

TIPC Ch P Review 1

$$\textcircled{1} \sqrt{(3x+5)^2} = \sqrt{121}$$

$$3x+5 = \pm 11$$

$$3x = -5 \pm 11$$

$$3x = 6 \text{ or } 3x = -16$$

$$\boxed{x=2} \text{ or } \boxed{x=-\frac{16}{3}}$$

$$\textcircled{2} \frac{3(v+2)^2}{3} = \frac{45}{3}$$

$$(v+2)^2 = 15$$

$$\sqrt{}$$

$$v+2 = \pm \sqrt{15}$$

$$\boxed{v = -2 \pm \sqrt{15}}$$

$$\textcircled{3} |x+5| \leq 8$$

$$-8 \leq x+5 \leq 8$$

$$\begin{matrix} -5 & -5 & -5 \end{matrix}$$

$$-13 \leq x \leq 3$$

interval notation $[-13, 3]$

$$\textcircled{4} |7x-1| \geq 4$$

$$7x-1 \geq 4 \text{ or } 7x-1 \leq -4$$

$$7x \geq 5$$

$$7x \leq -3$$

$$x \geq \frac{5}{7}$$

$$\text{or } x \leq -\frac{3}{7}$$

interval notation $(-\infty, -\frac{3}{7}] \cup [\frac{5}{7}, \infty)$

$$\textcircled{5} x^2 + 7x \leq -12$$

$$x^2 + 7x + 12 \leq 0 \text{ (}\leq \text{ bounded)}$$

$$(x+3)(x+4) \leq 0$$

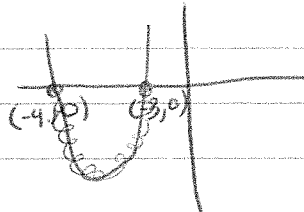
$$x+3=0 \quad x+4=0$$

$$x=-3 \quad x=-4$$

Since $\leq$, bounded,

interval notation is $[-4, -3]$

$\uparrow$
x values where the parabola of $x^2 + 7x + 12$ is under the x-axis



$$\textcircled{6} x^2 - 4x - 21 > 0$$

$>$ is unbounded

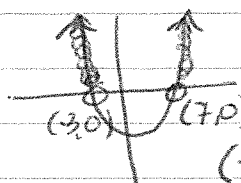
finding x values where parabola is above x-axis

$$(x-7)(x+3) > 0$$

$$x-7=0 \quad x+3=0$$

$$x=7$$

$$x=-3$$



unbounded

$(-\infty, -3) \cup (7, \infty)$

$$\begin{matrix} 2' \\ 5' \end{matrix}$$

$$LCM = 2' \cdot 5' = 10$$

$$\textcircled{7} \frac{10}{1} \cdot \frac{5x-5}{5} + \frac{10}{1} \cdot \frac{5x+4}{2} = \frac{4}{1} \cdot \frac{10}{1}$$

$$2(5x-5) + 5(5x+4) = 40$$

$$10x - 10 + 25x + 20 = 40$$

$$35x + 10 = 40$$

$$35x = 30$$

$$x = 30/35$$

$$\boxed{x = 6/7}$$

$$\textcircled{8} (2-7i)(5-5i)$$

$$10 - 10i - 35i + 35i^2$$

$$10 - 45i + 35(-1)$$

$$10 - 45i - 35$$

$$\boxed{-25 - 45i}$$

$$\textcircled{9} (4 + \sqrt{3}i)$$

complex conjugate $4 - \sqrt{3}i$

product is $a^2 + b^2$

$$4^2 + (\sqrt{3})^2 = 16 + 3 = \boxed{19}$$

$$\textcircled{10} \left(\frac{2}{xy^2} \right)^{-2} = \left(\frac{2^{-2}}{x^{-2}y^{-4}} \right) = \frac{x^2y^4}{2^2}$$

