Incoming **(Honors Calculus)** Summer Math Guide

The following summer guide is to be used as a study tool to prepare you for the skills necessary for success in **(Honors Calculus)**. The following skills will be assessed as your first test grade. **The first test will be given within the first few weeks of school.** If you are struggling on certain skills, you can use resources such as www.IXL.com/math , www.khanacademy.org/math/, www.coolmath.com. More can be found through an online search.

None of your work will be collected or graded at the beginning of the school year. This is being provided to you in advance of the school year to help you maintain knowledge of the skills you were already taught but you will need for your next course or grade.

Section 1: Trigonometry

Video to help you:
https://www.khanacademy.org/math/trigonometry/unit-circle-trig-func/trig-values-special-angles/v/trigonometry-unit-circle-symmetry

Fill in the table with exact values.

θ	$sin\theta$	$cos\theta$	$tan\theta$
$\frac{\pi}{6}$			
$\frac{\pi}{4}$			
$\frac{\pi}{3}$			
0			
$\frac{\pi}{2}$			
π			
$\frac{3\pi}{2}$			

Find all of the values of θ in the interval $[0, 2\pi]$ that satisfies the equation.

$2cos\theta - 1 = 0$	$4sin^2\theta = 3$
$2sin(2\theta) = \sqrt{2}$	$\sqrt{2}cos(2\theta) = -1$

Section 2: Logarithms

Find the exact value of each expression.

ln(1)=

Section 3: Functions

Video to help you:

https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:functions/x2f8bb11595b61c86:evaluating-functions/v/what-is-a-function

If $h(t) = t^2 + 2t - 5$, Find:		
$h(1)$	$h(\frac{3}{2})$	$h(c + 6)$
$-h(x)$	$h(2x)$	$h(x^2)$
Evaluate $\frac{f(x+h)-f(x)}{h}$ for $f(x) = x^2 + 5x - 4$		

Video to help you:
https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:absolute-value-piecewise-functions/x2f8bb11595b61c86:piecewise-functions/v/piecewise-function-example

$$p(x)=\begin{cases}-2|x+6|+7, & -8\le x<-3\\ \frac{1}{3}x-2, & -3<x\le 3\\ (x-5)^2-5, & 3<x<8\end{cases}$$

Find the values of $p(3)$and $p(-\ 4)$, if they exist. If a value does not exist, explain why it does not.

Video to help you:
https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:rational-functions

$F(x)\ =\ \frac{(ax-3)(x-2)}{2(x+3)(x-2)}$ such that $y\ =-\ 2$ is a horizontal asymptote.
Find the correct value of *a*.
Find any vertical asymptotes, if they exist.
Find the coordinates of any holes that exist.

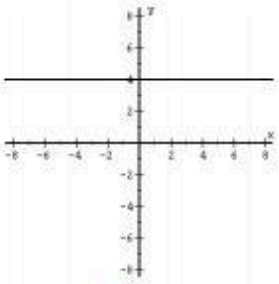
$f(x) = \frac{2}{x-3}$ and $g(x) = \frac{x-2}{x^2-9}$
At what value(s) of x will the graphs of $f(x)$ and $g(x)$ have discontinuities?

Section 4: Factoring
Video to help you:
https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-intro/v/factoring-polynomials-1

$f(x) = 5x^3 - 20x$	$g(x) = 3x^3 - 3x^2 - 18x$	$h(x) = -10x^3 + 26x^2 + 12x$
$p(x) = x^3 + 2x^2 - 4x - 8$	$q(x) = 3x^3 + 5x^2 - 3x - 5$	$r(x) = x^4 - 10x^2 + 9$
$m(x) = x^4 - 2x^3 - 15x^2$	$g(x) = 4x^3 + 16x^2 + 16x$	$h(x) = 2x^3 + 3x^2 - 8x - 12$

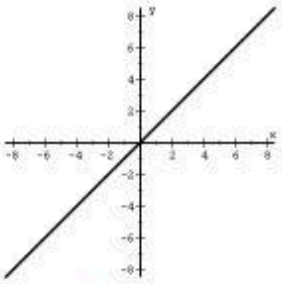
Section 5: Parent Functions

You are expected to know the general shape of each of these graphs.



