

Math 3
Unit 1 Test Review

Name: Key
Date: _____

Section #1: Find the appropriate solution for the assigned function(s)

$$f(x) = 3x - 8 \text{ and } g(x) = -2x^2 + 5x - 7$$

1. $f(0) = -8$

4. $f(g(x)) = -6x^2 + 15x - 29$

2. $f(g(2)) = -23$

5. $f(x) - g(x) = -2x^2 + 2x - 1$

3. $2[f(2) - g(1)] = 4$

6. $f(2z) + g(z) = -2z^2 + 11z - 15$

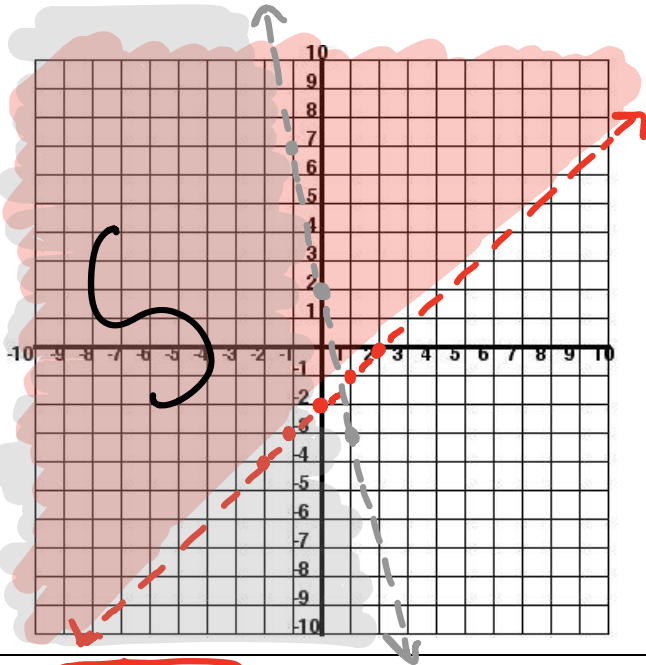
Section #2: Find the solution(s) to the following system.

7. $y = -4x + 4$
 $y = -x^2 - 2x + 4$ Solutions: $(0, 4)$
 $(2, -4)$

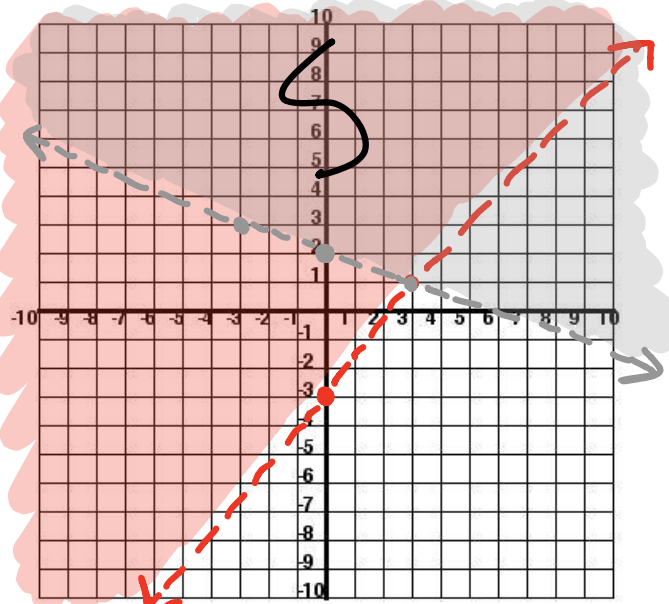
8. $y = |x - 3|$
 $y = \frac{-2}{5}x + \frac{27}{5}$ Solutions: $(-4, 7)$
 $(6, 3)$

Section #3 Sketch the solution for each inequality.

