

Fairfield College Preparatory School

Calculus

Summer Assignment

Gentlemen,

In preparation for your Calculus class next year, you are required to complete the following packet by the first full day of classes: **AUGUST 29, 2019** Please show all work directly on this packet and print it out before the start of class. Make sure to show all steps and box your final answer. The assignment will be checked and collected.

If you are struggling with a particular topic, use the countless resources available on the internet. Some suggested websites are:

<http://www.khanacademy.org>

<http://patrickjmt.com>

Thank you!

The Math Department

## Know Geometry Formulas

MEMEMORIZE:

Area of a rectangle:  $A = lw$

Area of a triangle:  $A = \frac{1}{2}bh$

Area of a circle:  $\text{Area} = \pi r^2$

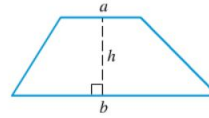
Volume of a closed rectangular box:  $V = lwh$

Volume of a Sphere of radius  $r$ :  $V = \frac{4}{3}\pi r^3$

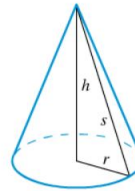
Volume of a right circular cylinder of height  $h$  and radius  $r$ :

$$\text{Volume} = \pi r^2 h$$

Area of a trapezoid:



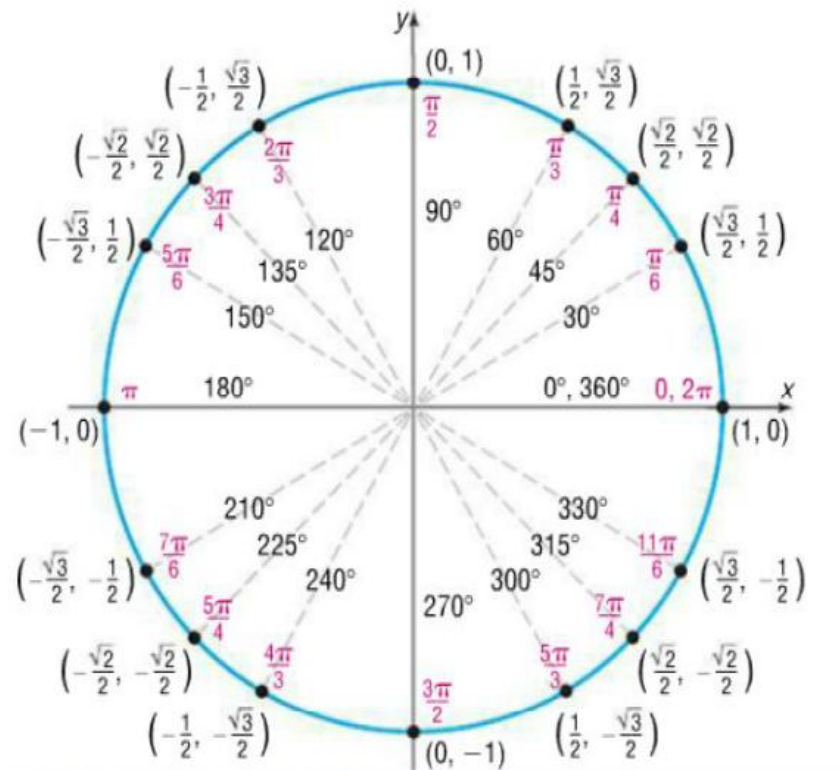
$$A = \frac{1}{2}(a + b)h$$



Volume of a right circular cone:

$$V = \frac{1}{3}\pi r^2 h$$

**REVIEW THE UNIT CIRCLE.** You need to memorize the first quadrant and be able to figure out the other quadrants. Know how to find sine, cosine, tangent, cosecant, secant and cotangent of unit circle angles.



Know these identities:

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\sin(2\theta) = 2 \sin \theta \cos \theta$$

$$\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$$

$$\sin(-\theta) = -\sin(\theta)$$

$$\cos(-\theta) = \cos(\theta)$$

Rational exponents:

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$$

Write an equation for the specified line:

1. Through (1, -6) with slope 3

4. Through (3, 3) and (-2, 5)

2. Vertical Line through (0, -3)

5. Horizontal Line through (0, 2)

3. Through (3, 1) and parallel to  
 $4x + 3y = 12$

6. Through (-2, -3) and perpendicular to  
 $3x - 5y = 1$

Evaluate the following using the function below:

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

$f(1) =$

$f(-2) =$

$f(2x) =$

$f(x+h) =$

Solve the following equations:

a.)  $x^2 - 36 = 0$

c.)  $3x^2 - 12x + 15 = 0$

b.)  $x^2 + 11x + 10 = 0$

d.)  $x^3 - x^2 + x - 1 = 0$

Factor completely. Do not solve.

a.)  $x^3 - 1$

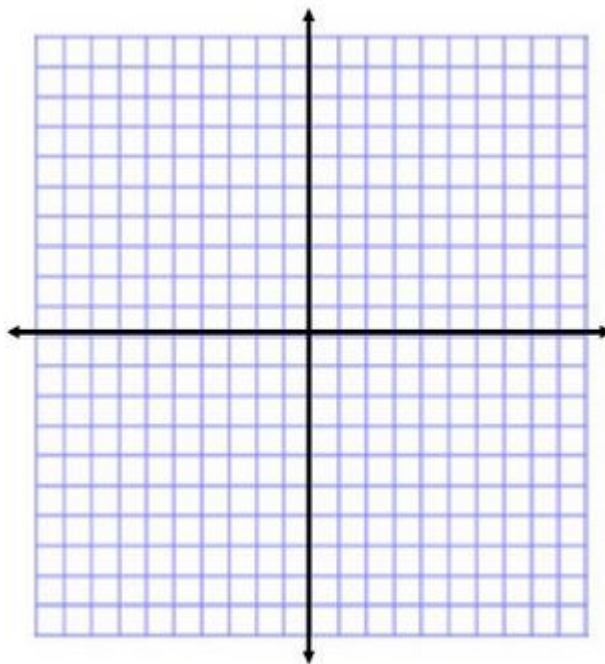
c.)  $81x^3 - 192$

b.)  $8x^3 + 27$

d.)  $x^4 - x^3 + 2x - 2$

Graph the following piecewise function. Find the domain and range.

$$y = \begin{cases} -x - 2, & -2 \leq x \leq -1 \\ x, & -1 < x \leq 1 \\ -x + 2, & 1 < x \leq 2 \end{cases}$$



Simplify the following rational expressions:

$$\frac{x + 4}{x^2 - 16}$$

$$\frac{2p^2 - 12p}{p^2 - 2p - 24}$$

$$\frac{2n^3 - 26n^2 + 60n}{n^2 - 6n - 40}$$

$$\frac{9x^2 + 81x}{x^3 + 8x^2 - 9x}$$