Name: _____ Date: _____

Algebra 2 Summer Work

Directions: Complete each problem to the best of your ability and show all work. You may use a graphing calculator. Under each section, record the date that you complete it. You are welcome to email me with any questions. If some of this material is confusing or challenging for you — do not worry! We will review all of this in the first few weeks of class. This will count for your first quiz grade of the year. Due on the first full day of class, Wednesday September 4.

*There will be awkward blank spaces at some points in this packet — ignore those! The numbering of the questions may also seem strange on some pages. I took out some questions so the numbers skip around a bit.

I've also tried to put in some hints, so please use those. You are also welcome to responsibly use the internet for help.

Order of Ops & Evaluating Expressions

Hint: PEMDAS

Date:

Simplify each expression.

1. $6^3 \div \left\{\left(12+5^2\right)-\left(\left|-7\right|-15\right)^2\right\}$

2. $\dfrac{3^3-6+\sqrt{-40+11^2}}{18-6^2\cdot 2}$

Evaluate the expressions below if a = 8, b = -2 and c = -9.

3. $\left|-a^2-2bc\right|$

4. $-\dfrac{7}{6}c+\dfrac{3}{4}ab$

Multi-Step Equations

Date:

Solve each equation.

1. $14a-(2a+9)=\frac{2}{3}(12a-18)$

Hint: cross-multiplication

3. $\frac{3}{8}=\frac{6w-7}{2w+14}$

4. Solve $F=\frac{9}{5}C+32$ for C

Word Problems

Date:

1. The leg of an isosceles triangle is two less than three times the length of its base. If the perimeter of the triangle is 45 meters, find the length of the leg.

Hint: perimeter is all the sides added together. Draw it out!

Absolute Value Equations

Hint: the inside of the absolute value can be equal to either a positive 26 or a negative 26.

Date:

Solve each equation. ***Be sure to check for extraneous solutions. ***

1. $|4x+6|=26$

2. $\frac{|-8-5r|}{6}=2$

Multi-Step Inequalities

Hint: dividing or multiplying inequalities by a negative number will flip the sign.

Date:

Solve, graph, and write the solution in interval notation.

1. $\frac{3(2x+16)}{-8} \geq x-1$

2. $-\frac{5}{4}(24-6m) > 14-\frac{1}{2}(16-7m)$

Compound Inequalities

Date:

Solve, graph, and write the solution in interval notation.

1. $2(2-3c) \leq -2$ or $4c+5<-3$

2. $4-7a \leq 67$ and $\frac{5a+2}{-9} > 2$

Absolute Value Inequalities

Date:

Solve, graph, and write the solution in interval notation.

1. $|6x - 10| \leq 34$

2. $-6|2v - 6| + 5 < -79$

Evaluating Functions

Date:

Given $f(x) = 8x - 9$, $g(x) = -x^2 + 7x$ and $h(x) = |2 - 4x|$, find each value.

1. $g(8)$

2. $h(13) - f(-1)$

5. If $f(x) = -23$, find x.

Slope-Intercept & Standard Form

Date:

Write each equation in standard form:

1. $12y = 9x - 30$

2. $\frac{2}{9}x - \frac{5}{6}y = 2$

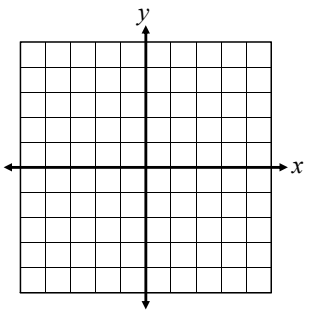
Hint: Standard form is Ax+By=C where A cannot be negative.

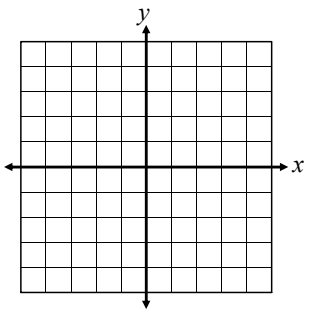
Write in slope-intercept form, then graph.

3. $x - 5y = 20$

4. $15x = -10y$

Hint: Slope intercept form is y=mx+b.