$$= \boxed{\frac{x^2y^4}{4}}$$

$$\textcircled{11} \left(\frac{x^{-4}y^3}{x^{-6}y^3} \right)^{-5} = \frac{x^{16}y^{-12}}{x^{30}y^{-15}} = x^{-14}y^3 = \boxed{\frac{y^3}{x^{14}}}$$

$$\textcircled{12} (-\infty, -6] \quad \textcircled{13} [-5, -1)$$

$\textcircled{14}$ Algebraically

$$3x - 11 = 2 \quad 3x - 11 = -2$$

$$3x = 13 \quad 3x = 9$$

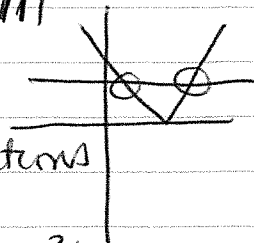
$$x = \frac{13}{3} \quad x = 3$$

w/ Graphing Calc

$$f_1(x) = |3x - 11|$$

$$f_2(x) = 2$$

use intersections



$$x = 3, x = 13/3$$

$$\textcircled{15} 0 \leq 5t + 2 < 9$$

$$-2 \leq 5t < 7$$

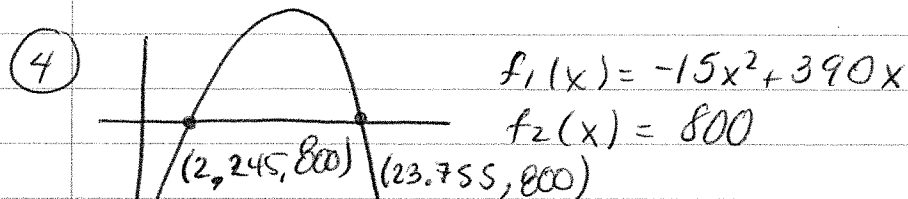
$$-2/5 \leq t < 7/5$$

TIPC Review 2 - CK A

pg. 108²
(Review 2)

① $-7 < x \leq 5$ ② $-4 < x \leq 5$

③ All ^{real} numbers greater than or equal to -4 and less than 8



The projectile is more than 800 feet above ground after 2,245 seconds, ~~but~~ before 23.755 seconds.

