

Final Exam Review Fall 2015

Now that you have completed this Review Packet, make sure you do the following:

1. Check your solutions when the answer keys are provided.
2. Mark any that are incorrect or need additional work.
3. Go back and REWORK any problem with errors. Do not assume that because you “see” the correct answer, you know how to do the problem correctly. Rework them so that you know that you can actually do them.

Practice Problems:

Unit 1

Simplify the following expressions. How many terms are in each expression?

1. $20x^5 + 12x^2 + 2x - 8x^5 + 8$
 $20x^5 - 8x^5 + 12x^2 + 2x + 8$

$12x^5 + 12x^2 + 2x + 8$
 Quintic 4 term Polynomial

2. $-4x^3 - 3x^2 + 2(x + 3)$
 $-4x^3 - 3x^2 + 2x + 6$

Cubic 4 term polynomial

3. $(-5x^2 + 3x + 7) - (2x^3 - x^2 + 3x)$
 $-5x^2 + 3x + 7 - 2x^3 + x^2 - 3x$

$-2x^3 - 4x^2 + 7$
 Cubic Trinomial

Use Dimensional Analysis to convert the following.

4. Anna is 429,687 seconds old. How old is she in days?
 $429687s \cdot \frac{1 \text{ min}}{60s} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ day}}{24 \text{ hr}} =$

5. Jason is traveling 123 km/hr. How fast is he going in miles per hour?
 (Hint: 1 mile = 1609.34 meters)

$123 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ mile}}{1609.34 \text{ m}} =$

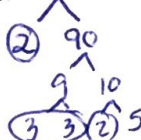
6. A juice company produced 6,528 mL of orange juice. How many 1 liter bottles can they fill with this amount?

$6528 \text{ mL} \cdot \frac{1 \text{ L}}{1000 \text{ mL}} =$

7. A water faucet is dropping one drop of water every 2 seconds. Estimate how many drops the faucet will drop in one week if it continues at this rate.

$\frac{1 \text{ drop}}{2 \text{ s}} \cdot \frac{60 \text{ s}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{24 \text{ hr}}{1 \text{ day}} \cdot \frac{7 \text{ days}}{1 \text{ week}} =$

8. $\sqrt{180r^{12}v^7}$



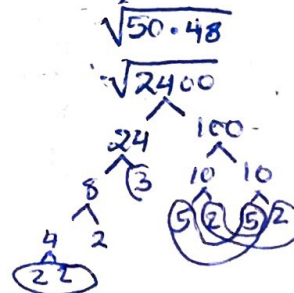
$2 \cdot 3 \cdot 2 \cdot 3 \cdot \sqrt{5r}$
 $6 \cdot 2 \cdot 3 \sqrt{5r}$
 $36 \sqrt{5r}$

9. $3\sqrt{28} + \sqrt{63}$



$3 \cdot 2 \sqrt{7} + 3 \sqrt{7}$
 $6 \sqrt{7} + 3 \sqrt{7}$
 $9 \sqrt{7}$

10. $\sqrt{50 \cdot 48}$



$2 \cdot 2 \cdot 5 \sqrt{3 \cdot 2}$
 $20 \sqrt{6}$

11. $\frac{\sqrt{18} - \sqrt{72}}{3}$

$$\begin{array}{r} \sqrt{18} - \sqrt{72} \\ \begin{array}{r} \sqrt{2 \cdot 9} - \sqrt{4 \cdot 9 \cdot 2} \\ \sqrt{2 \cdot 3 \cdot 3} - \sqrt{2 \cdot 3 \cdot 3 \cdot 2} \\ \sqrt{2 \cdot 3 \cdot 3} - \sqrt{2 \cdot 3 \cdot 3 \cdot 2} \\ \sqrt{2 \cdot 3 \cdot 3} - \sqrt{2 \cdot 3 \cdot 3 \cdot 2} \end{array} \end{array}$$

$$\begin{aligned} 3\sqrt{2} - 3 \cdot 2\sqrt{2} \\ 3\sqrt{2} - 6\sqrt{2} \\ \boxed{-3\sqrt{2}} \end{aligned}$$

14. $\sqrt{2}(\sqrt{2}-4)^2$

$$\begin{aligned} \sqrt{2}(\sqrt{2}-4)(\sqrt{2}-4) \\ \sqrt{2}(\sqrt{2} \cdot 2 - 4\sqrt{2} - 4\sqrt{2} + 16) \\ \sqrt{2}(\sqrt{2} \cdot 2 - 8\sqrt{2} + 16) \\ \sqrt{2}(2 - 8\sqrt{2} + 16) \\ \sqrt{2}(18 - 8\sqrt{2}) = 18\sqrt{2} - 8\sqrt{2} \cdot 2 \\ 18\sqrt{2} - 8 \cdot 2 \\ \boxed{18\sqrt{2} - 16} \end{aligned}$$

Unit 2

12. $(5\sqrt{2}-3)^2$

$$\begin{aligned} (5\sqrt{2}-3)(5\sqrt{2}-3) \\ 25\sqrt{2} \cdot 2 - 15\sqrt{2} - 15\sqrt{2} + 9 \\ 25\sqrt{4} - 30\sqrt{2} + 9 \\ 25 \cdot 2 - 30\sqrt{2} + 9 \\ 50 - 30\sqrt{2} + 9 \\ \boxed{59 - 30\sqrt{2}} \end{aligned}$$

