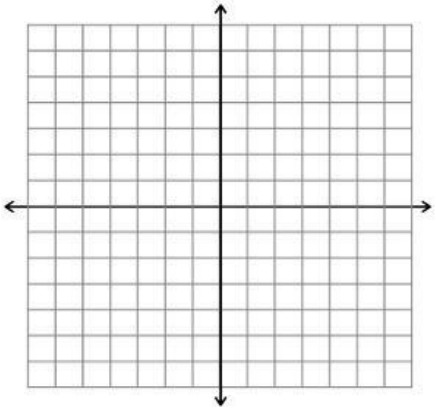
Name: _____

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: _____

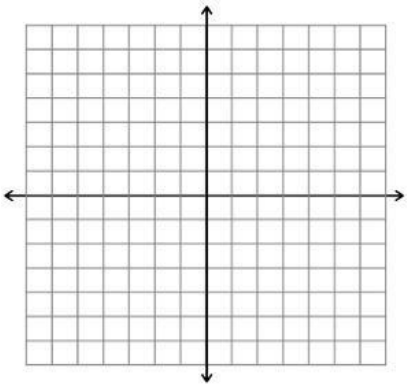
x-intercept(s): _____

y-intercepts: _____

End Behavior: _____

$f(x) = 2\sqrt{x - 5} - 8$

Sketch using transformations



Parent function Name: _____

Domain: _____

Range: _____

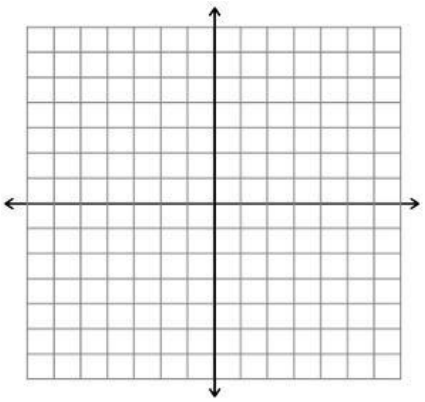
x-intercept (s): _____

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: _____

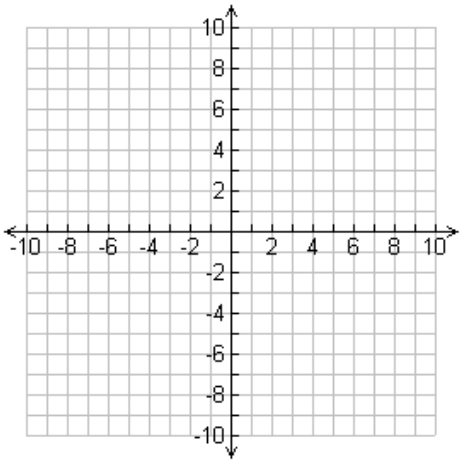
$f(x) = 0$_____

y-intercept: _____

$f(-2) =$ _____

$y = -1$

Sketch using transformations



Domain: _____

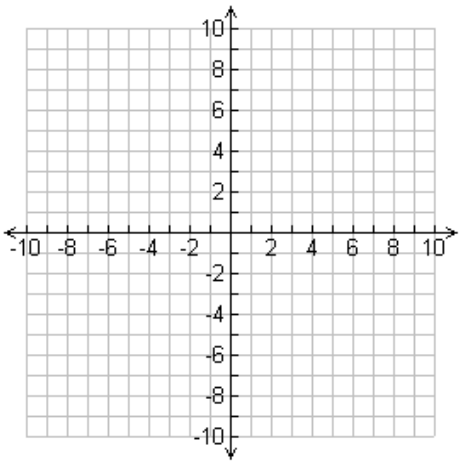
Vertical asymptote: _____

$f(x) = 0$_____

$f(11)$_____

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

Sketch using transformations



Domain: _____

Range: _____

x-intercept:_____

y-intercept: _____

$f(55) =$ _____

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

Amplitude: _____

Period: _____

Phase Shift: _____

Vertical Shift: _____

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

Range: _____

Domain: _____

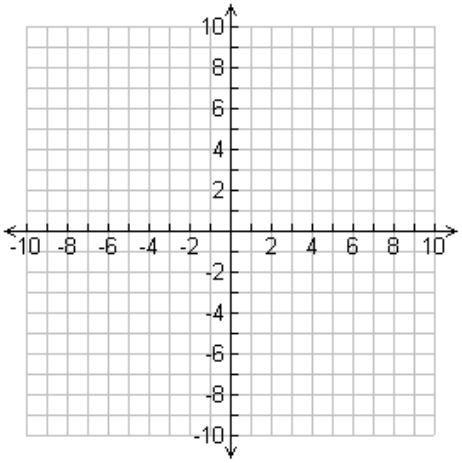
$f(x) = \{-x + 3, \quad x > 2; \; 2x - 1, \quad x \leq 2$

f(2)= _____

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

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