



**Cedar Grove High School  
Mathematics Department**

***Summer Skills Packet***

**Pre-Calculus**

**AND**

**Pre-Calculus Honors**

*This packet is to be handed in on the first day of school. A diagnostic  
assessment of this material will take place within the first week of the new  
school year.*

This assignment is for students ENTERING

Pre-Calculus.

Pre-Calculus HONORS.

## Welcome to Precalculus!

Attached is a take-home summer review packet. This will be your first grade and will be worth 100 points: 50 points for completing the packet combined with the results from a 50 point exam designed to prove your mastery of these skills. The packet is due and the test will be administered during the first week of school. The packet will be graded based on completeness and the exam will be based on content mastery. A lack of mastery may result in a change of course or level.

You will need a **TI-84 Plus** calculator for this math class. You may use a calculator to complete this assignment if you wish, unless otherwise indicated.

Good luck and have a great summer!

**Mrs. Rack**

rack.michele@cgschools.org

**To be successful in precalculus, I expect you to know these skills BEFORE you start the course. If you need additional help, I have included resources to help you master the material.**

**Be prepared; we will hit the ground running!**



### Resources:

<http://algebra2.flippedmath.com/> Videos and worksheets

<https://www.mathsisfun.com/links/curriculum-algebra-2.html> Great simple lessons

<https://www.khanacademy.org/math/algebra2> Khan Academy Videos & Practice

[www.purplemath.com/modules/index.htm](http://www.purplemath.com/modules/index.htm) Lots of worked out solutions

## Radical and Rational Exponents

Evaluate the expressions WITHOUT using a calculator.

$$\sqrt{144}$$

$$\sqrt[3]{-216}$$

$$\sqrt[3]{\frac{16}{27}}$$

Simplify by removing factors from the radicand.

$$\sqrt{288}$$

$$\sqrt{2x^3y^4}$$

$$\sqrt[3]{-27x^3y^6}$$

Rationalize the denominator.

$$\frac{4}{\sqrt[3]{2}}$$

$$\frac{1}{\sqrt{5}}$$

$$\frac{1}{\sqrt[5]{x^2}}$$

Convert to exponential form.

$$\sqrt[3]{(a+2b)^2}$$

$$2x^3\sqrt{x^2y}$$

Convert to radical form.

$$a^{\frac{3}{4}}b^{\frac{1}{4}}$$

$$x^{-\frac{5}{3}}$$

**Simplify the exponential expression.**

$$(x^2y^4)^{\frac{1}{2}}$$

$$\left(\frac{x^{\frac{1}{2}}}{y^{\frac{1}{3}}}\right)^6$$

**Simplify the radical expression.**

$$\sqrt{16y^8z^{-2}}$$

$$3\sqrt{48} - 2\sqrt{108}$$

$$\sqrt{18x^2y} + \sqrt{2y^3}$$

**Solve the equation.**

$$2 + \sqrt{r} = 11$$

$$\sqrt[3]{x} + 5 = -3$$

$$2\sqrt[3]{8x + 9} = 5$$

## Polynomials and Factoring

Write the polynomial in standard form and state its degree.

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

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

Simplify the expression. Write your answer in standard form.

$$(-3x^2 - 5) - (x^2 + 7x + 12)$$

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

Expand the product.

$$(2x + 3)(4x + 1)$$

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

$$(x - \sqrt{2})(x + \sqrt{2})$$

$$(x + 2)^2$$

**Factor completely.**

$$5x^3 - 20x$$

$$9y^2 - 16$$

$$y^2 + 8y + 16$$

$$4z^2 - 4z + 1$$

$$y^3 - 8$$

$$z^3 + 64$$

**Fractional Expressions**

**Write the expression in reduced form.**

$$\frac{x^3}{x^2-2x}$$

$$\frac{2y^2+6y}{4y+12}$$

$$\frac{y^2-y-30}{y^2-3y-18}$$

$$\frac{y^2+3y}{y^3+3y^2-5y-15}$$

**Simplify.**

$$\frac{3}{x-1} \cdot \frac{x^2-1}{9}$$

$$\frac{x+3}{x-1} \cdot \frac{1-x}{x^2-9}$$

$$\frac{2y^2+9y-5}{y^2-25} \cdot \frac{y-5}{2y^2-y}$$

$$\frac{2x^2y}{(x-3)^3} \cdot \frac{8xy}{x-3}$$

$$\frac{x-1}{\frac{x-1}{9} + \frac{9}{x-1}}$$

$$\frac{\frac{x^2}{9} - \frac{25}{4}}{\frac{4}{x} - \frac{x}{5}}$$

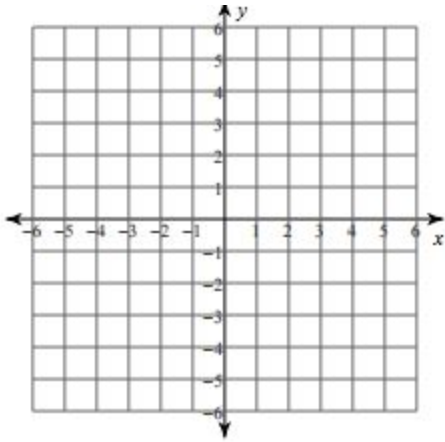
**Write with positive exponents and simplify.**