⑤ $x^2 = 9 - 4x$

$x^2 + 4x - 9 = 0$

$b=4$

$x^2 + 4x = 9$

$(\frac{4}{2})^2$ $x^2 + 4x + 4 = 9 + 4$

2^2 $(x+2)^2 = 13$

4

$x+2 = \pm\sqrt{13}$

$x = -2 \pm \sqrt{13}$

⑥ $x^2 - 12x + 11 = 0$

$x^2 - 12x = -11$

$(-12/2)^2$

$x^2 - 12x + 36 = -11 + 36$

$(-6)^2$

$(x-6)^2 = 25$

36

$\sqrt{\quad}$

$\sqrt{\quad}$

$x-6 = \pm 5$

$x = 6 \pm 5$

$x = 11, x = 1$

⑦ $24x^2 + 42x + 15 = 0$

3

$8x^2 + 14x + 5 = 0$

Grouping

$8x^2 + 4x + 10x + 5 = 0$

$4x(2x+1) + 5(2x+1) = 0$

$(4x+5)(2x+1) = 0$

$4x+5=0$

$2x+1=0$

$4x = -5$

$2x = -1$

$x = -5/4$

$x = -1/2$

Fractions

$\frac{8x^2}{4x} = \frac{2x}{1}$

$\frac{8x^2}{10x} = \frac{4x}{5}$

Box $2x+1$

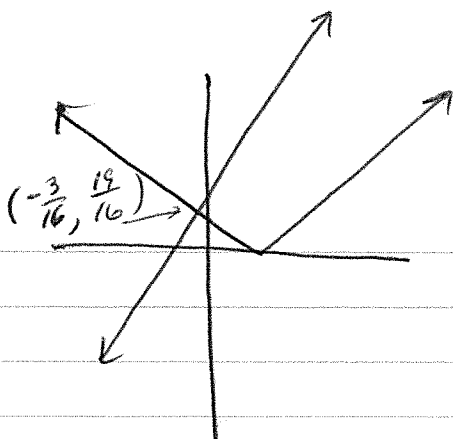
$4x$	$8x^2$	$4x$
$+5$	$10x$	5

~~$\begin{array}{r} 40 \\ 10 \times 4 \\ 14 \end{array}$~~

$$\textcircled{8} \underbrace{|x-1|}_{f_1(x)} = \underbrace{15x+4}_{f_2(x)}$$

Find where they intersect on calc.

$$x = \frac{-3}{16}$$

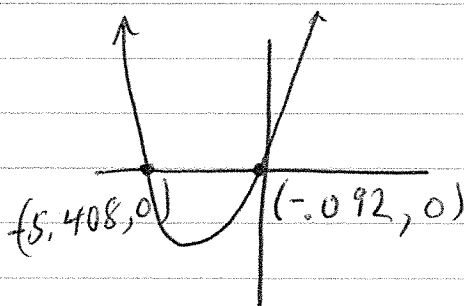


Pg. 2082
(review 2)

$$\textcircled{9} 2x^2 + 11x + 1 = 0$$

$$x \approx -5.408$$

$$x \approx -.092$$



$$\textcircled{10} (3+8i) - (-2+i)$$

$$3+8i+2-i$$

$$\boxed{5+7i}$$

$$\textcircled{11} (i^2+1) - (8+i^3)$$

$$(-1)+1-8-(-i)$$

$$\boxed{-8+i}$$

$$\textcircled{12} 5i(4-6i)$$

$$20i-30i^2$$

$$20i-30(-1)$$

$$\boxed{30+20i}$$

$$\textcircled{13} (-6+4i)(-6-4i) \text{ complex conjugates}$$

$$\text{so } a^2+b^2$$

$$(-6)^2+(4)^2 = 36+16 = \boxed{52}$$

$$\textcircled{14} \frac{i}{8+i} \cdot \frac{8-i}{8-i} = \frac{8i-i^2}{8^2+1^2} = \frac{8i-(-1)}{64+1} = \frac{8i+1}{65} = \boxed{\frac{1+8i}{65}}$$

$$\textcircled{15} \left. \begin{array}{l} 8+2i \\ 4-6i \end{array} \right\} \div 2 \quad \frac{4+i}{2-3i} \cdot \frac{2+3i}{2+3i} = \frac{8+12i+2i+3i^2}{2^2+3^2} = \frac{8+14i+3(-1)}{4+9}$$

makes
#s lower

$$= \frac{8+14i-3}{13}$$

can do only because all 4 are even

$$= \boxed{\frac{5+14i}{13}}$$

Rational Study Guide

LCM

SOL'N(S)

① $x(x-7)$

$x = 4/7$ ~~$x = 0$~~

② $(x+2)(x-2)$

$x = -8$ $x = 6$

③ $4x$

$x = -8$

④ $(x-5)(x-8)$

$x = 84/13$

⑤ $(x+2)(x-5)$

$x = 2$ $x = 1/2$

⑥ $x-1$

Infinitely many sol'ns

⑦ $x-1$

$x = 3$ ~~$x = 1$~~

⑧ $x(x-4)$

$x = -3$ ~~$x = 0$~~

SLOT STUDY GUIDE

① $\frac{7x}{x-7} - \frac{4}{x} = \frac{28}{x(x-7)}$ LCM: $x(x-7)$

$$\frac{x(x-7)}{1} \cdot \frac{7x}{(x-7)} - \frac{x(x-7)}{1} \cdot \frac{4}{x} = \frac{28}{x(x-7)} \cdot \frac{x(x-7)}{1}$$

