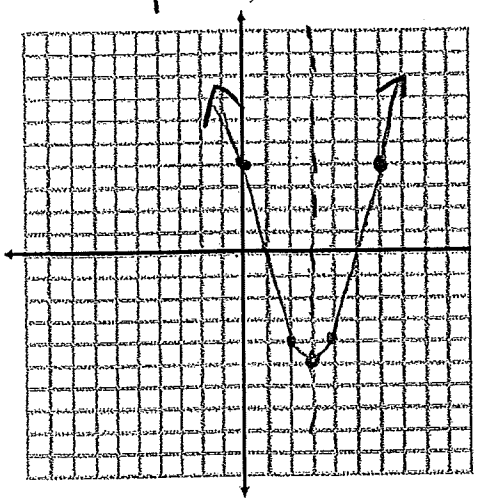
h) What is the domain? $(-\infty, \infty)$

i) What is the range? $[-9, \infty)$

3. **Graph the quadratic equation**:*(Sections 9.2-9.4)*

a) $y = x^2 - 6x + 4$

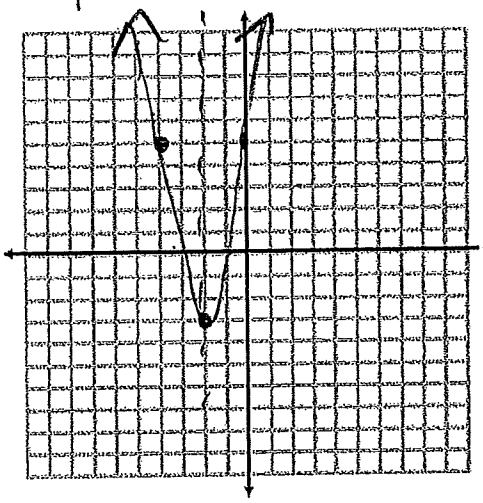
x	y
0	4
3	-5
4	-4



b) $y = 2(x+2)^2 - 3$

x	y
-4	5
-2	-3
0	5

vertex (-2, -3)



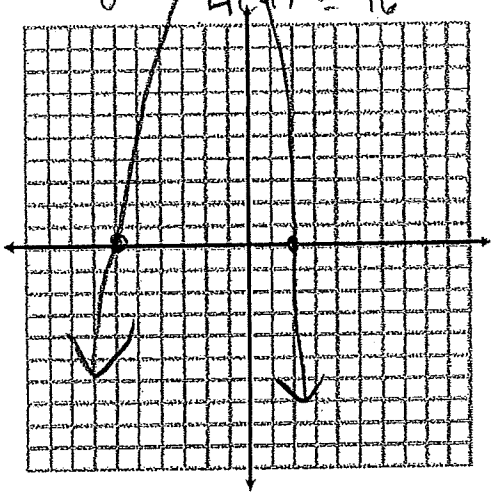
c) $y = -(x-2)(x+6)$

intercepts 2 and -6

$\frac{2 + -6}{2} = \frac{-4}{2} = -2$ vertex x

$y = -(-2-2)(-2+6)$

$-4(4) = 16$



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

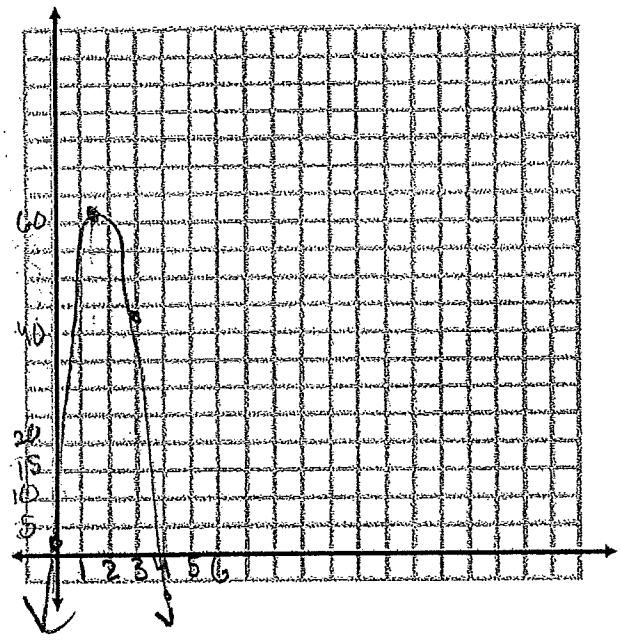
A punter kicked the football into the air with an upward velocity of 62 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 62t + 2$.