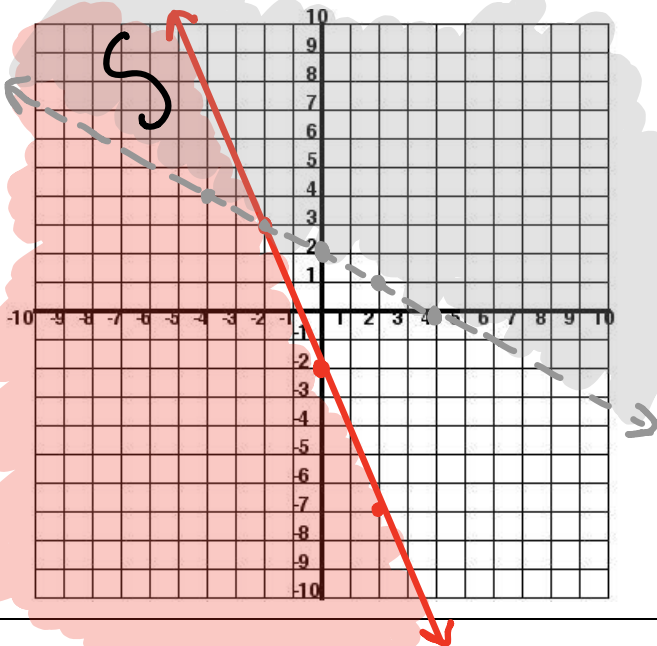
9. $y > -x - 2$
 $y < -5x + 2$



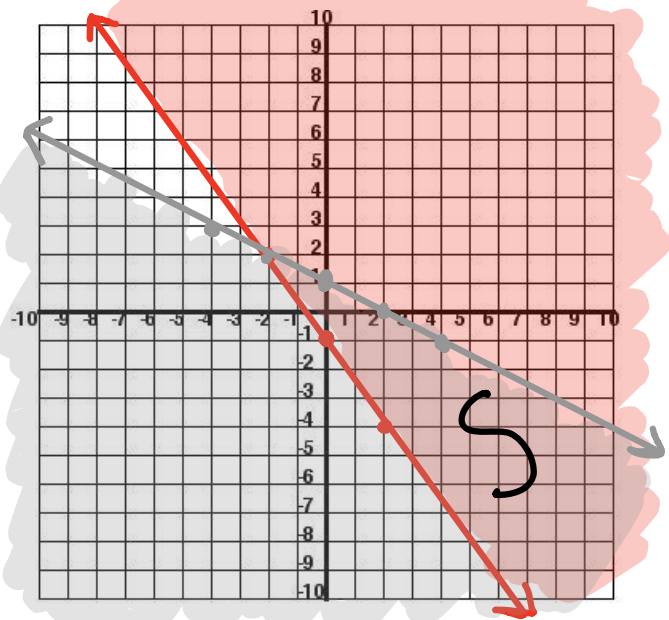
10. $4x - 3y < 9 \rightarrow y > \frac{4}{3}x - 3$
 $x + 3y > 6 \rightarrow y > -\frac{1}{3}x + 2$