15. $(7+\sqrt{2})(7-\sqrt{2})$

$$\begin{aligned} 49 - 7\sqrt{2} + 7\sqrt{2} - \sqrt{2} \cdot 2 \\ 49 - 2 \\ \boxed{47} \end{aligned}$$

13. $(5\sqrt{7})^2$

$$\begin{aligned} (5\sqrt{7})(5\sqrt{7}) \\ 5 \cdot 5 \sqrt{7} \cdot 7 \\ 25\sqrt{49} \\ 25 \cdot 7 \\ \boxed{175} \end{aligned}$$

16. $(x^3-4y)(x^3+4y)$

$$\begin{aligned} x^6 + 4x^3y - 4x^3y - 16y^2 \\ \boxed{x^6 - 16y^2} \end{aligned}$$

Set up each problem as a linear equation and solve for the unknown value.

17. The literature club is printing a storybook to raise money. The Print Shop A charges \$3 for each book, and \$45 to create the film. How many books can be printed if the club has a budget of \$350? Write an equation that models this situation and solve for the number of books.

$$\begin{array}{r} 3x + 45 = 350 \\ -45 \quad -45 \\ \hline 3x = 305 \\ \frac{3x}{3} = \frac{305}{3} \\ x = 101.\bar{6} \end{array}$$

They can print 101 books

18. A rectangle is 5 feet longer than it is wide. The perimeter of the rectangle is 34 feet. What is the length of the rectangle?

$$\begin{aligned} \text{Perimeter} &= 2L + 2W \\ L &= W + 5 \end{aligned}$$

$$\begin{aligned} 2L + 2W &= 34 \\ 2(W+5) + 2W &= 34 \\ 2W + 10 + 2W &= 34 \\ 4W + 10 &= 34 \\ -10 \quad -10 \\ \hline 4W &= 24 \end{aligned}$$

$$\begin{array}{r} 4W = 24 \\ \frac{4W}{4} = \frac{24}{4} \\ W = 6 \end{array}$$

$$L = W + 5 = 6 + 5 = \boxed{11 \text{ ft}}$$

19. Allison earns \$5 for every candy bar she sells as part of her fundraiser, and \$15 for every bundt cake she sells. In one week, Ashley earned \$350 selling candy bars and cakes. Write a linear model that relates the number of candy bars and cakes that Allison sold and then find the number of candy bars she sold if she sold 6 cakes.

$$\begin{aligned} 5c + 15b &= 350 \\ b &= 6 \end{aligned}$$

$$\begin{array}{r} 5c + 15(6) = 350 \\ 5c + 90 = 350 \\ -90 \quad -90 \\ \hline 5c = 260 \\ \frac{5c}{5} = \frac{260}{5} \end{array}$$

$c = 52$ candy bars

20. Write an equation to solve for three consecutive numbers whose sum is 51.

Consecutive: $n, n+1, n+2$

$$n + n + 1 + n + 2 = 51$$

$$\begin{array}{r} 3n + 3 = 51 \\ -3 \\ \hline 3n = 48 \end{array}$$

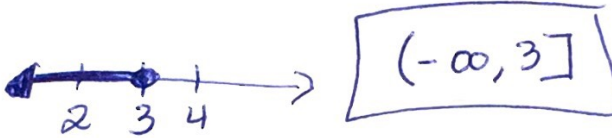
$$\begin{array}{r} 3n = 48 \\ \hline n = 16 \end{array}$$

16, 17, 18

Solve and graph each inequality. Then write the solution using interval notation.

21. a. $7x + 2(3x - 11) \leq 17$

$$\begin{array}{r} 7x + 6x - 22 \leq 17 \\ 13x - 22 \leq 17 \\ +22 \\ \hline 13x \leq 39 \\ \hline x \leq 3 \end{array}$$

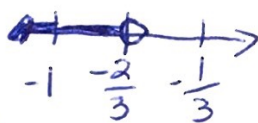


- b. Solution using interval notation:

$(-\infty, 3]$

22. a. $-6x + 1 > 5$

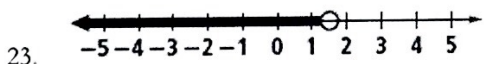
$$\begin{array}{r} -6x + 1 > 5 \\ -6x > 4 \\ \hline -6x > 4 \\ \hline x < -\frac{2}{3} \end{array}$$



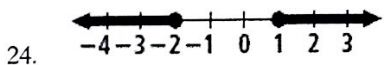
- b. Solution using interval notation:

$(-\infty, -\frac{2}{3})$

For each graph, write the corresponding single or compound inequality.