$$7x \cdot x - 4(x-7) = 28$$

$$7x^2 - 4x + 28 = 28$$

$$7x^2 - 4x = 0$$

$$x(7x - 4) = 0$$

extraneous ~~$x=0$~~ $7x-4=0$ $7x=4$ $x = \frac{4}{7}$

② LCM: $(x+2)(x-2)$ $\frac{(x+2)(x-2)}{1} \cdot \frac{10}{x-2} = \frac{(x+2)(x-2)}{1} \cdot \frac{1}{1} + \frac{12}{x+2} \cdot \frac{(x+2)(x-2)}{1}$

$$10(x+2) = (x+2)(x-2) + 12(x-2)$$

$$10x+20 = x^2-4+12x-24$$

$$0 = x^2+2x-48$$

$$(x+8)(x-6) = 0$$

$$x+8=0$$

$$x-6=0$$

$$x = -8$$

$$x = 6$$

③ LCM: $4x$

$$\frac{4x}{1} \cdot \frac{5-x}{x} + \frac{4x}{1} \cdot \frac{3}{4} = \frac{7}{x} \cdot \frac{4x}{1}$$

$$4(5-x) + 3x = 7 \cdot 4$$

$$20 - 4x + 3x = 28$$

$$-x + 20 = 28$$

$$-x = 8$$

$$x = -8$$

④ $\frac{4}{x-5} + \frac{9}{x-8} = \frac{7}{(x-5)(x-8)}$

$$LCM = (x-5)(x-8)$$

$$\frac{(x-5)(x-8)}{1} \cdot \frac{4}{x-5} + \frac{9}{x-8} \cdot \frac{(x-5)(x-8)}{1} = \frac{7}{(x-5)(x-8)} \cdot \frac{(x-5)(x-8)}{1}$$

$$4(x-8) + 9(x-5) = 7$$

$$4x - 32 + 9x - 45 = 7$$

$$13x - 77 = 7$$

$$13x = 84$$

$$x = \frac{84}{13}$$

$$\textcircled{5} \frac{2x}{x+2} + \frac{5}{x-5} = \frac{8}{(x-5)(x+2)} \quad \text{LCM: } (x-5)(x+2)$$

$$\frac{(x-5)(x+2)}{1} \cdot \frac{2x}{x+2} + \frac{5}{x-5} \cdot \frac{(x-5)(x+2)}{1} = \frac{8}{(x-5)(x+2)} \cdot \frac{(x-5)(x+2)}{1}$$

$$2x(x-5) + 5(x+2) = 8$$

$$2x^2 - 10x + 5x + 10 = 8$$

$$2x^2 - 5x + 2 = 0$$

$$(2x-1)(x-2) = 0$$

$$2x-1=0$$

$$2x=1$$

$$\boxed{x = \frac{1}{2}}$$

$$x-2=0$$

$$\boxed{x=2}$$

$$\textcircled{6} \frac{-1}{x-1} = \frac{1}{1} - \frac{x}{x-1} \quad \text{LCM: } x-1$$

$$\frac{(x-1)}{1} \cdot \frac{-1}{(x-1)} = \frac{(x-1)}{1} \cdot \frac{1}{1} - \frac{(x-1)}{1} \cdot \frac{x}{(x-1)}$$

$$-1 = x-1-x$$

$-1 = -1$ infinitely many solutions

$$\textcircled{7} \text{ LCM: } x-1$$

$$\frac{x-1}{1} \cdot \frac{x}{1} = \frac{x-1}{1} \cdot \frac{4x-3}{x-1} + \frac{x-1}{1} \cdot \frac{-x}{x-1}$$

$$x(x-1) = 4x-3-x$$

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

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x-3=0$$

$$\boxed{x=3}$$

$$x-1=0$$

$$\boxed{x=1}$$

extraneous

$$\textcircled{8} \frac{x+4}{x} + \frac{3}{x-4} = \frac{-16}{x^2-4x}$$

$$\text{LCM: } x(x-4)$$

$$\frac{x(x-4)}{1} \cdot \frac{x+4}{x} + \frac{x(x-4)}{1} \cdot \frac{3}{x-4} = \frac{-16}{x(x-4)} \cdot \frac{x(x-4)}{1}$$

