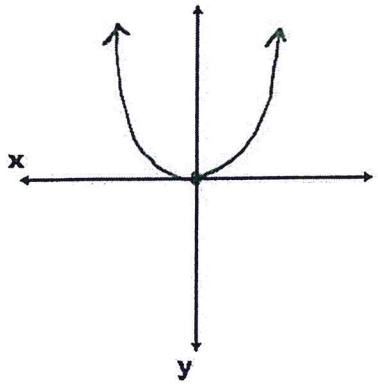
Name: Key Hour: ____

Family Functions Test Review

Write the equation of the parent function and sketch its graph.

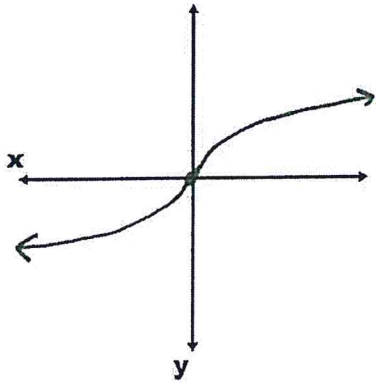
Polynomial Even

Equation: $f(x) = x^2$



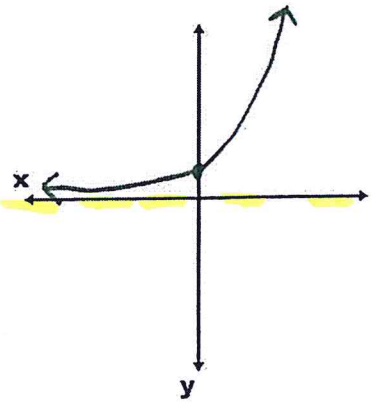
Radical Odd

Equation: $f(x) = \sqrt[3]{x}$



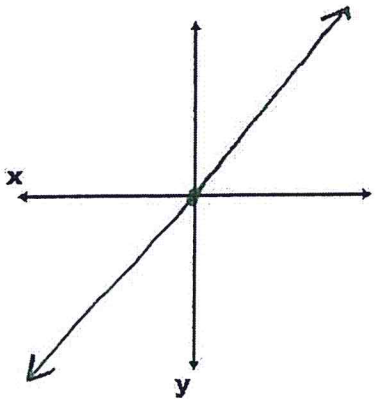
Exponential Growth

Equation: $f(x) = 2^x$



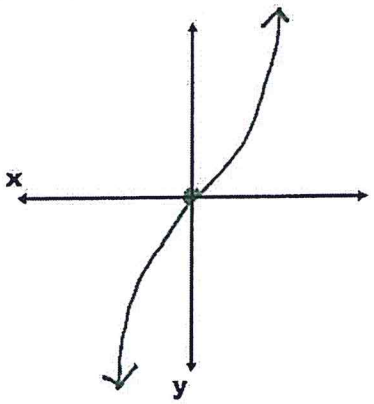
Linear

Equation: $f(x) = x$



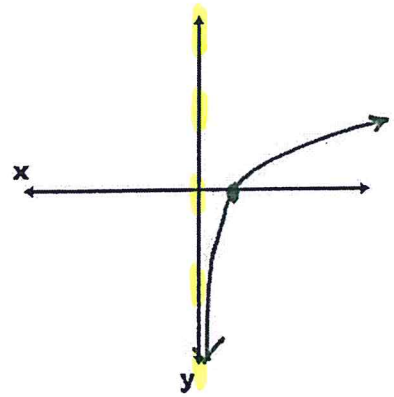
Polynomial Odd

Equation: $f(x) = x^3$



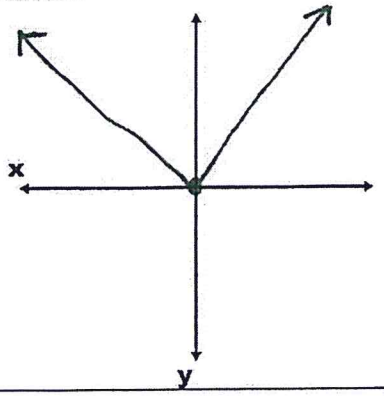
Logarithm

Equation: $f(x) = \log x$



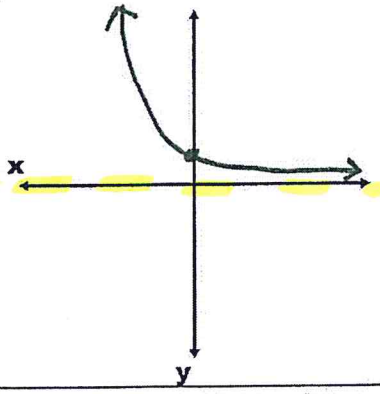
Absolute Value

Equation: $f(x) = |x|$



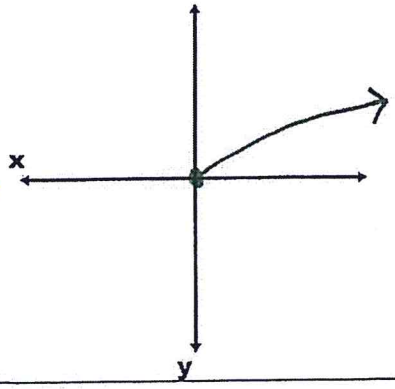
Exponential Decay

Equation: $f(x) = \left(\frac{1}{3}\right)^x$



Radical Even

Equation: $f(x) = \sqrt{x}$



Determine all the key features on the given parent functions.

1. **Function Family:** logarithm

   Domain: $(0, +\infty)$

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

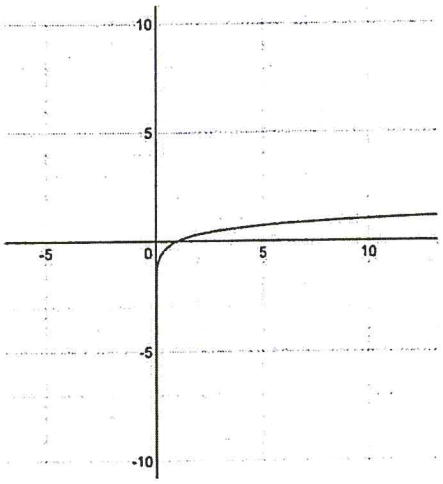