$x < 1.5$



$-2 \geq x < 1$

25. Jerry scored 92% and 95% on his first two tests, but his third test score was a 76%, which dropped his grade average. Write and solve an inequality to determine what score Jerry needs in order to have at least a 90% average again?

$$\frac{92 + 95 + 76 + x}{4} \geq 90$$

$$\begin{array}{r} 4 \cdot \frac{263 + x}{4} \geq 90 \cdot 4 \\ 263 + x \geq 360 \\ -263 \\ \hline x \geq 97 \end{array}$$

Solve for the indicated variable

26. $A = \frac{1}{2}h(b_1 + b_2)$; solve for b_1

$$\begin{array}{r} A = \frac{1}{2}hb_1 + \frac{1}{2}hb_2 \\ -\frac{1}{2}hb_2 \\ \hline A - \frac{1}{2}hb_2 = \frac{1}{2}hb_1 \\ \hline \frac{A - \frac{1}{2}hb_2}{\frac{1}{2}h} = \frac{\frac{1}{2}hb_1}{\frac{1}{2}h} \\ \hline A - \frac{1}{2}hb_2 = b_1 \end{array}$$

27. $V = \frac{1}{3}\pi r^2$; solve for r^2

$$\begin{array}{r} \frac{1}{3}\pi r^2 = V \\ \hline r^2 = \frac{V}{\frac{1}{3}\pi} \\ \hline r^2 = \frac{3V}{\pi} \end{array}$$

28. $P = 2l + 2w$, solve for w

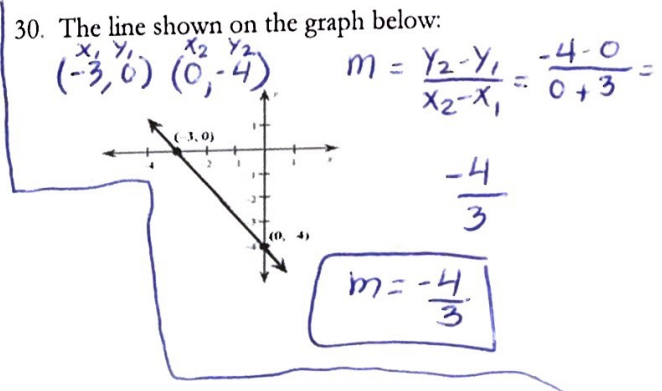
$$\begin{array}{r} P = 2l + 2w \\ -2l \\ \hline P - 2l = 2w \\ \hline \frac{P - 2l}{2} = \frac{2w}{2} \\ \hline \frac{P - 2l}{2} = w \end{array}$$

Use the SLOPE formula to find the slope for the following problems:

29. The line passing through the points $(8, 1)$ and $(-3, 0)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 1}{-3 - 8} = \frac{1}{11}$$

$$m = \frac{1}{11}$$



31. Write the equation $y - 2 = -\frac{2}{3}(x + 6)$ in standard form.

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

$$y - 2 = -\frac{2}{3}x - \frac{12}{3}$$

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

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

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

32. Write an equation of the line passing through the point $(-7, -6)$ with slope $m = 4$.

Point Slope Form $y + 6 = 4(x + 7)$ Slope-Intercept Form $y = 4x + 22$

$$y + 6 = 4(x + 7)$$

$$y + 6 = 4x + 28$$

$$y = 4x + 22$$

33. Write an equation of the line passing thru $(-7, 2)$ and $(-3, -4)$.

Point Slope Form $y - 2 = -\frac{3}{2}(x + 7)$ Standard Form $y = -\frac{3}{2}x - \frac{17}{2}$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 2}{-3 - (-7)} = \frac{-6}{4} = -\frac{3}{2}$$

$$y + 4 = -\frac{3}{2}(x + 3)$$

$$y + 4 = -\frac{3}{2}x - \frac{9}{2} - 4$$

$$y = -\frac{3}{2}x - \frac{17}{2}$$

$$-\frac{9}{2} - \frac{4}{1} = -\frac{17}{2}$$

34. Write the equation: $5x - 9y = -12$ in slope intercept form.

$$5x - 9y = -12 - 5x$$

$$-9y = -5x - 12$$

$$\frac{-9y}{-9} = \frac{-5x - 12}{-9}$$

$$y = \frac{5}{9}x + \frac{4}{3}$$

Let $f(x) = x^2 - 5x + 8$ and $g(x) = x^2 - 4$ and $h(x) = -3x + 5$ Perform the indicated operations for # 73-# 78.

35. $g(x) + h(x)$

$$x^2 - 4 + -3x + 5$$

$$x^2 - 3x + 1$$

36. $2f(x) + 3g(x)$

$$2(x^2 - 5x + 8) + 3(x^2 - 4)$$

$$2x^2 - 10x + 16 + 3x^2 - 12$$

$$5x^2 - 10x + 4$$

37. $h(x) - f(x)$

$$-3x + 5 - (x^2 - 5x + 8)$$

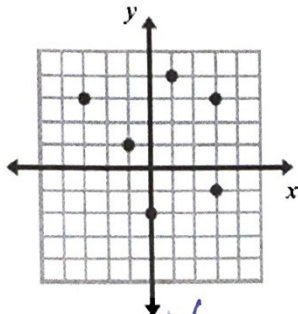
$$-3x + 5 - x^2 + 5x - 8$$

$$-x^2 + 2x - 3$$

Midterm Review Fall 2018

Determine and state the domain and range of each graph and determine if it is a function.

38.

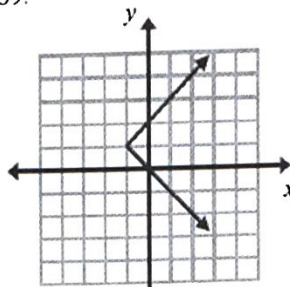


Function? No

Domain: $[-3, 3]$

Range: $[-2, 4]$

39.