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



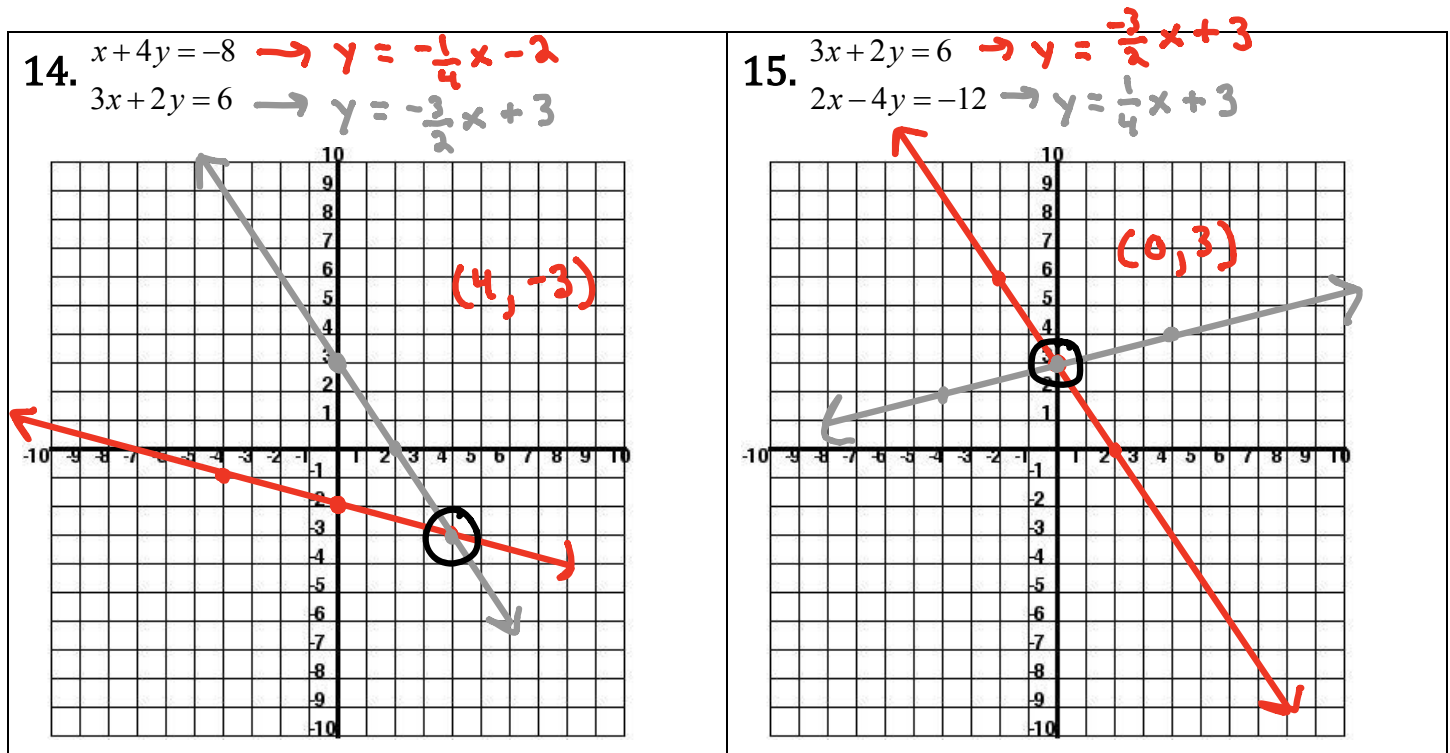
12. $3x + 2y \geq -2 \rightarrow y \geq -\frac{3}{2}x - 1$
 $x + 2y \leq 2 \rightarrow y \leq \frac{-1}{2}x + 1$



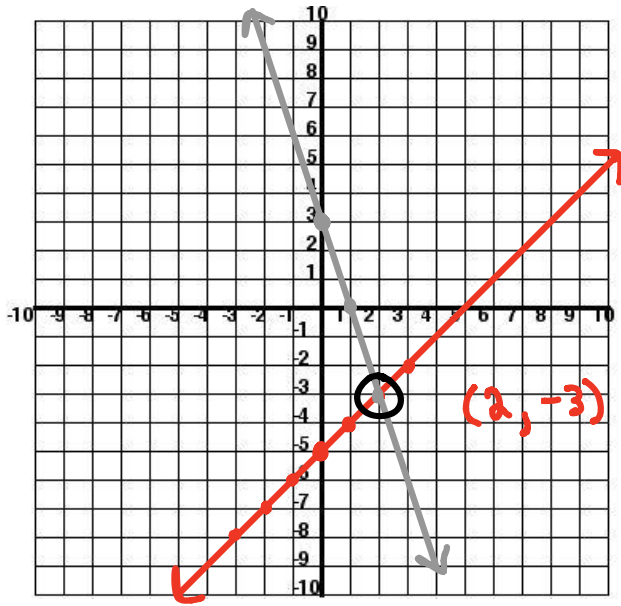
Section #4: Solve the systems of linear equations through graphing, substitution, or elimination. Use method indicated if possible.

