Math 4
Unit 1 Review

Name __Key__

Date_____

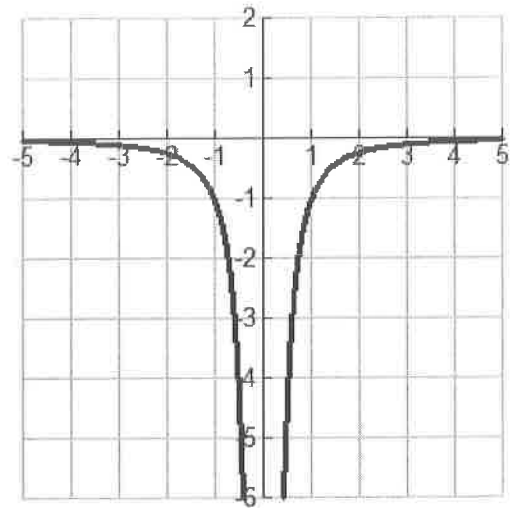1.   **Function Families**

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

Domain: Range:

$$X \neq 0$$ $$Y < 0$$

Symmetry: Type of function:

even   negative

reciprocal

2.   **Function Operations**

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

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

Calculate the following:

$[t + j](x)$

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

$$x^2 + 5x - 5$$

$[t - j](x)$

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

$$-x^2 + x - 15$$

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

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

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

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

$j(t(x))$

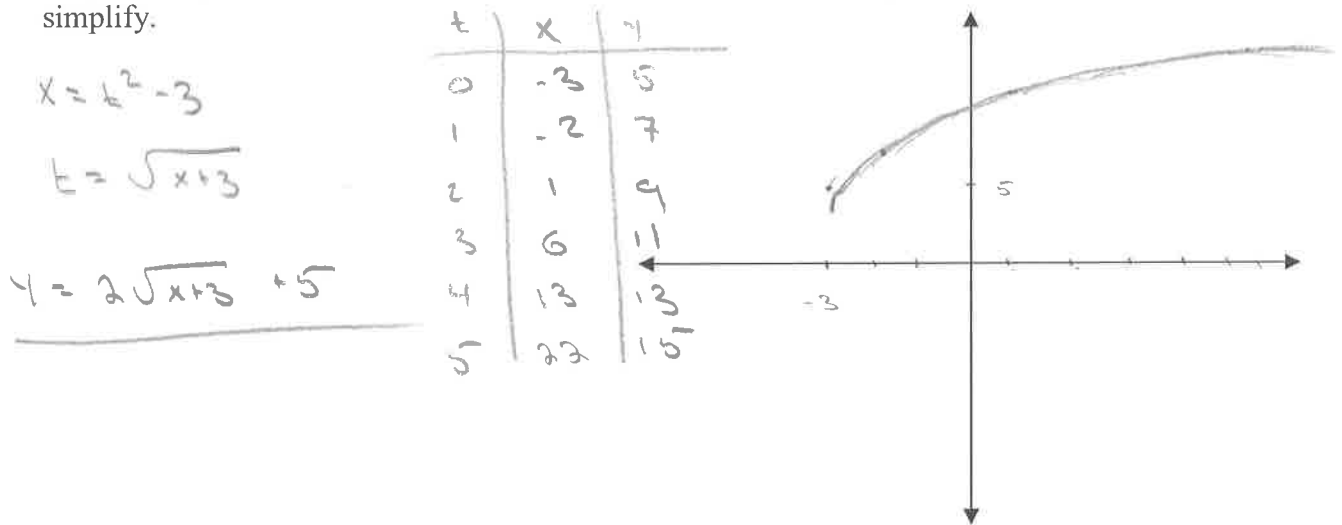$$(3x - 10)^2 + 2(3x - 10) + 5$$

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

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

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.

$X = t^2 - 3$

$t = \sqrt{x+3}$

$Y = 2\sqrt{x+3} + 5$

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.

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

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

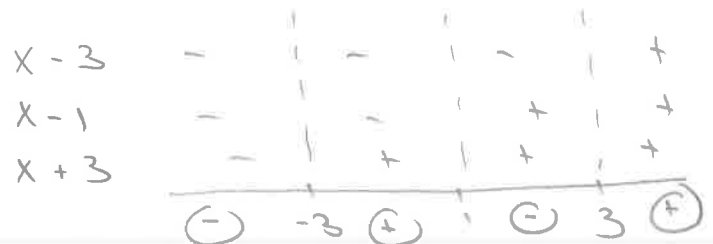$(3e^x + 2)(e^x - 5) = 0$

$e^x = -\frac{2}{3}$

No solution

$e^x = 5$

$x = \ln 5$

5. **Number Line Analysis**

Solve the inequality below.

$(x-3)(x-1)$

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

$X - 3$

$X - 1$

$X + 3$

$X < -3$ 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!