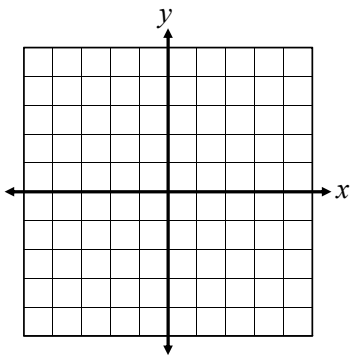


x- and y-Intercepts

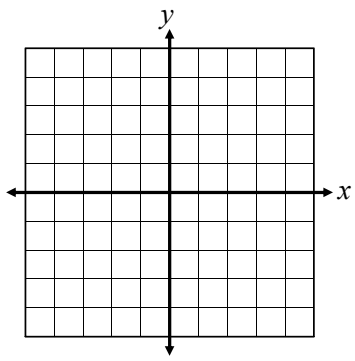
Date:

Find the x- and y-intercepts of each equation, then graph.

1. $y = -6x + 2$



2. $5x = 8y + 20$



Point-Slope & Two Points

You may leave your answer in point-slope form or slope-intercept form.

Date:

Write a linear equation with the given information.

2. Passes through (2, -6) and parallel to the line $2x - 3y = 15$.

3. Passes through the points (-9, 7) and (3, -2).

Linear Equations Applications

Date:

Define variables, set up an equation, then solve.

1. Caitlyn is going away to college and will need to rent a truck to help move. The cost of the truck is $35 plus $0.79 per mile. If her college is 85 miles away and she budgeted $100 for the rental, will she have enough money?

Solving Systems by Graphing & Substitution

Hint: "solving" means to find the coordinate where the lines intersect.

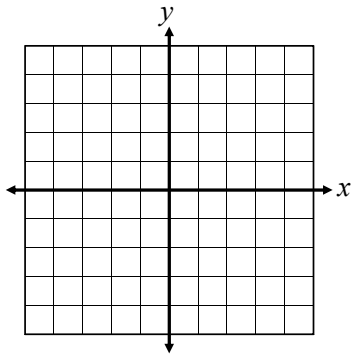
Hint: isolate one variable in one equation, then plug it into the other equation.

Date:

1. Solve by graphing.

$3x + 4y = -16$

$2x = y - 7$



2. Solve by substitution.

$2x + 7y = -23$

$5x - y = -39$

Solving Systems: by Elimination

Hint: Remember that for elimination, you need the coefficients of one of the variables to match up. Then you can add or subtract the equations together to "eliminate" that variable.

Date:

Solve each system by elimination.

1. $x - 4y = -14$

$6x + 8y = -12$

2. $6y = 2x + 4$

$7x + 14 = 21y$

Systems Applications

Hint: write one equation for Kate and one equation for Eric.

Date:

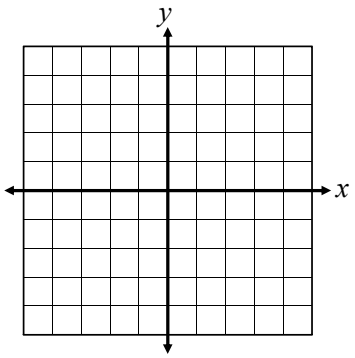
Kate bought 5 pounds of hamburger and 2 pounds of hotdogs and paid $28.50. Eric bought half the amount of hamburger and a fourth of the amount of hotdogs that Kate did and paid $12.50. Find the cost per pound of hamburgers and hotdogs.

Linear Inequalities & Systems

Date:

1. Graph the linear inequality.

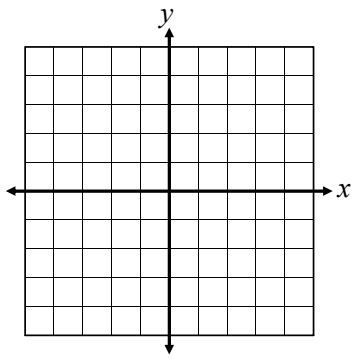
$4x - 5y \geq 10$



2. Graphing the system of linear inequalities.

$6x + 3y > 15$

$y > -2$

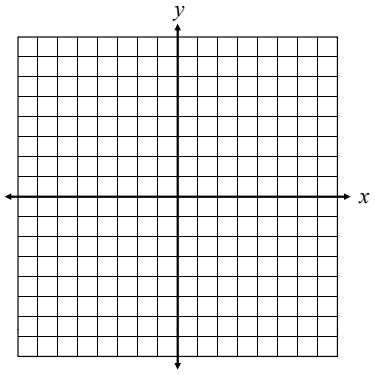


Piecewise Functions

Date:

Graph each function. State the domain and range.

