

WMRHSD Mathematics Department

Algebra 2 Summer Assignment

Please complete the following problems prior to the first day of school in August. If you need help with a problem, use the links provided to refresh your memory! Please remember to **SHOW ALL WORK!!!** **Calculators should not be used unless stated in the numbered problem.**

1. Solve each of the proportions below.

a.
$$\frac{n+4}{n-11} = \frac{10}{3}$$

b.
$$\frac{12}{r+1} = -\frac{8}{r-1}$$

Helpful Links: https://youtu.be/09ILy_EChwA

2. Solve each of the linear equations below.

a.
$$-96 = -3(-8v + 8)$$

b.
$$2(8b - 6) = 116$$

Helpful Links: <http://tinyurl.com/mayd3ge>
<http://tinyurl.com/h6yfpj4>

3. Solve the given absolute value equation.

$$3|2x - 7| - 5 = 4$$

Helpful Links: <http://tinyurl.com/nko9uhu>
<http://tinyurl.com/cl8ktgc>

4. Solve each of the following inequalities and use a number line to graph the solutions.

a. $-2 < 1 - 3x < 10$

b. $5x + 16 \leq 31$ or $8 - 4x < -12$

Helpful Links: <http://tinyurl.com/okvdbr>
<http://tinyurl.com/14xnlpo>

5. Given the functions below perform the indicated operation without a calculator.

$$f(x) = 4x - 12x^2 + 7x^3$$

$$g(x) = x^2 + 4$$

a. $f(1) =$

b. $(f - g)(x) =$

Helpful Links: <https://www.youtube.com/watch?v=uWKGVSpWcc8>
<http://tinyurl.com/ha8lje4>

6. Solve the systems of equations algebraically. You may use your calculator only to check your answers.

a.
$$\begin{cases} y = 2x + 4 \\ -3x + y = -9 \end{cases}$$

b.
$$\begin{cases} 3x + 3y = 6 \\ -5x + 2y = 17 \end{cases}$$

Helpful Links: <https://tinyurl.com/krkshgf>
<https://www.youtube.com/watch?v=4Fv6o-pYJDs>

7. Simplify the expressions using properties of exponents.

a. $-5ab^4 \cdot -2ba^0$

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

c. $\frac{2m^2}{3m^4}$

Helpful Links: <https://youtu.be/vBMYNH-Bi8s>

8. Factor the expressions completely.

a. $3x^2 - 8x + 4$

b. $25x^2 - 100$

Helpful Links: <http://tinyurl.com/mqqzugg>
<http://tinyurl.com/kdyc6ah>

9. Solve the quadratic equations by factoring.

a. $x^2 - 25 = 0$

b. $x^2 - 6x + 5 = 0$

c. $2x^2 + 8x = 0$

Helpful Links: <http://tinyurl.com/mfrlndm>
<http://tinyurl.com/ll4s27s>

10. Solve the quadratic equation using the Quadratic Formula. (If necessary, click on the link below to see the Quadratic Formula) **You may use your calculator!**

$$0 = x^2 - 4x - 8$$

Helpful Links: <http://tinyurl.com/mntfd45>

11. Simplify the following polynomial expressions.

a. $(5v^3 - 5v^2 + 5) + (1 - 6v + 5v^2)$

b. $(8n^4 - 3n^2 + n^3) - (5n^3 + 3n^4 + 5n^2)$

c. $(2v - 7)(7v - 4)$

d. $(6p + 3)^2$

Helpful Links: <http://tinyurl.com/lh1l72e>

12. Simplify the radical expression without using a calculator.

a. $\sqrt{192}$

b. $\sqrt{\frac{6}{27}}$

c. $\frac{3}{\sqrt{6}}$

d. $(2\sqrt{5})^2$

Helpful links: <https://tinyurl.com/zg93ad6>

13. Write an equation in slope-intercept form for each line described below.

a. Passes through (5, 4) and has a slope of $-\frac{2}{3}$.

b. Passes through (-6, -3) and (-2, -5).

Helpful Links: <https://tinyurl.com/hyfah9z>
<https://tinyurl.com/grt9duf>

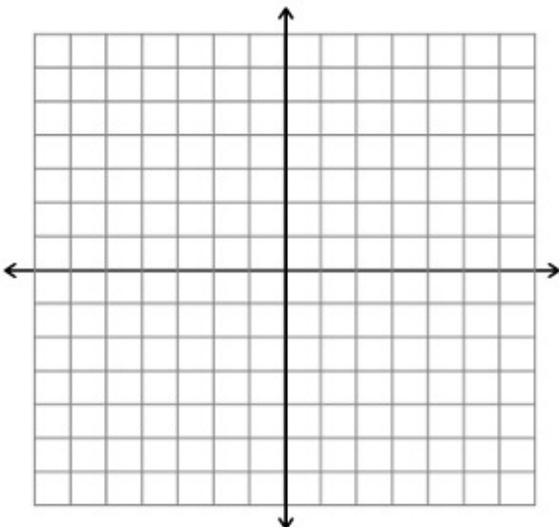
14. Find the x and y intercepts of the graph of the linear equation algebraically (by hand). You may use your calculator to confirm your answer.