$\frac{-62}{2(-16)} = \frac{-62}{-32} = 1.94$

$h = -16(1.94)^2 + 62(1.94) + 2$

$h = 62.$

height(ft)



Time (seconds)

a. What is the maximum height the ball reaches?

62 ft

b. How long will it take the football to reach the maximum height?

1.94 seconds

c. How long does it take for the ball to hit the ground?

t	h
1.94	62
3	44
4	-6

3.9 seconds

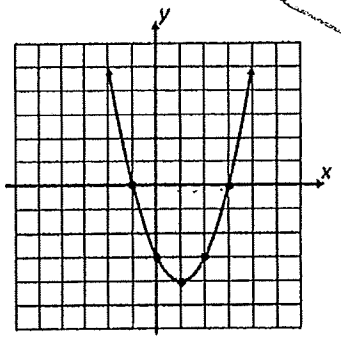
$0 = -16t^2 + 62t + 2$ (a, b, c)

$\frac{-62 \pm \sqrt{(62)^2 - 4(-16)(2)}}{2(-16)}$

$= \frac{-62 \pm 63}{-32}$

$= 3.9$

5. What are the x-intercepts of the graph? *(Section 9.3)*

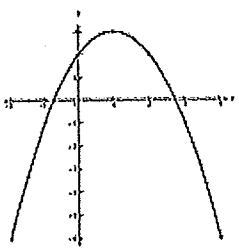


(-1, 0) and (3, 0)

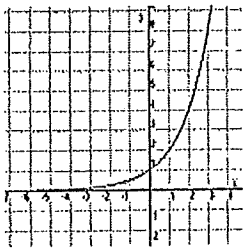
6. What is the y-intercept of the parabola? $y = 5x^2 + 2x - 3$

(0, -3)

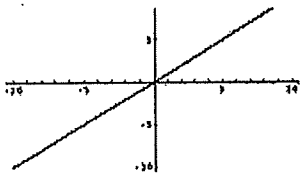
7. Label each graph as linear, quadratic, or exponential. *(Section 9.7)*



quadratic



exponential



linear

8. Find the value of c that will make the expression a perfect square trinomial. *(Section 9.5)*

$x^2 - 30x + c$

$\left(\frac{-30}{2}\right)^2 =$

$c = 225$

9. Write the function in vertex form by completing the square. Then, state the vertex. *(Section 9.5)*

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

(-2.5, -10.25) vertex

$0 = x^2 + 5x - 4$

$+4 \quad +4$

$4 = x^2 + 5x$

$+6.25 \quad \left(\frac{5}{2}\right)^2$

$10.25 = x^2 + 5x + 6.25$

$y = (x + 2.5) - 10.25$

b) $y = x^2 + 2x - 28$

$0 = x^2 + 2x - 28$

$+28 \quad +28$

$28 = x^2 + 2x$

$\left(\frac{2}{2}\right)^2 = 1$

$+1 \quad +1$

$29 = x^2 + 2x + 1$

$29 = (x+1)^2$

$-29 \quad -29$

$y = (x+1)^2 - 29$

(-1, -29) vertex

10. What methods do we know for solving quadratic equations? *(Chapter 9)*

graphing, factoring, square roots, quadratic formula

11. **Solve each equation for x. Use a method of your choice.** *(Sections 9.4-9.6)*