13. The equations $8x+4y=28$ and $-9x+9y=36$ represents the amount of money collected from the Stone Creek Movie Theater. If “y” represents the cost of an adult ticket to get into the movie and “x” represents the cost of a child ticket to get into a movie then what is the cost of each adult ticket? Use any method! ☺ **Adult Ticket: \$5**

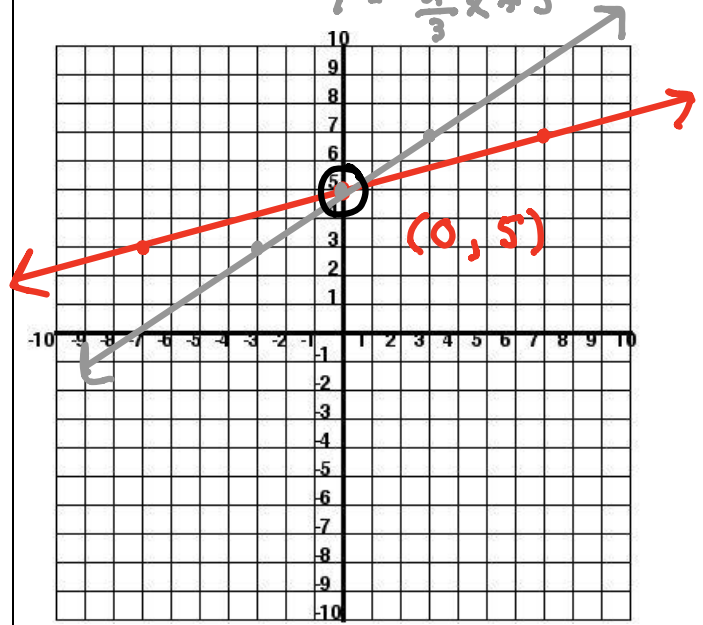
METHOD 1: GRAPHING



16. $x - y = 5 \rightarrow y = x - 5$
 $3x + y = 3 \rightarrow y = -3x + 3$



17. $7y = 2x + 35 \rightarrow y = \frac{2}{7}x + 5$
 $3y = 2x + 15 \rightarrow y = \frac{2}{3}x + 5$



METHOD 2: Elimination

18. $4x - 5y = 17$
 $3x + 4y = 5$

$(3, -1)$

19. $5x - 2y = 10$
 $3x + 2y = 6$

$(2, 0)$

20. $2y - 4x = -6$
 $2y - 8x = -12$

$(1.5, 0)$

or

$(\frac{3}{2}, 0)$

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

$(6, 0)$

Method 3: Substitution

<p>22. $x - y = 1$ $x + 2y = 7$</p> <p style="text-align: center;">$(3, 2)$</p>	<p>23. $-5m + 9n = 21$ $2m + 2n = 14$</p> <p style="text-align: center;">$(3, 4)$</p>
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Section #5: Evaluate each piece-wise function for its given domain.

<p>24. $f(x) = \begin{cases} 2x + 1 & x \geq 1 \\ x^2 + 3 & x < 1 \end{cases}$</p> <p>$f(-10) = (-10)^2 + 3 = 103$</p> <p>$f(-2) = (-2)^2 + 3 = 7$</p> <p>$f(6) = 2(6) + 1 = 13$</p> <p>$f(1) = 2(1) + 1 = 3$</p>	<p>25. $f(x) = \begin{cases} x^2 - 1 & x \leq 0 \\ 2x - 1 & 0 < x \leq 5 \\ 3 & x > 5 \end{cases}$</p> <p>$f(-2) = (-2)^2 - 1 = 3$</p> <p>$f(0) = (0)^2 - 1 = -1$</p> <p>$f(5) = 2(5) - 1 = 9$</p> <p>$f(7) = 3$</p>
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26. Looking at #24 find: $2f(1) - 3(f(-3) + f(0)) = -39$

Section #6: For each equation state the domain and range (using interval notation) then find the inverse and state the domain and range of the inverse.

Also, determine if the inverse is a function.