   Increasing: $(0, +\infty)$

   Decreasing: none

   X-intercepts: $(1, 0)$

   Y-intercepts: none

   Asymptotes: $x = 0$



End Behavior:

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

Right: As x approaches $+\infty$, y approaches $+\infty$.

2. **Function Family:** Radical Odd

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

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

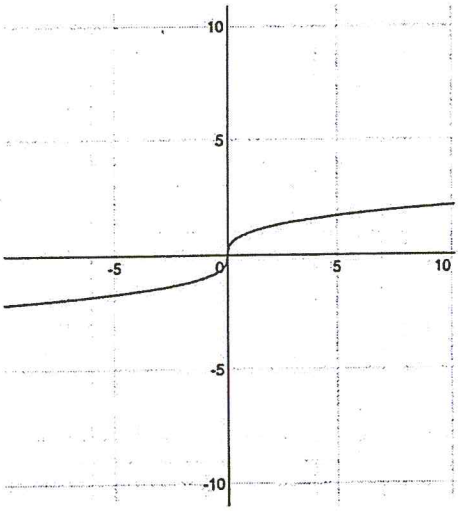
   Increasing: $(-\infty, +\infty)$

   Decreasing: none

   X-intercepts: $(0, 0)$

   Y-intercepts: $(0, 0)$

   Asymptotes: none



End Behavior:

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

Right: As x approaches $+\infty$, y approaches $+\infty$.

3. **Function Family:** absolute value

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

Range: $[0, +\infty)$

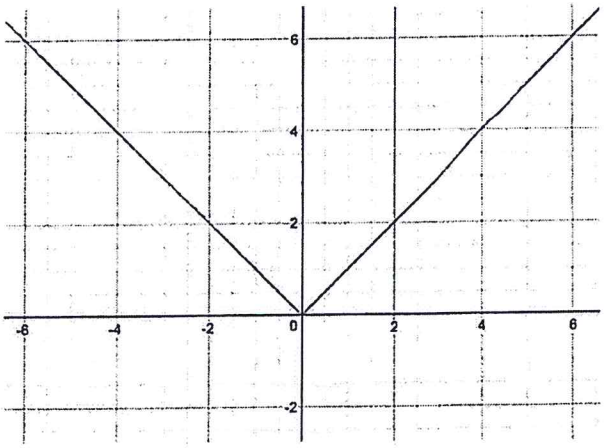
Increasing: $(0, +\infty)$

Decreasing: $(-\infty, 0)$

X-intercepts: $(0, 0)$

Y-intercepts: $(0, 0)$

Asymptotes: none



End Behavior:

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

Right: As x approaches $+\infty$, y approaches $+\infty$.

