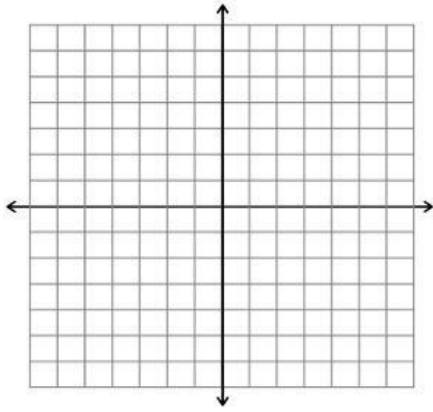
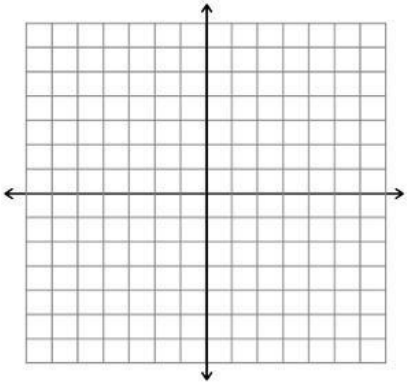
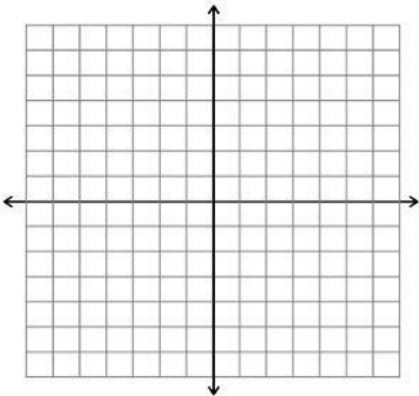


Name: _____

The goal of this summer assignment is to allow you to practice skills that are essential for success in your Intro to Calculus Class. You should be fluent in these topics when you come to class in August. Although this is not required, it is strongly recommended that you complete this so you are ready for class in the fall. If you need help, remember you can use online resources to review some topics. We recommend <https://www.khanacademy.org/>

I. Answer the following questions regarding the different functions you have studied thus far. Use proper notation and give EXACT answers only. Use interval notation when intervals are required.

$f(x) = -2 x + 3 + 1$ Sketch using transformations  Range: _____ Interval Decreasing: _____ Solve $f(x) = -15$ _____ $f(-5) =$ _____	$f(x) = -2x^2 - 8x - 1$ Vertex form: _____ $f(x) = 0$ _____ Vertex: _____ Max/Min Value: _____ Range: _____ Value of the discriminant: _____
$f(x) = \frac{2x^2 - 2x - 24}{x^2 - 9}$ Vertical Asymptote: _____ Horizontal Asymptote: _____ x-intercept: _____ y-intercept: _____ Hole: _____ Domain: _____	$f(x) = 2^{x-3} - 16$ Horizontal Asymptote: _____ Range: _____ $f(x) = 0$ _____ y-intercept: _____ $f^{-1}(x)$ (the inverse): _____

$f(x) = -x^4 + x^3 + 2x^2$ End Behavior: _____ Zeros: _____ Range: _____ $f(-3)$: _____	$f(x) = -2(x + 2)(x - 5)(x + 3)$ Degree of polynomial: _____ x-intercept(s): _____ y-intercepts: _____ End Behavior: _____
$f(x) = 2\sqrt{x - 5} - 8$ Sketch using transformations  Parent function Name: _____ Domain: _____ Range: _____ x-intercept (s): _____ Interval increasing: _____ $f^{-1}(x)$ (the inverse): _____	$y = -\ln \ln(x + 3) + 2$ Sketch using transformations  Domain: _____ Range: _____ Vertical asymptote: _____ $f(x) = 0$ _____ $f(-2)$ _____
$f(x) = \sqrt{25 - x^2} + 2$ Domain: _____ Range: _____ $f(x) = 5$: _____ y-intercept: _____ $f(10) =$ _____	$x^2 + y^2 = 36$ Technical Name: _____ $f(-6) =$ _____ Domain: _____ Is this a function? _____