<p>27. $f(x) = 5x^3 - 7$</p> <p>Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$</p> <p>$f^{-1}(x) = \sqrt[3]{\frac{x+7}{5}}$</p> <p>Domain of $f^{-1}(x)$: $(-\infty, \infty)$</p> <p>Range of $f^{-1}(x)$: $(-\infty, \infty)$</p>	<p>28. $f(x) = -5x - 11$</p> <p>Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$</p> <p>$f^{-1}(x) = \frac{x+11}{-5}$</p> <p>Domain of $f^{-1}(x)$: $(-\infty, \infty)$</p> <p>Range of $f^{-1}(x)$: $(-\infty, \infty)$</p>
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29. $f(x) = 3x^2 - 1$

Domain: $(-\infty, \infty)$ Range: $[-1, \infty)$

$f^{-1}(x) = \sqrt{\frac{x+1}{3}}$

Domain of $f^{-1}(x)$: $[-1, \infty)$

Range of $f^{-1}(x)$: $[0, \infty)$

30. $f(x) = \sqrt{x-4}$

Domain: $[4, \infty)$ Range: $[0, \infty)$

$f^{-1}(x) = x^2 + 4$

Domain of $f^{-1}(x)$: $(-\infty, \infty)$

Range of $f^{-1}(x)$: $[4, \infty)$

Section #7 Absolute Value Equations & Functions

31. Solve each of the following.

a. $|x-1| < 4$ $x < 5$ & $x > -3$

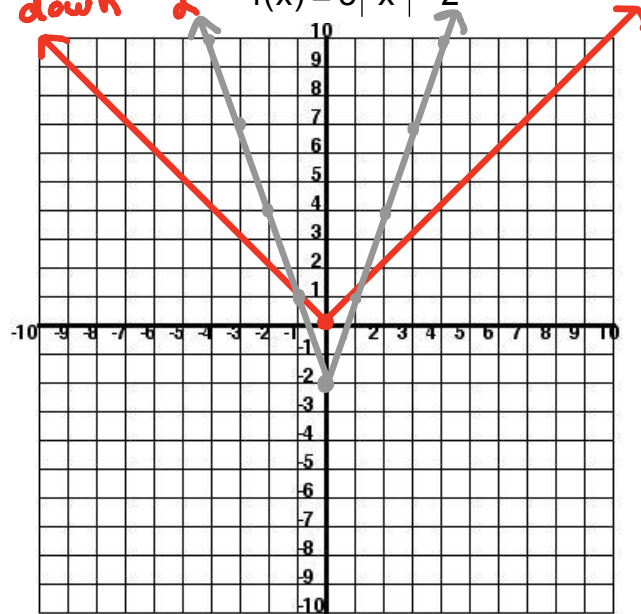
b. $3+|y| \leq 5$ $y \leq 2$ & $y \geq -2$

c. $|2+3d| \geq 4$ $d \geq \frac{2}{3}$ & $d \leq -2$

d. $|2m-1| > 2$ $m > \frac{3}{2}$ & $m < -\frac{1}{2}$

32. Graph the following equation. Then

describe the translate of $g(x) = |x|$ to $f(x)$.
 vertical stretch by a factor of 3
 down 2
 $f(x) = 3|x-2|$



33. Determine whether each of the following is a function. Justify your answer. Find the Domain and Range of each.

a. $f(x) = \sqrt{x-3}$ Yes
 Domain: $[3, \infty)$
 Range: $[0, \infty)$

b. $f(x) = -x^2 + 2x - 27$ Yes
 Domain: $(-\infty, \infty)$
 Range: $(-\infty, -26]$

~~34. You work forty hours a week at a furniture store. You receive a \$720 weekly salary, plus a 3% commission on sales over \$5000. Assume that you sell enough this week to get the commission. Given the functions $f(x) = 0.03x$ and $g(x) = x - 5000$, which of $(f \circ g)(x)$ and $(g \circ f)(x)$ represents your commission? Also, how much will your salary be if your sales were \$14,000? How much will your salary be if your sales were \$4999?~~