1. $f(x) = \begin{cases} -3x - 5 & \text{if } x < -2 \\ -x + 1 & \text{if } x \geq -2 \end{cases}$



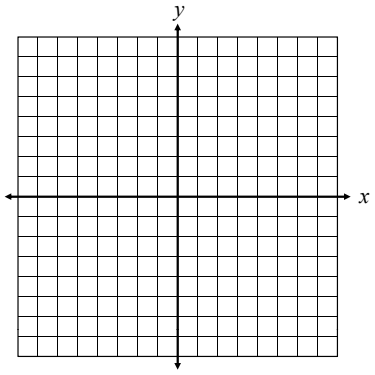
Absolute Value Functions

Hint: the graph of an absolute value function will look like a "V"

Date:

Graph each function using a table of values.

1. $f(x) = -2|x+4|$



Parent Functions & Transformations

Hint: is the function moving up, down, left, or right?

Date:

Identify the parent function for each function family, then sketch the graph.

1. Linear

2. Absolute Value

Describe the transformations in each function.

3. $f(x) = |x+8|$

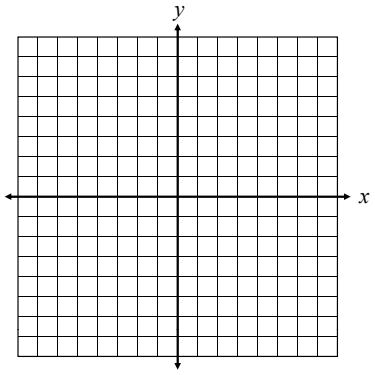
4. $f(x) = -|x| - 3$

Vertex Form of an Absolute Value Function

Date:

Give the vertex of each function, then graph.

1. $f(x) = |x + 3| - 6$



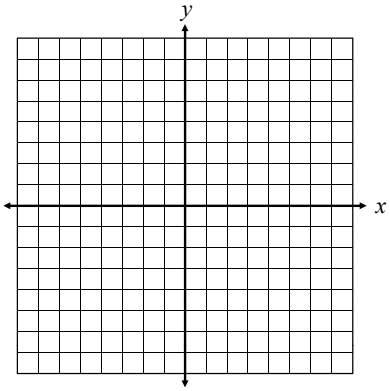
Quadratic Functions: Standard Form

Hint: You can find the x-coordinate of a quadratic by using x=-b/(2a). Once you find the x-coordinate, plug that value back into the function to find the y-coordinate of the vertex. Then make a table of values!

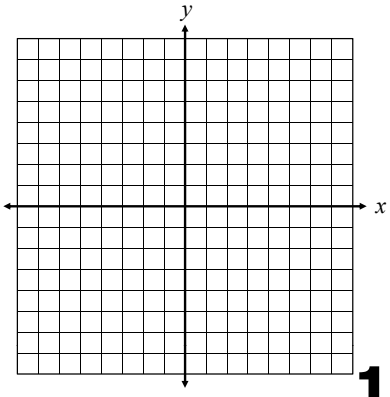
Date:

Give the axis of symmetry and vertex of each function. Graph using a table of values.

1. $f(x) = x^2 + 6x + 8$



2. $f(x) = -2x^2 - 4x + 5$

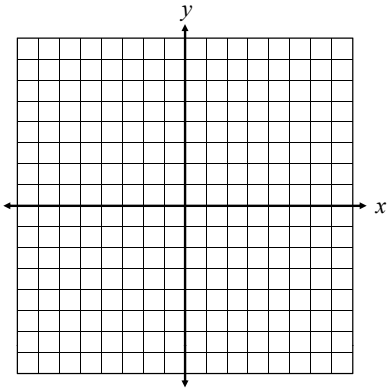


More Piecewise Functions Practice

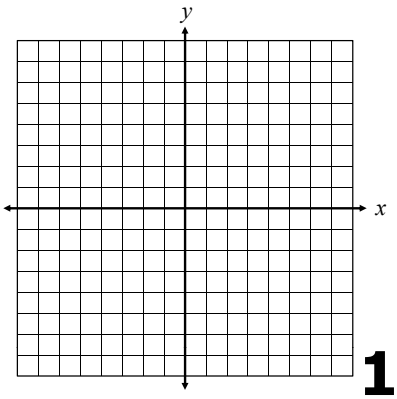
Date:

Graph each function. State the domain and range.