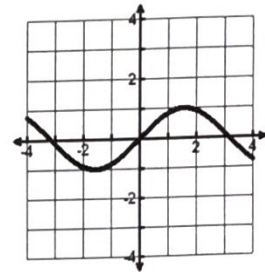


Function? No

Domain: $[-1, \infty)$

Range: $(-\infty, \infty)$

40.

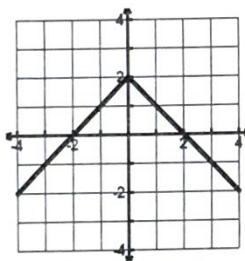


Function? Yes

Domain: $(-\infty, \infty)$

Range: $[-1, 1]$

41.

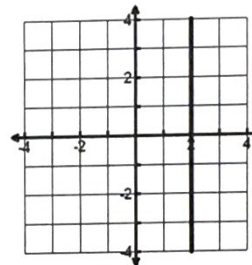


Function? Yes

Domain: $(-\infty, \infty)$

Range: $(-\infty, 2]$

42.



Function? No

Domain: $x = 2$

Range: $(-\infty, \infty)$

43. Use the graph below to find the following input and output values:

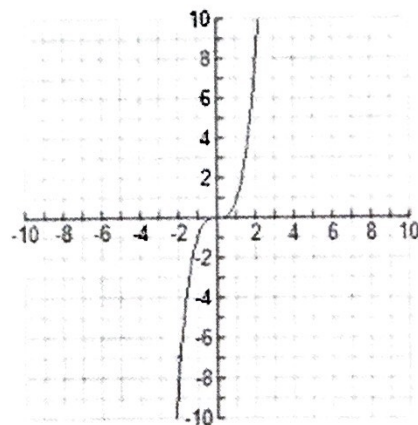
a. $f(-2) = 7, 8$

c. $f(x) = 8$
 $x = 2$

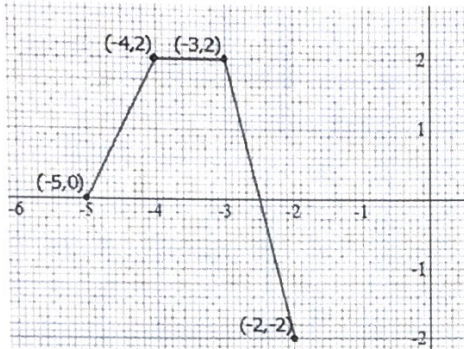
b. $f(0) = 0$

d. $f(x) = 0$
 $x = 0$

e. What is the end behavior of the graph:
 $f(x) \rightarrow$ increases as $x \rightarrow$ increases
 $f(x) \rightarrow$ decreases as $x \rightarrow$ decreases



44. Identify the following for the graph below:



- a. What can the maximum value of $f(x)$ be for the function? **2**
- b. For what interval is the graph increasing? Write answer in interval notation form. **Left to Right!**
 $[-5, -4]$
- c. For what interval is the graph decreasing? Write answer as an inequality. **Left to Right!**
 $-3 \leq x \leq -2$
- d. Find x for when $f(x) = -2$.
 $x = -2$

45. Find the Rate of Change between the points $(-5, 3)$ and $(-4, -3)$.
 x_1, y_1 x_2, y_2
Slope = m

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 3}{-4 - (-5)} = \frac{-6}{1} = \boxed{-6}$$

46. Determine if the table represents a linear function, an exponential function or neither. Explain how you know.

x	2	3	4	5
y	3	-6	12	-24

47. Determine if the table represents a linear function, an exponential function or neither. Explain how you know.

x	1	2	3	4
y	-1	1	3	5

+2 +2 +2

Linear, because the function increases at a fixed rate with +2

Write the rule for the n th term of the arithmetic sequence in explicit form and find the indicated value.
 (moved to unit 2 for 2015)

48. $-10, -4, 2, 8, 14, \dots$

49. $a_1 = -13; d = 8$

50. $a_{36} = -276; d = -7$

Explicit Rule _____
 $a_n = -10 + 6(n-1)$

Explicit Rule _____
 $a_n = -13 + 8(n-1)$

Explicit Rule _____
 $a_n = -31 - 7(n-1)$

$$a_{23} = -10 + 6(23-1)$$

$$= -10 + 132$$

$$\boxed{a_{23} = 122}$$

$$a_{55} = -13 + 8(55-1)$$

$$= -13 + 432$$

$$\boxed{a_{55} = 419}$$

$$a_{14} = -31 - 7(14-1)$$

$$= -31 - 7(13)$$

$$\boxed{a_{14} = -122}$$

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51. Given the arithmetic sequence: $-6, -11, -16, -21, \dots$ write the explicit formula for the n th term, then find the 20th term.

$$a_n = -6 - 5(n-1)$$

$$a_{20} = -6 - 5(20-1)$$

$$a_{20} = -101$$

52. For the given arithmetic sequence, write the recursive formula for the n th term and find the next three terms.
 $a_5 = 150$ and $d = -1.5$

$$a_n = a_{(n-1)} - 1.5$$

$$a_6 = 150 - 1.5 = 148.5$$

$$a_7 = 148.5 - 1.5 = 147$$

$$a_8 = 147 - 1.5 = 145.5$$

Write the rule for the n th term of the arithmetic sequence in explicit form and find the indicated value.