$$\frac{2x}{3} + \frac{y}{4} = 2$$

Slope-intercept form: _____

Slope: _____

x-intercept: _____

y-intercept: _____

Slope of the line perpendicular to the given line: _____

Equation of the vertical line passing through the y-intercept: _____

Slope of the horizontal line passing through the x-intercept: _____

$$f(x) = -3\left(\frac{1}{2}\right)^x + 6$$

Growth or decay? _____

Horizontal Asymptote: _____

Range: _____

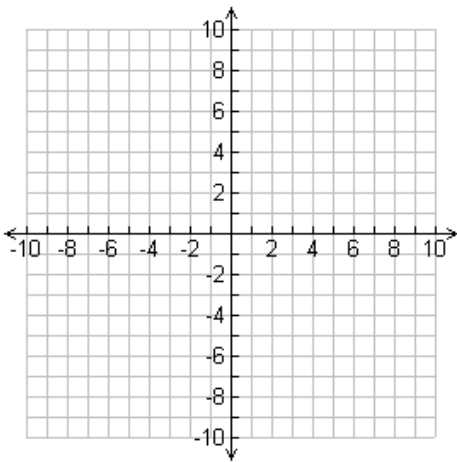
$f(x) = 0$ _____

y-intercept: _____

$f(-2) =$ _____

$$y = -1$$

Sketch using transformations



Domain: _____

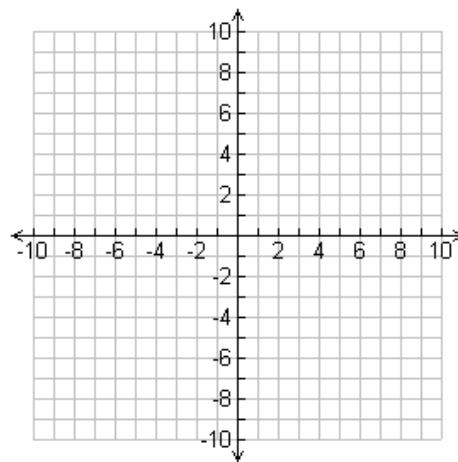
Vertical asymptote: _____

$f(x) = 0$ _____

$f(11)$ _____

$$f(x) = 2 \cdot \sqrt[3]{x-1} - 4$$

Sketch using transformations



Domain: _____

Range: _____

x-intercept: _____

y-intercept: _____

$f(55) =$ _____

$$y = -3\sin(2x - \pi)$$

Amplitude: _____

Period: _____

Phase Shift: _____

Vertical Shift: _____

x-intercepts on $[0, 2\pi]$: _____

Range: _____

Domain: _____

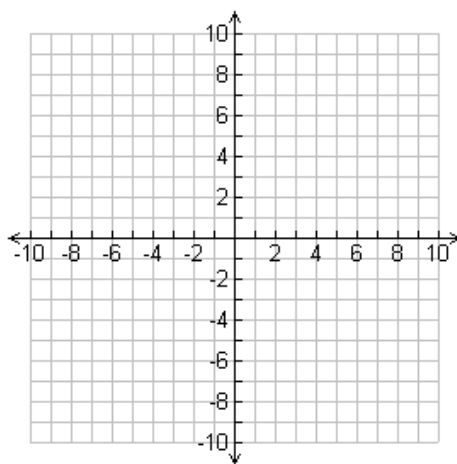
$$f(x) = \begin{cases} -x + 3, & x > 2 \\ 2x - 1, & x \leq 2 \end{cases}$$

$$f(2) = \underline{\hspace{2cm}}$$

Interval Increasing: _____

Interval Decreasing: _____

Sketch:



FACTORING Review**II. Factor the following expressions completely**

$2a^2b - 4ab^2$	$a^2 + 8a + 16$	$9x^2 + 100y^2$	$2y^3 - 128$
$2a^2 + 6a - ab - 3b$	$z^2 - 7z + 12$	$16c^2 - 36$	$m^2 + 14m + 49$
$8x^4 - 4x^3 + 12x^2$	$y(3x - 2) + 4(2 - 3x)$	$128t^4 - 2t^2$	$8x^2 + 6x - 9$
$9x^2 - 16$	$3x^2 - 5x - 2$	$x^2 - 18x + 81$	$14x^3 - 7x^2 - 21x$
$x^2 + 2x - 35$	$6x^2 + 12x + 6$	$y^5 + 3y^3 + 4y^2 + 12$	$4x^2 - 25y^2$
$4x^2 + 2x - 20$	$5x^2 - 5$	$3x^2 - 20x - 7$	$x^2 - 7x - 18$
$6y^2 - 54$	$x^2 - 8x + 16$	$2x^3 - 20x^2 - 48x$	$a^2 + 12a + 27$
$x^2 - 64$	$x^2 - 6x - 16$	$4y^2 + 7y - 2$	$5a^3 - 25a^2 + 15a$

Rational Expressions

III. Simplify and/or perform the indicated operation on the following rational expressions. Simplify your final answers completely

$\frac{x^2 + 9x + 20}{2x + 8}$	$\frac{3x - 12}{3x^2 - 12x}$	$\frac{x^2 - 5x + 6}{x^2 + 2x - 15}$	$\frac{x^2 - 5x + 4}{x^2 - 4x}$
$\frac{36a^5b^2c^6}{42a^7b^2c^2}$	$\frac{6}{x^2 - 9x + 20} \cdot \frac{5x - 25}{15}$	$\frac{9x + 18}{x^2 - 2x - 8} \cdot \frac{3x - 12}{6x}$	$\frac{5n + 15}{4n + 8} \cdot \frac{2n + 4}{3n + 9}$
$\frac{x^2 - x - 12}{x - 4} \div \frac{2x + 6}{x - 5}$	$\frac{x^2 - 5x - 6}{5x + 15} \div \frac{x^2 - 3x - 4}{7x + 21}$	$\frac{x^2 - 2x}{6} \div \frac{3x - 6}{x}$	$\frac{3x + 12}{12x} \div \frac{x + 4}{48x^3}$
$\frac{7x + 4}{x^2 + 3x + 2} - \frac{3x - 2}{x^2 + 3x + 2}$	$\frac{7}{x + 2} - \frac{4}{x - 5}$	$\frac{3}{y + 5} + \frac{y}{y^2 + 7y + 10}$	$\frac{2x + 3}{5x - 30} - \frac{3x + 4}{x - 6}$