1. $f(x) = \begin{cases} |x-1|-5 & \text{if } x < 3 \\ -2x+7 & \text{if } x \geq 3 \end{cases}$



2. $f(x) = \begin{cases} x^2-1 & \text{if } x < -1 \\ -x+4 & \text{if } x > -1 \end{cases}$

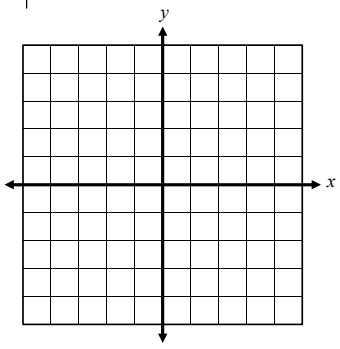


Function Families Review

Date:

Graph each function and give its characteristics.

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

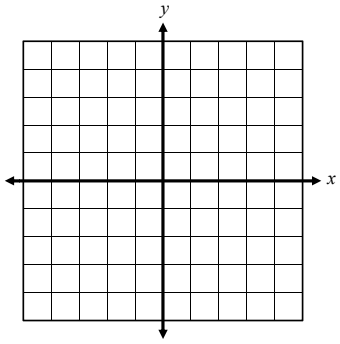


Parent Function: _____

D: _____; **R:** _____

Number of roots: _____

2. $f(x) = \frac{6}{5}x - 1$



Parent Function: _____

D: _____; **R:** _____

Number of roots: _____

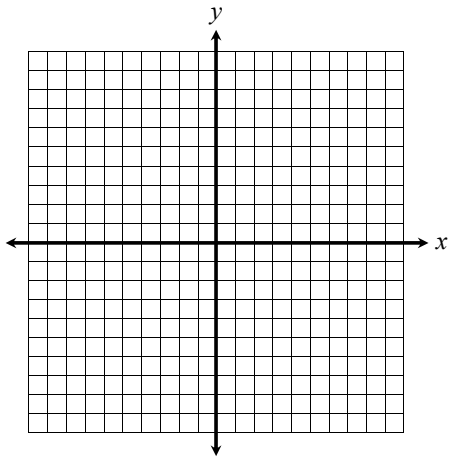
Quadratic Roots

Date:

1. What are quadratic roots?

2. What else are quadratic roots referred to as?

3. Find the roots by graphing: $f(x) = -x^2 + 2x + 8$



Factoring Review

Date:

Factor each polynomial completely:

1. $x^2 - 14x - 95$

2. $5x^2 - 40x + 80$

4. $16x^2 - 49$

6. $24x^2 - 10x$

Hint: Always try to find a GCF first.

For a trinomial with no coefficient of x^2, look for two numbers that multiply to c and add to b.

And don't forget about difference of squares and the a*c method.

Solving Quadratics by Factoring

Hint: you can only factor when the equation is set equal to 0.

Date:

Solve each quadratic equation by factoring:

1. $x^2 + 11x + 30 = 0$

2. $2x^2 + x = 2x + 6$

3. $4x^2 - 74 = x^2 + 1$

Factored Form vs. Vertex Form

Hint: "Roots" is another way of saying x-intercepts.

Date:

1. What are the roots of the quadratic equation below?

$f(x) = (3x + 2)(x - 4)$

2. Write the equation below in factored form
Give the axis of symmetry, vertex, and roots.

$f(x) = -x^2 - 12x - 27$

Solving Quadratics by Square Roots

*Hint: The key with solving by square roots is to isolate the x squared term first.

Date:

Solve each quadratic equation by square roots:

1. $x^2 - 10 = 159$

2. $36x^2 - 1 = 0$

3. $2x^2 + 7 = 41$

Completing the Square

Hint: we had to complete the square when finding the equation of circles.

*#2 is tricky because of the coefficient of 4. Try factoring out a 4 first from each term and then completing the square.

Date:

Solve by completing the square:

1. $x^2 + 12x + 47 = 0$

2. $-4x^2 + 408 = 20 - 8x$

The Quadratic Formula

*If you forgot the quadratic formula, feel free to Google it.

Date:

Solve by the quadratic formula:

1. $10x^2 - 9x = 2x + 6$

2. $-x^2 = 8x + 26$

Projectile Motion

*Hint: Think about if the quadratic will be facing up or down. Which part of the quadratic represents the maximum height? How will you find the coordinate of that point?

For #2, you are given the height, and you are now trying to find time. Will you plug in 6 for h(t) or t in the equation?

Date:

The football coach threw a football from a platform to his quarterback below. The height of the football, h, at time t seconds is modeled by the equation $h(t) = -16t^2 + 28t + 15$.

1. What is the maximum height of the ball?

2. If the quarterback caught the ball at a height of 6 feet, how many seconds was the ball in the air?