$$(x-4)(x+4) + 3x = -16$$

$$x^2 - 16 + 3x = -16$$

$$x^2 + 3x = 0$$

$$x(x+3) = 0$$

$$\boxed{x=0}$$

$$x+3=0$$

$$\boxed{x=-3}$$

extraneous

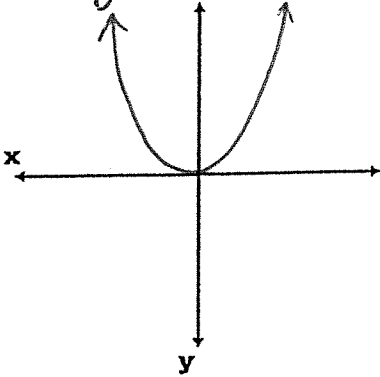
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Family Functions Test Review

Write the equation of the function and sketch its graph. (You fill in a and n , and b , when applicable)

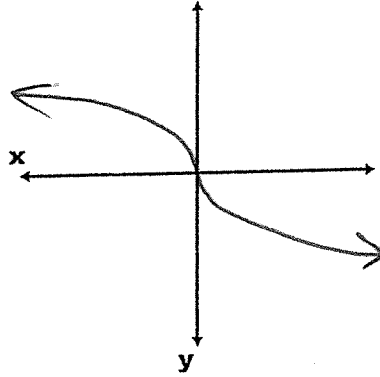
Polynomial Even

Equation: $y = 3x^4$



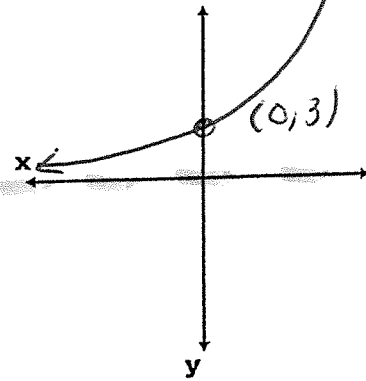
Radical Odd

Equation: $y = -2\sqrt[3]{x}$



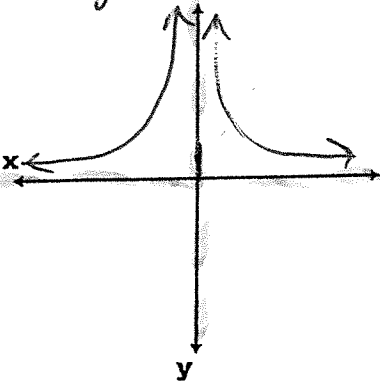
Exponential Growth

Equation: $y = 3(2)^x$



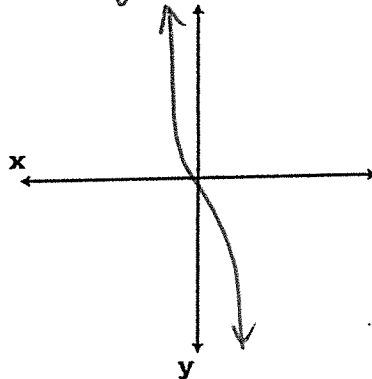
Rational (even)