53. $a_1 = -4; d = -2$

54. $a_1 = 112; d = 4$

Explicit Rule $a_n = -4 - 2(n-1)$

Explicit Rule $a_n = 112 + 4(n-1)$

Find:

$$a_{12} = -4 - 2(12-1)$$

$$a_{12} = -26$$

Find:

$$a_9 = 112 + 4(9-1)$$

$$a_9 = 144$$

55. A company that fails to meet EPA pollution standards by a pre-assigned date is fined \$1000 on the first day, \$1200 on the second day, \$1400 on the third day, \$1600 on the fourth day and so on.

Arithmetic or Geometric _____

Explicit Formula $a_n = 1000 + 200(n-1)$

What was the company's fine on the 12th day after the deadline? $a_{12} = 1000 + 200(12-1) = \3200

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56. Swine flu has hit in Porkopolis again, and it is extremely contagious. Maddie catches it, and even though she is complaining of a fever, she goes to school the next day and infects 6 of her friends. Each newly infected student passes the virus to 6 new students in the next hour. This pattern continues until all students in the school are infected and Porkopolis High School shuts down for a week.

Arithmetic or Geometric _____ $1, 6, 36, 216$

Explicit Formula $a_n = 1 \cdot 6^{n-1}$

How many students are infected in 4 hours (by lunch time) $a_4 = 1 \cdot 6^{4-1} = 216$

Determine if the following ordered pairs are solutions of the inequalities (show work)

57. $x + 2y \leq -3$; $(-5, 1)$

$$-5 + 2(1) \leq -3$$

$$-3 \leq -3$$

Yes

58. $4x + 3y > 6$; $(\frac{1}{2}, 1)$

$$4(\frac{1}{2}) + 3(1) > 6$$

$$2 + 3 > 6$$

$$5 > 6$$

No

59. $-8x - 5y < 10$; $(-1, -2)$

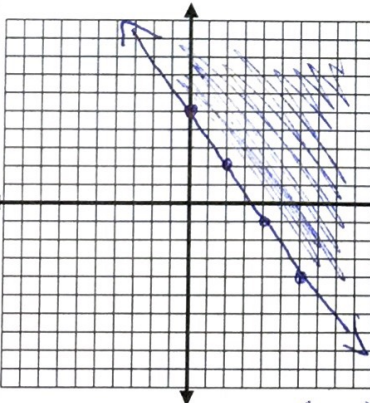
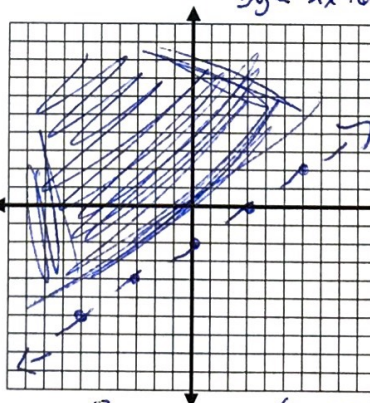
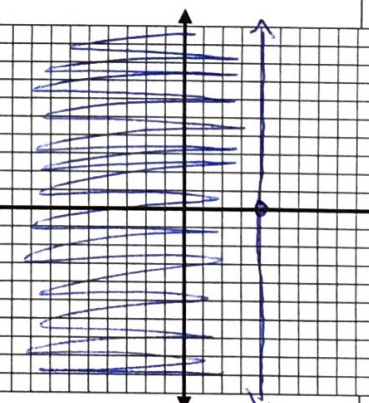
$$-8(-1) - 5(-2) < 10$$

$$8 + 10 < 10$$

$$18 < 10$$

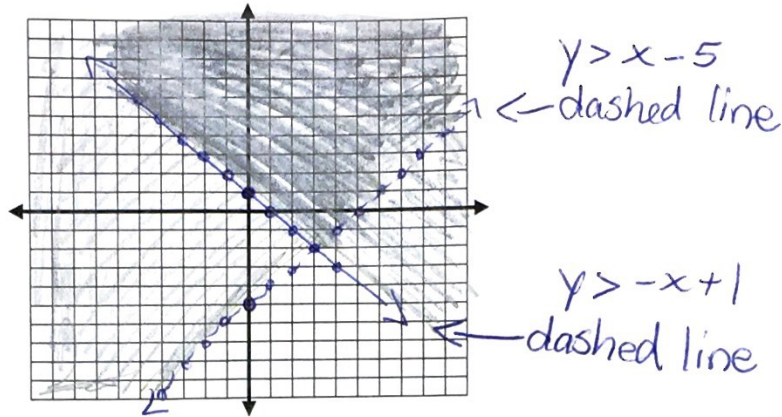
No

Graph the following inequalities in the coordinate plane. Graphs must be neat and legible and y-intercepts MUST BE LISTED AS POINTS!!!