a) $-2x^2 + 3x + 10 = 0$

a b c

$a = -2$

$b = 3$

$c = 10$

$x = \frac{-3 \pm \sqrt{3^2 - 4(-2)(10)}}{2(-2)}$

$x = \frac{-3 \pm \sqrt{89}}{-4}$

$= -1.61$

$= 3.11$

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

$2x - 1 = 0 \quad 5x + 2 = 0$

$x = \frac{1}{2} \quad x = -\frac{2}{5}$

c) $2x^2 - 128 = 0$

$2x^2 = 128$

$\sqrt{x^2} = \sqrt{64}$

$x = \pm 8$

a) $x^2 + 11x - 26 = 0$

$(x+13)(x-2) = 0$

$x = -13$

$x = 2$

b) $x^2 - 25 = 0$

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

$x = \pm 5$

c) $x^2 - 19x + 80 = -8$

$+8 \quad +8$

$x^2 - 19x + 88 = 0$

$(x-8)(x-11) = 0$

$x = 8$

$x = 11$

d) $5x^2 - 8x = 8 - 5x$

$+5x \quad +5x$

$5x^2 - 3x = 8$

$-8 \quad -8$

$5x^2 - 3x - 8 = 0$

a b c

$x = \frac{3 \pm \sqrt{(-3)^2 - 4(5)(-8)}}{2(5)}$

$\frac{3 \pm 13}{10}$

$x = 1.6$

$x = -1$

e) $-3x^2 + 7x = -10$

$-3x^2 + 7x + 10 = 0$

$\frac{-3x^2}{x} + \frac{10x}{x} - 3x + 10 = 0$

$x(-3x + 10) + 1(-3x + 10)$

$(x+1)(-3x+10) = 0$

$x = 1$ and $x = \frac{10}{3}$

f) $(x+3)^2 = 25$

$x^2 + 6x + 9 - 25 = 0$

$x^2 + 6x - 16 = 0$

$(x+8)(x-2)$

$x = -8$

$x = 2$

12. How many real-number solutions does each equation have?

a) x^2+4x+5

$4^2-4(1)(5)$

$16-20$

no solutions

b) $3x^2-9x+5=0$

$(-9)^2-4(3)(5)$

$81-60$

two solutions

13. You are creating a rectangular banner for a school pep rally. You have 100 ft² of paper, and you want the length to be 15ft longer than the width. What should be the dimensions of the banner?

$100 = w(w+15)$

$-100 = w^2+15w-100$

$0 = w^2+15w-100$

$(w+20)(w-5)=0$

$w=5$

$w=-20$

width = 5ft

length = 20ft

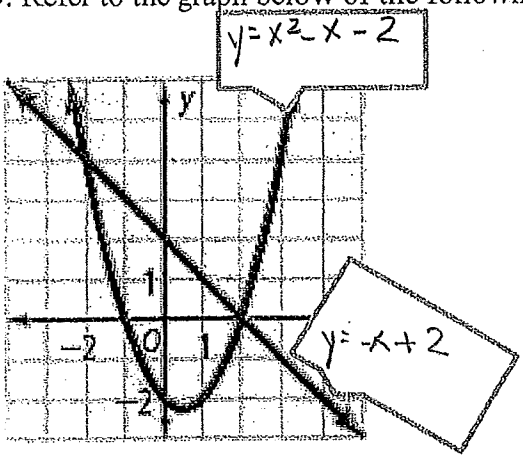
14. You throw a ball upward. Its height h, in feet, after t seconds can be modeled by the function $h=-16t^2+30t+6$. After how many seconds will it hit the ground?

$0=-16t^2+30t+6$

$a \quad b \quad c$

$\frac{-30 \pm \sqrt{(30^2)-4(-16)(6)}}{2(-16)} \rightarrow \frac{-30 \pm 35.83}{-32}$ → 2.1 sec.

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



a. Match each equation with its graph on the coordinate plane.

b. Identify the solutions: (-2 , 4) and (2 , 0)

c. $y = -x+2$ is greater than $y = x^2 - x - 2$ when x is between -2 and 2

[-2, 2]

16. Solve each system.

a) $y = x^2+3x-23$

$y = 25-5x$

$25-5x = x^2+3x-23$

$+5x \quad +5x \quad -25 \quad +5x-25$

$0 = x^2+8x-48$

$(x+12)(x-4)=0$

$x=-12 \rightarrow (-12, 85)$

$x=4 \rightarrow (4, 5)$

b) $y = x^2+2x-2$

$y = x+10$

$x+10 = x^2+2x-2$

$-x \quad -10 \quad -x \quad -10$

$0 = x^2+1x-12$

$(x+4)(x-3)=0$

$x=-4 \rightarrow (-4, 6)$

$x=3 \rightarrow (3, 13)$