$$y = -6x + 8$$

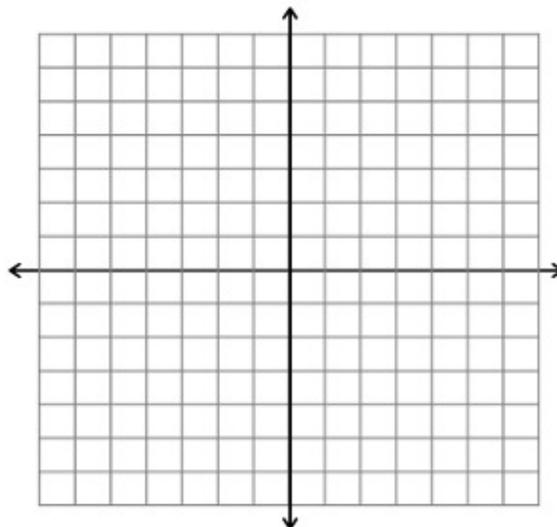
Helpful Links: <https://tinyurl.com/k7fbfwb>

15. Graph each of the linear equations and inequalities. (Helpful Links on following page)

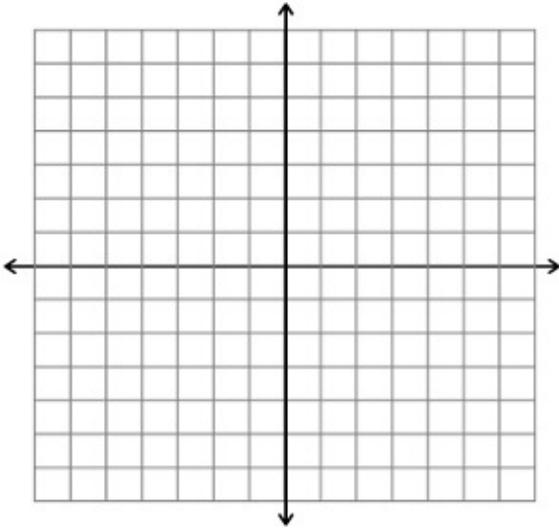
a. $y = \frac{3}{4}x - 4$



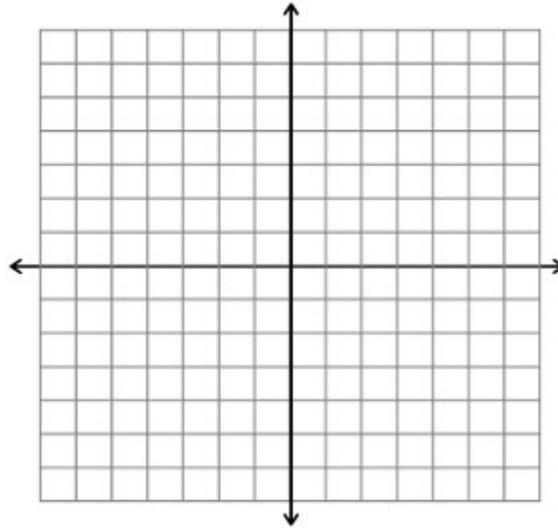
b. $x + 3y = 6$



c. $y + 4 = 3(x + 1)$



d. $3x - 2y > 6$



Helpful Links: Slope-intercept form <https://tinyurl.com/lpqx9yt>

Standard form <https://tinyurl.com/z36lwbw>

Point-slope form: <https://tinyurl.com/mglyya8>

Graphing linear inequalities: <https://tinyurl.com/o9l8zeb>

16. In words, describe the transformations of $f(x)$. (For example: translations left/right/up/down, reflections, vertical stretch/compression)

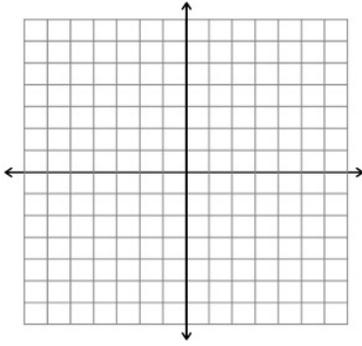
a. $g(x) = 2 \cdot f(x) + 3$

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

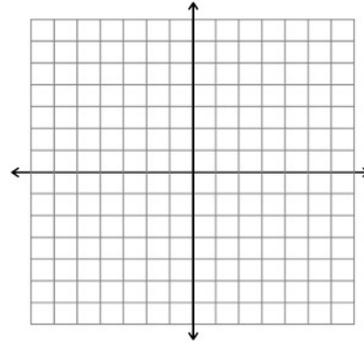
Helpful Links: <https://www.youtube.com/watch?v=Ccq1aQDCfVE>