<p>60. $y \geq -3x + 5$</p>  <p>Slope: -3 y-int: $(0, 5)$</p> <p>Name a point that is a solution: $(5, 2)$</p>	<p>61. $2x - 3y < 6$</p> <p style="text-align: right;">$-3y < -2x + 6$</p>  <p>Slope: $\frac{2}{3}$ y-int: $(0, -2)$</p> <p>Name a point that is NOT a solution: $(5, -2)$</p>	<p>62. $x \leq 4$</p>  <p>Slope: <i>undefined</i> y-int: _____</p> <p>Name a point that is a solution: $(0, 0)$</p>
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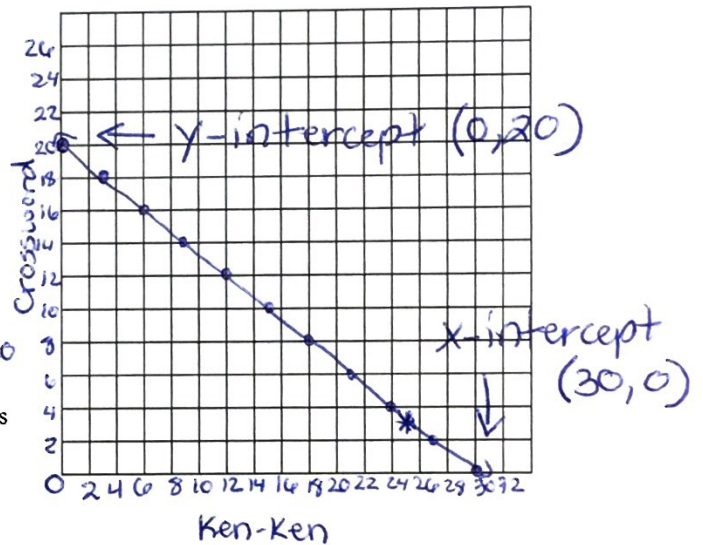
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63. Graph the system of inequalities: $y + x > +1 \rightarrow y > -x + 1$
 $y > x - 5$



64. Mrs. Daas really loves working puzzles and is always at Barnes and Noble buying more puzzle books. She realizes that she needs to put herself on a puzzle budget. Ken-Ken puzzle books are \$8, crossword puzzle books are \$12, and she has decided to allot \$240 this year for buying the books.

- a. Assign meaning to the variables x and y
 $x = \text{Ken-Ken}$
 $y = \text{crossword}$
- b. Write an equation of a line in standard form to represent Mrs. Daas's puzzle budget for the year.
 $8x + 12y = 240$



- c. Graph the line using the x and y intercepts. LABEL the axes of the graph and the intercepts.
 $y = -\frac{2}{3}x + \frac{20}{1}$ [OR] $y = -\frac{2}{3}x + 20$
- d. If Mrs Daas ends up buying 25 Ken-Ken puzzle books this year, how many crossword puzzle books can she buy and still meet her budget? Show your answer graphically AND algebraically.

$x = 25$

$$8x + 12y = 240$$

$$8(25) + 12y = 240$$

$$200 + 12y = 240$$

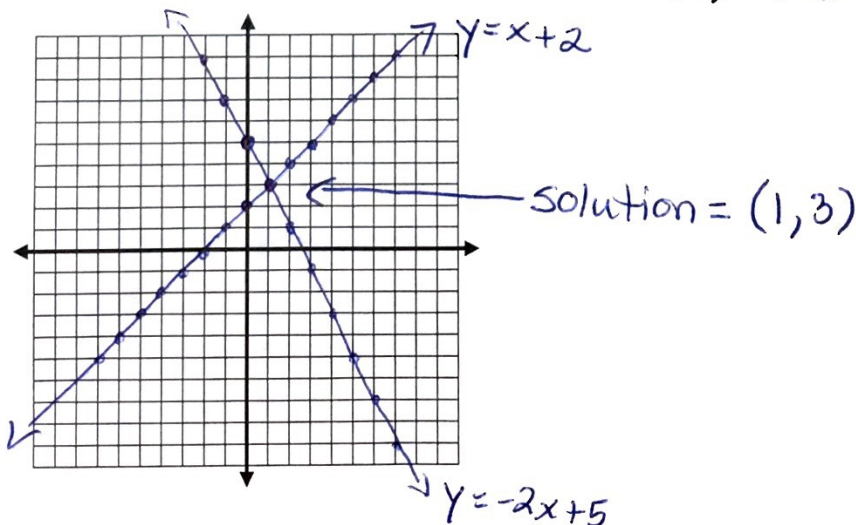
$$12y = 40$$

$$y = 3.\bar{3}$$

65. Graph the system and state the solution.

$$y = -2x + 5$$

$$x - y = -2 \rightarrow y = x + 2$$



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66. Solve the system using either **SUBSTITUTION** or **ELIMINATION**.

$$\begin{array}{r}
 -4\left(x + \frac{1}{2}y = 1\right) \\
 -3x + 2y = 11 \\
 \hline
 -4x - 2y = -4 \\
 -3x + 2y = 11 \\
 \hline
 -7x = 7 \\
 x = -1 \\
 \hline
 x + \frac{1}{2}y = 1 \\
 -1 + \frac{1}{2}y = 1 \\
 \frac{1}{2}y = 2 \\
 y = 4 \\
 \hline
 (-1, 4)
 \end{array}$$

67. Solve the system using **SUBSTITUTION** or **ELIMINATION**.

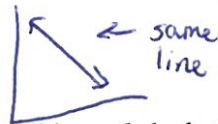
$$\begin{array}{r}
 9x - 7y = -77 \\
 3(-3x - 9y = 3) \\
 \hline
 9x - 7y = -77 \\
 -9x - 27y = 9 \\
 \hline
 -34y = -68 \\
 y = 2 \\
 \hline
 9x - 7(2) = -77 \\
 9x - 14 = -77 \\
 9x = -63 \\
 x = -7 \\
 \hline
 (-7, 2)
 \end{array}$$

Use the following results of solving a system algebraically to state how many solutions the system has. Draw a sketch of the solutions.