$$\left(\frac{1}{x} + \frac{1}{y}\right)(x+y)^{-1}$$

$$x^{-1} + y^{-1}$$

**Graph the following linear functions. Identify the slope and y-intercept.**

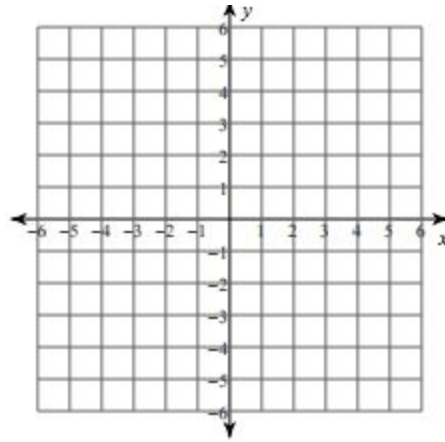
$$4x + 2y = -6$$



slope: \_\_\_\_\_

y-intercept: \_\_\_\_\_

$$2y = 3x - 8$$

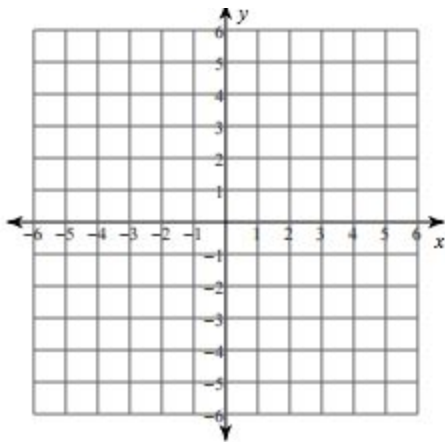


slope: \_\_\_\_\_

y-intercept: \_\_\_\_\_

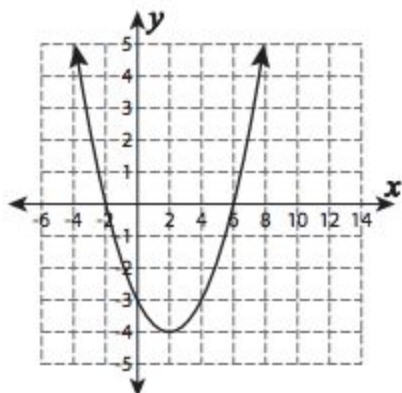
**Graph the following quadratic functions.**

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





Find the properties of the following quadratic function. Write the equation.



$y =$  \_\_\_\_\_

Domain : \_\_\_\_\_

Range : \_\_\_\_\_

$x$ -intercepts : \_\_\_\_\_

$y$ -intercept : \_\_\_\_\_

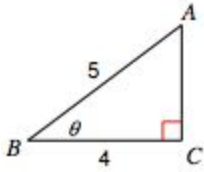
Vertex : \_\_\_\_\_

Minimum value : \_\_\_\_\_

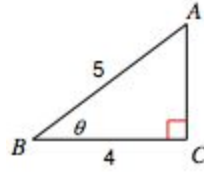
Axis of symmetry : \_\_\_\_\_

Open up or down : \_\_\_\_\_

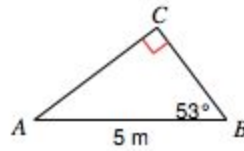
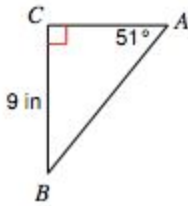
Find the indicated angle.



Find the missing side length.



Use right triangle trigonometry to solve the following triangles.



Solve the following word problems.

Michael has some coins in his pocket consisting of dimes, nickels, and pennies. He has two more nickels than dimes, and three times as many pennies as nickels. How many of each kind of coins does he have if the total value is 52 cents?

A service station checks Mr. Gittleboro's radiator and finds it contains only 30% antifreeze. If the radiator holds 10 quarts and is full, how much must be drained off and replaced with pure antifreeze in order to bring it up to a required 50% antifreeze?

For what value of  $k$  is the point  $(-2, k)$  on the line with equation  $-3x + 3y = 4$ ?

For what value of  $a$  will the system given below have no solutions?

$$2x + 6y = -2$$

$$-3x + ay = 4$$

Which equation best describes the relationship between  $x$  and  $y$  in this table?

$x$	$y$
0	-4
4	-20
-4	12
8	-36

A)  $y = -x/4 - 4$

B)  $y = -x/4 + 4$

C)  $y = -4x - 4$

D)  $y = -4x + 4$