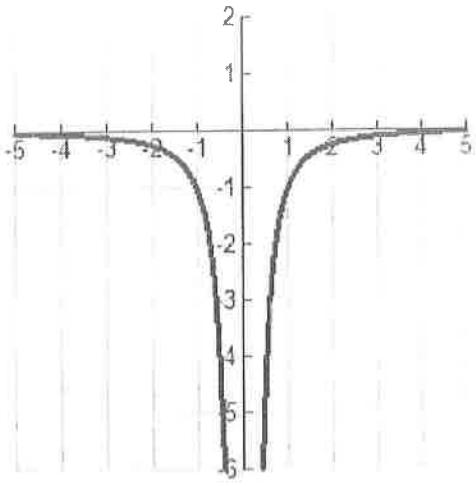
Key

Math 4
Unit 1 Review

Name_____
Date_____

1. **Function Families**

Given a function or graph, find the domain, range, symmetries, degree and type of function family.



Domain:
$X \neq 0$

Range:
$Y < 0$

Symmetry:
Even

Type of function:
Inverse variation
$y = -\frac{k}{x^2}$

2. **Function Operations**

Given two functions, calculate arithmetic operations and the composition of the functions.

$t(x) = 3x - 10$ $\quad$ $j(x) = x^2 + 2x + 5$

Calculate the following:

$[t + j](x)$

$= 3x - 10 + x^2 + 2x + 5$

$= x^2 + 5x - 5$

$[t - j](x)$

$= 3x - 10 - (x^2 + 2x + 5)$

$= 3x - 10 - x^2 - 2x - 5$

$= -x^2 + x - 15$

$t(x) \cdot j(x)$

$= (3x - 10)(x^2 + 2x + 5)$

$= 3x^3 + 6x^2 + 15x - 10x^2 - 20x - 50$

$= 3x^3 - 4x^2 - 5x - 50$

$j(t(x))$

$= j(3x - 10)$

$= (3x - 10)^2 + 2(3x - 10) + 5$

$= 9x^2 - 60x + 100 + 6x - 20 + 5$

$= 9x^2 - 54x + 85$

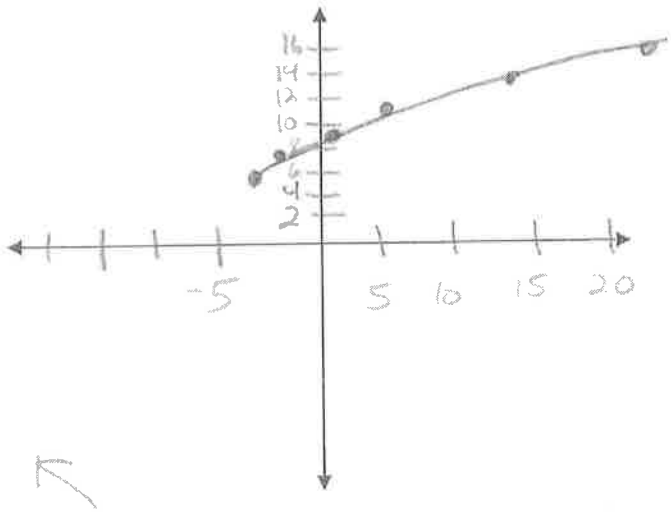
3. **Parametric Equations**

Use parametric equation to construct a graph. Convert parametric equations to rectangular form.

$$\begin{cases} x(t) = t^2 - 3 \\ y(t) = 2t + 5 \end{cases}$$

Graph the equations over the interval $0 \le t \le 5$ then convert the equations to rectangular form & simplify.

t	x	y
0	-3	5
1	-2	7
2	1	9
3	6	11
4	13	13
5	22	15



4. **Chunking/*u*-substitution**

Solve for x.

$$5e^{2x} - 9e^x - 10 = 2e^{2x} + 4e^x$$

$u = e^x$

$3e^{2x} - 13e^x - 10 = 0$

$3u^2 - 13u - 10 = 0$

$(3u + 2)(u - 5) = 0$

$u = -2/3 \quad u = 5$

$e^x = -\frac{2}{3}$ No Solution

$e^x = 5$

$\ln 5 = x$

$x + 3 = t^2$

$t = \pm\sqrt{x+3}$

$y = 2(\sqrt{x+3}) + 5$

$y = 2(-\sqrt{x+3}) + 5$

$y = -2\sqrt{x+3} + 5$

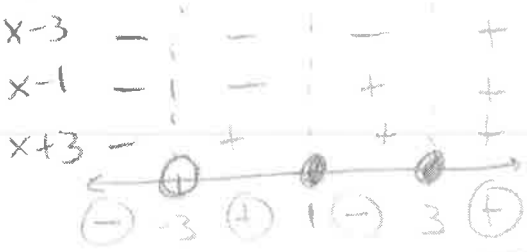
5. **Number Line Analysis**

Solve the inequality below.

$$\frac{x^2 - 4x + 3}{x + 3} \le 0$$

$\frac{(x-3)(x-1)}{x+3} \le 0$

$x = 3 \quad x = 1 \quad x = -3$



$x < -3$ or $1 \le x \le 3$

6. **Arithmetic and Geometric Sequences and Series including Sigma Notation**

Study your 1-6, 1-7 and 1-8 material & look over the quiz you just took!