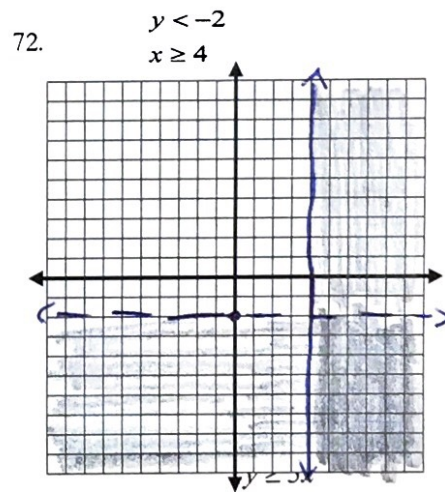
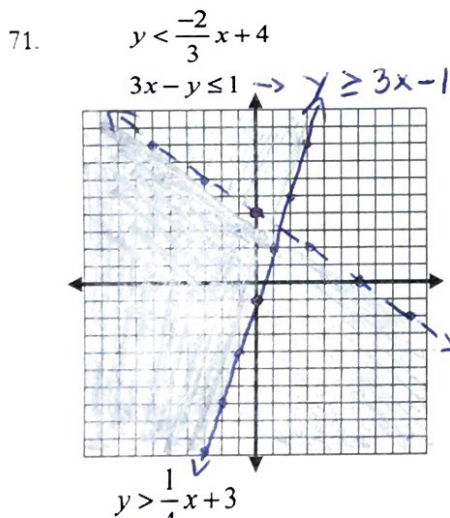
68. $0 = 6$ No Solution



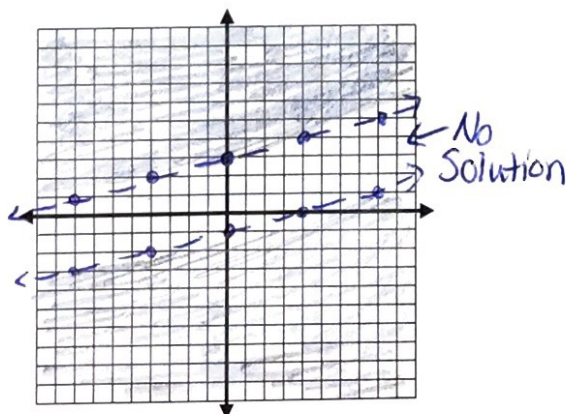
69. $8 = 8$ Infinitely Many 70. $x = 5$ and $y = -3$ 1 solution



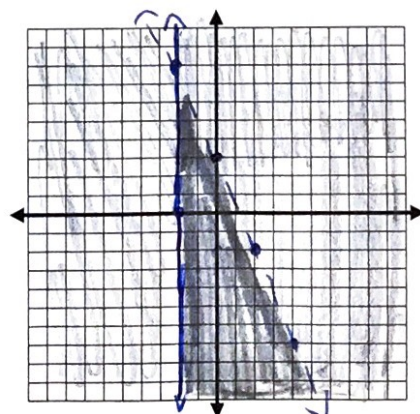
Graph the following systems of linear inequalities and shade the solution area.



73. $y > \frac{1}{4}x + 3$
 $y < \frac{1}{4}x - 1$



74. $y < \frac{-5}{2}x + 3$
 $x \geq -2$



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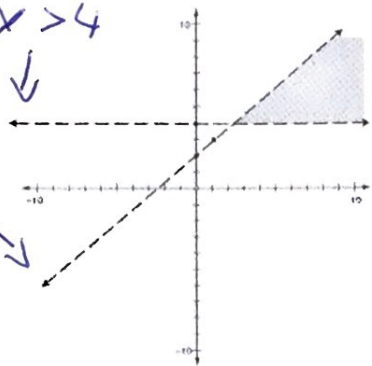
For the following graphs, write the corresponding system of inequalities

75.

$x > 4$
↓

System:

$y < x + 2$



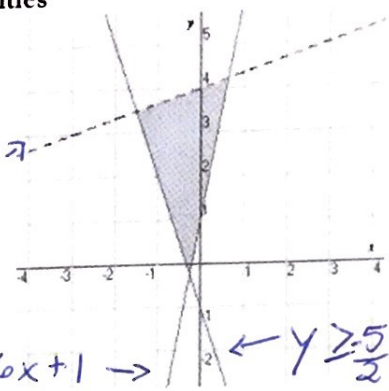
76.

System:

$y < \frac{1}{3}x + 4$

$y \geq 6x + 1$

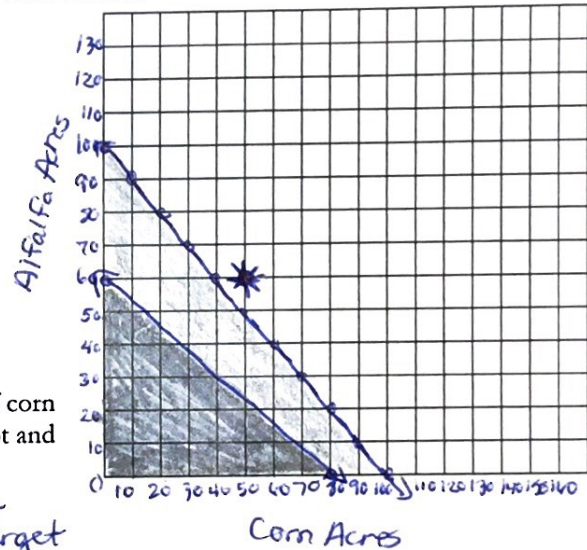
$y \geq \frac{5}{2}x - 1$



The following are word problems involving systems of linear equations and inequalities. Make sure on each problem that you state the meaning of x and y and show all work involved in solving. Problems involving graphs should include graphs that are labeled with intercepts with the solution area shaded neatly.