17. Use transformations of the parent curve $f(x) = x^2$ to graph the transformations $g(x)$.

a. $g(x) = f(x+2)$



b. $g(x) = -f(x) - 5$



Helpful Links: <https://www.youtube.com/watch?v=IFT2uznB7fM>

18. Given the below quadratic function, answer parts a - d.

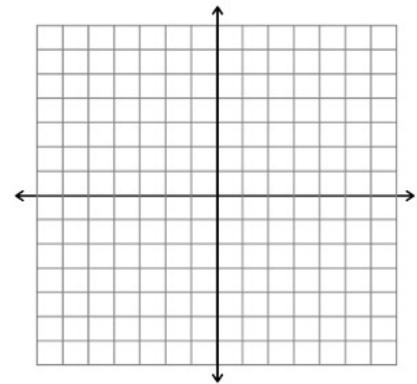
$$y = x^2 - 4x + 3$$

a. Identify the vertex.

b. Identify the axis of symmetry.

c. Find the y-intercept.

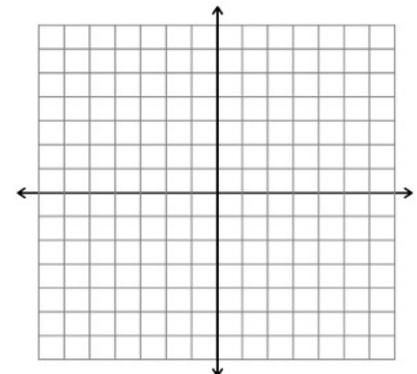
d. Use your answers from parts a - c to graph the quadratic.



Helpful Links: <https://www.youtube.com/watch?v=rnk0rC9Gyo>
<https://www.youtube.com/watch?v=RGUOwB81ZVI>

19. Solve the system of equations graphically.

$$\begin{cases} y = 2x + 4 \\ -3x + y = 3 \end{cases}$$

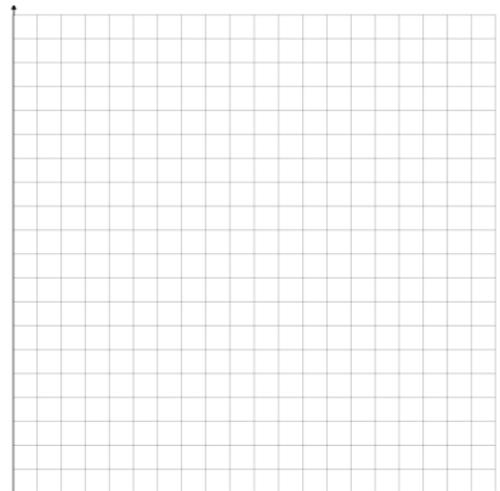
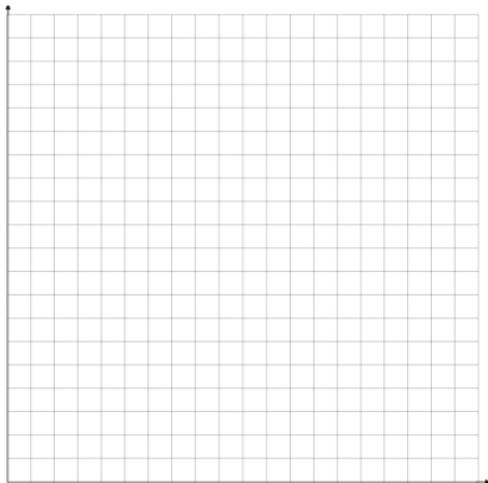


Helpful Links: <https://tinyurl.com/laytjtv>

20. Use the data presented in the two tables to create a scatterplot and answer the question that follows.

Set A	
x	f(x)
0	20
1	10
2	5
3	2.5
4	1.25

Set B	
x	g(x)
3	11
5	16
7	21
9	26
11	31



Determine whether each data set represents a linear, quadratic, or exponential function.

Data Set A: _____

Data Set B: _____

Helpful Links: <https://tinyurl.com/jm3glou>
<https://tinyurl.com/lp9gx8x>

21. A local mini-golf course charges \$5 per person to play a round of golf, and the course sells 120 rounds of golf per week. The manager of the course studied the effect of raising the price to increase revenue and found the following data. The table shows the price, number of rounds of golf, and weekly revenue for different numbers of \$0.25 increases in price. **You may use a calculator.**

Number of \$0.25 price increases, n	0	1	2	3	4
Price of a round of golf, $p(n)$	\$5.00	\$5.25	\$5.50	\$5.75	\$6.00
Number of rounds of golf sold, $s(n)$	120	117	114	111	108
Weekly revenue, $r(n)$	\$600	\$614.25	\$627	\$638.25	\$648

- a. Based on the data, write a linear function to model the price of one round of golf, $p(n)$, in terms of the number of \$0.25 increases.
- b. Based on the data, write a linear function to model the number of rounds of golf sold in a week, $s(n)$, in terms of the number of \$0.25 price increases.
- c. Based on the data, write a quadratic function for the weekly revenue in a week, $r(n)$, in terms of n , the number of \$0.25 increases.
- d. Use your quadratic function to determine the weekly revenue in a week when tickets cost \$6.25.
- e. What is the maximum possible weekly revenue?