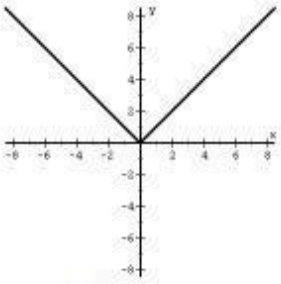
$f(x) = a$

Constant



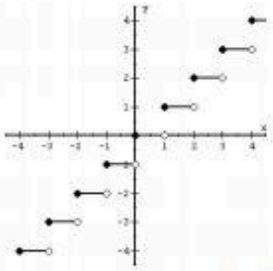
$f(x) = x$

Linear



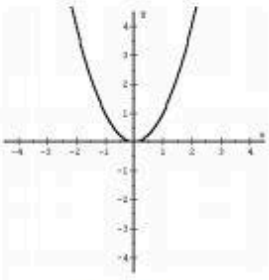
$f(x) = |x|$

Absolute Value



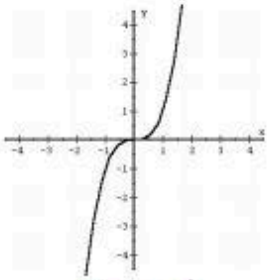
$f(x) = \text{int}(x) = [x]$

Greatest Integer



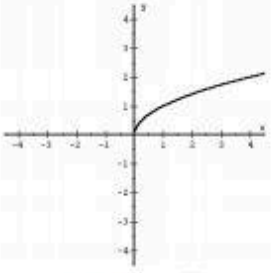
$f(x) = x^2$

Quadratic



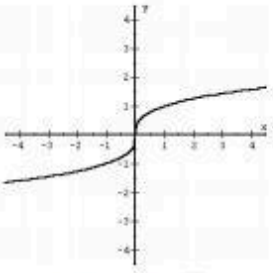
$f(x) = x^3$

Cubic



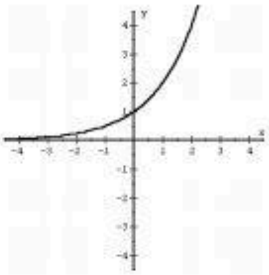
$f(x) = \sqrt{x}$

Square Root



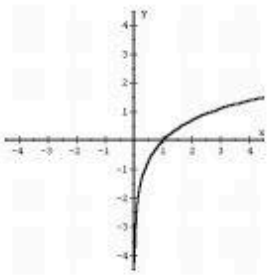
$f(x) = \sqrt[3]{x}$

Cube Root



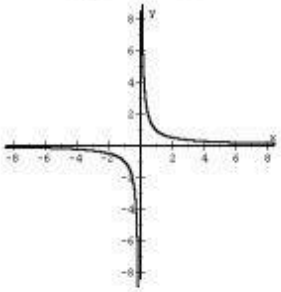
$f(x) = a^x$

Exponential



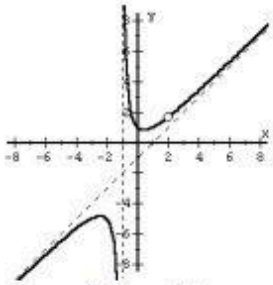
$f(x) = \log_a x$

Logarithmic



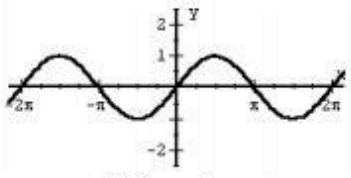
$f(x) = \dfrac{1}{x}$

Reciprocal

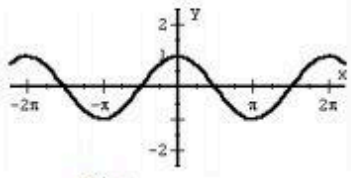


$f(x) = \dfrac{(x^2+1)(x-2)}{(x+1)(x-2)}$

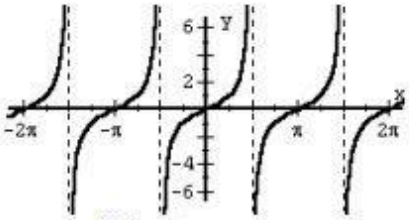
Rational



$f(x) = \sin x$



$f(x) = \cos x$



$f(x) = \tan x$

Trigonometric Functions