77. A farmer is considering what to plant on his farm. He wants to plant both corn and alfalfa. The seed for corn costs \$15 per acre and the seed for alfalfa costs \$20 per acre. The farmer can only spend \$1200 on seed. In addition, he only has irrigation to plant a total of 100 acres of land.

- a. Define the variables and label each axis.
 $x = \text{corn acres}$
 $y = \text{alfalfa acres}$
- b. Write and graph a system of linear inequalities to represent the situation.
 $x + y \leq 100 \rightarrow y \leq -x + 100$
 $15x + 20y \leq 1200 \rightarrow y \leq -\frac{3}{4}x + 60$
- c. Graph the inequalities using x and y intercepts.



- d. Is it possible for the farmer to plant 50 acres of corn and 60 acres of alfalfa? Explain why or why not and support your answer on the graph.

* Shows that he cannot plant that much and be in his target price and acre ranges.

78. You sold 72 boxes of candy for your marching band fundraiser. The large size box costs \$3.50 each and the small size box costs \$2.00 each. If you sold \$187.50 worth of candy, how many boxes of each size did you sell?

$x = \text{large box}$
 $y = \text{small box}$

$$x + y = 72$$

$$3.5x + 2y = 187.50$$

$$-2(x + y = 72) \rightarrow -2x - 2y = -144$$

$$\underline{3.5x + 2y = 187.50}$$

$$1.5x = 43.50$$

$$x = 29$$

$$29 + y = 72$$

$$y = 43$$

(29, 43)

79. You and a friend go to Taco Bell for lunch. You order three soft tacos and three burritos and your bill totals \$11.25. Your friend's bill is \$10 for four soft and two burritos. How much do soft tacos cost? How much do burritos cost?

$x = \text{soft tacos}$
 $y = \text{burritos}$

$$3x + 3y = 11.25$$

$$4x + 2y = 10$$

$$-6x - 6y = -22.50$$

$$\underline{12x + 6y = 30}$$

$$6x = 7.50$$

$$x = 1.25$$

$$3(1.25) + 3y = 11.25$$

$$3.75 + 3y = 11.25$$

$$3y = 7.50$$

$$y = 2.50$$

(1.25, 2.50)

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Factor the polynomials.

80. $x^2 - 8x + 12$

$$\begin{array}{l} \begin{array}{c} 12 \\ -6 \quad -2 \\ -8 \end{array} \\ (x^2 - 6x)(-2x + 12) \\ x(x-6) - 2(x-6) \\ (x-2)(x-6) \end{array}$$

81. $4x^2 - 13x + 10$

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

82. $4x^2 + 22x + 10$

$$2(2x + 1)(x + 5)$$

83. $5x^2 - 3x + 4$

prime

84. $64x^2 - 36$

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

85. $-4x^2 - 15x - 14$

$$(-x - 2)(4x + 7)$$

Solve the following quadratic equations by factoring.

86. $x^2 - 4x - 21 = 0$

$$\begin{array}{l} \begin{array}{c} -21 \\ -7 \quad 3 \\ -4 \end{array} \\ (x^2 - 7x)(+3x - 21) = 0 \\ x(x-7) + 3(x-7) = 0 \\ (x+3)(x-7) = 0 \end{array}$$

$$\begin{array}{l} x+3=0 \\ x=-3 \\ x-7=0 \\ x=7 \end{array}$$

88. $9x^2 - 81 = 0$

$$x_1 = -3$$

$$x_2 = 3$$

87. $x^2 + 12x = -32$

$$x_1 = -8$$

$$x_2 = -4$$

89. $\frac{1}{7}x^2 - 3 = 4$

$$x_1 = -7$$

$$x_2 = 7$$

90. $4(x-3)^2 = 256$

91. $9x^2 - 48x = -64$

Use the Quadratic Formula to solve each equation.

92. $x^2 - 2x - 15 = 0$

$a = 1$
 $b = -2$
 $c = -15$

$$= \frac{2 \pm \sqrt{4 - 4(1)(-15)}}{2}$$

$$= \frac{2 \pm \sqrt{64}}{2}$$

$$= \frac{2 \pm 8}{2}$$

$$\frac{10}{2} = 5$$

$$\frac{-6}{2} = -3$$

93. $2x^2 + 8x + 3 = 3$

$$x_1 = -4$$

$$x_2 = 0$$

Solve by completing the square.

94. $y^2 - 8y + 16 = 36$

$$y^2 - 8y + 16 = 20 + 16$$

$$\sqrt{(y-4)^2} = \sqrt{36}$$

$$y-4 = \pm 6$$

$$y = 6+4 \text{ and } -6+4$$

$$y = 10 \text{ and } y = -2$$

95. ~~$-2x^2 + 8x - 18 = 0$~~

Write the equation in vertex form of the quadratic equation that has been...

~~96. a) shifted to the right 4 and up 3~~