Equation: $y = \frac{5}{x^2}$



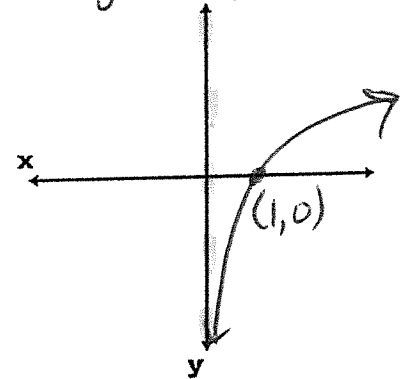
Polynomial Odd

Equation: $y = -2x^5$



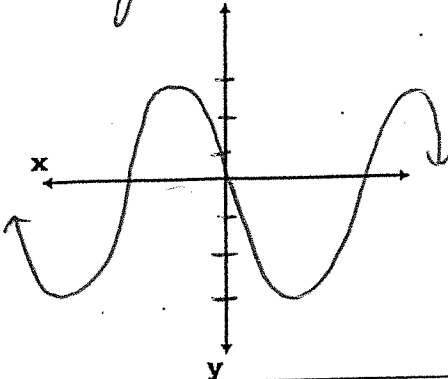
Logarithm

Equation: $y = 2 \log x$



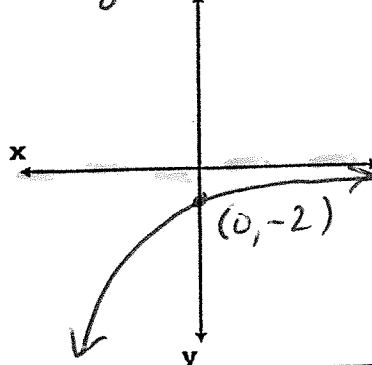
Trigonometric (sin)

Equation: $y = -3 \sin x$



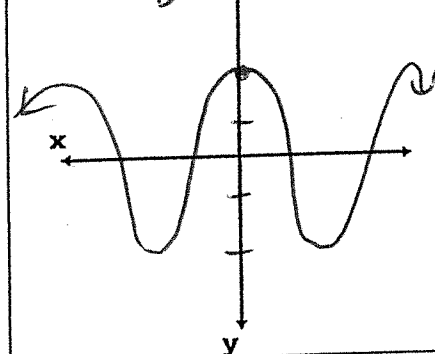
Exponential Decay

Equation: $y = -2\left(\frac{1}{4}\right)^x$



Trigonometric (cos)

Equation: $y = 2 \cos x$



Determine all the key features on the given parent functions.

1. Function Family: Logarithm

Domain: $(0, \infty)$

Range: $(-\infty, \infty)$

Increasing: $(0, \infty)$

Decreasing: —

X-intercepts: $(1, 0)$

Y-intercepts: —

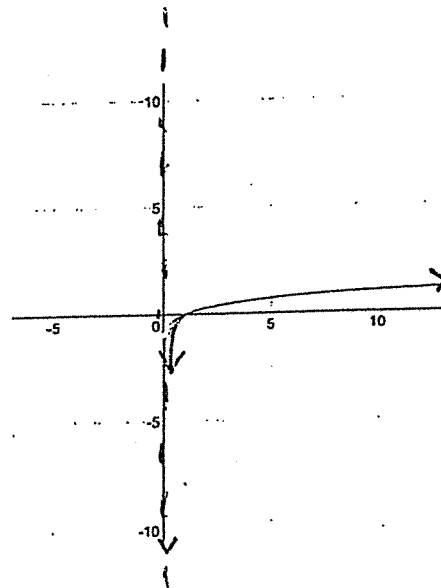
Asymptotes: VA at $x=0$

End Behavior:

Left: As x approaches 0, y approaches $-\infty$.

Right: As x approaches ∞ , y approaches ∞ .

Symmetry: Odd Even Neither



2. Function Family: Rational (odd)

Domain: $(-\infty, 0) \cup (0, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

Increasing: $(-\infty, 0) \cup (0, \infty)$

Decreasing: —

X-intercepts: —

Y-intercepts: —

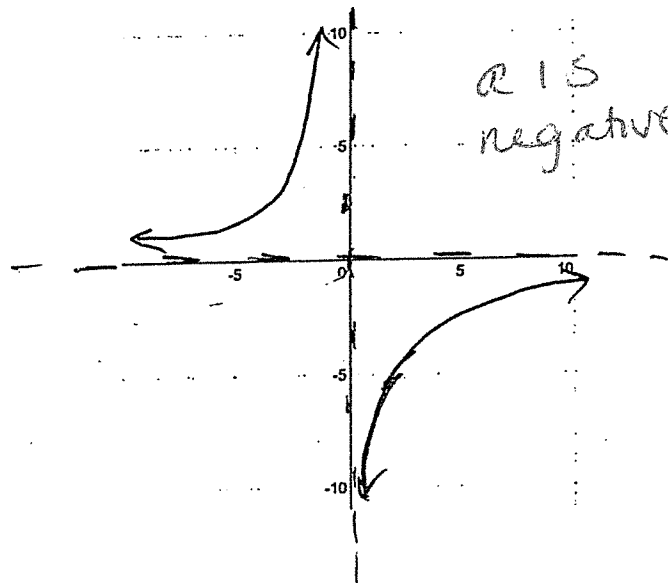
Asymptotes: VA at $x=0$, HA at $y=0$

End Behavior:

Left: As x approaches ∞ , y approaches 0.

Right: As x approaches ∞ , y approaches 0.

Symmetry: Odd Even Neither



FCU Fams Review

3. Function Family: Absolute Value

Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

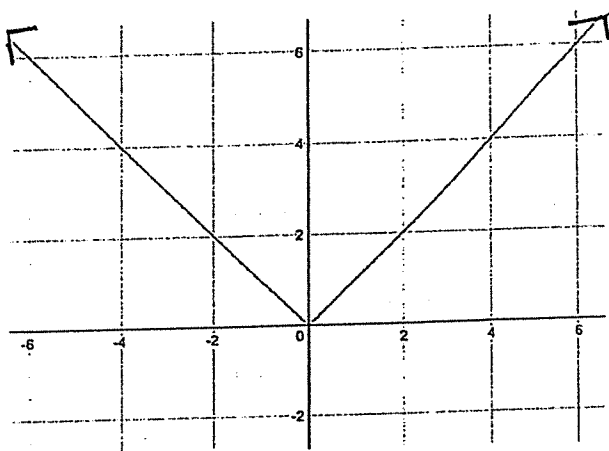
Increasing: $(0, \infty)$

Decreasing: $(-\infty, 0)$

X-intercepts: $(0, 0)$

Y-intercepts: $(0, 0)$

Asymptotes: —



End Behavior:

Left: As x approaches $-\infty$, y approaches ∞ .

Right: As x approaches ∞ , y approaches ∞ .

Symmetry: Odd Even Neither

4. Function Family: Radical (even)

Domain: $[0, \infty)$

Range: $[0, \infty)$

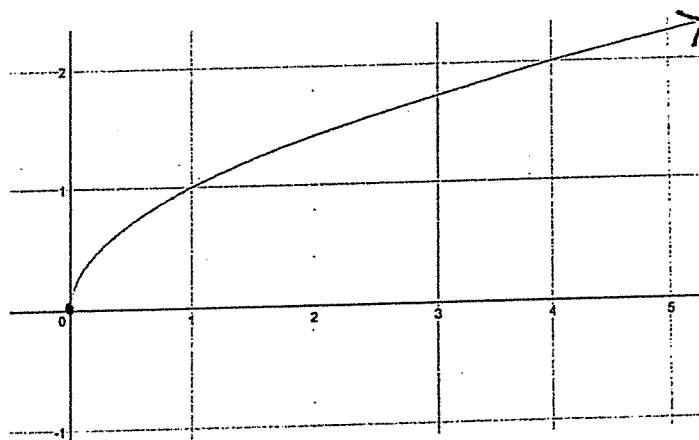
Increasing: $(0, \infty)$

Decreasing: —

X-intercepts: $(0, 0)$

Y-intercepts: $(0, 0)$

Asymptotes: —



End Behavior:

Left: As x approaches 0 , y approaches 0 .

Right: As x approaches ∞ , y approaches ∞ .

Symmetry: Odd Even Neither