4. **Function Family:** radical even

Domain: $[0, +\infty)$

Range: $[0, +\infty)$

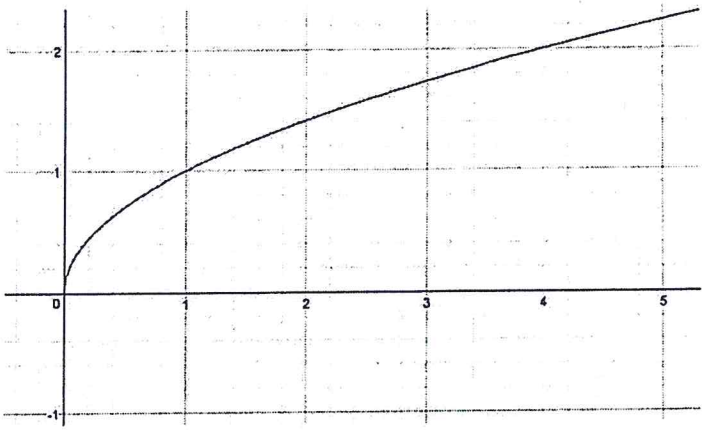
Increasing: $(0, +\infty)$

Decreasing: none

X-intercepts: $(0, 0)$

Y-intercepts: $(0, 0)$

Asymptotes: none



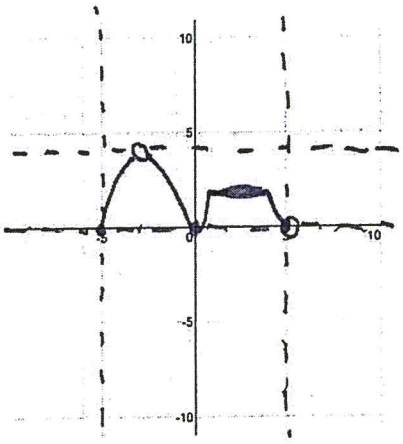
End Behavior:

Left: As x approaches 0, y approaches 0.

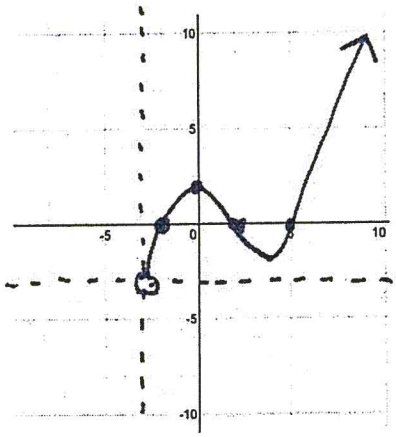
Right: As x approaches $+\infty$, y approaches $+\infty$.

Given specific key features of a function, graph.

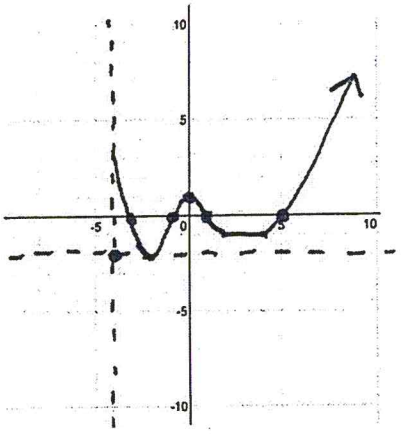
5. (1) Domain: $[-5, 5)$
   Range: $[0, 4)$
   (3) Increasing: $(-5, -3) \cup (0, 1)$ ~~$\cup (4, 5)$~~
   Decreasing: $(-3, 0) \cup (4, 5)$ ← should be ↓ to work
   Constant: $(1, 4)$
   (2) x-intercept: $(-5, 0)$ $(0, 0)$ $(5, 0)$
   y-intercept: $(0, 0)$



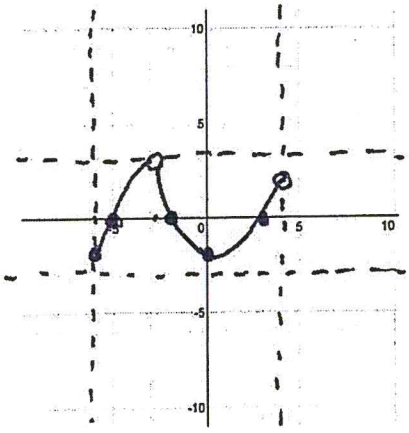
6. (1) Domain: $(-3, +\infty)$
   Range: $(-3, +\infty)$
   (3) Increasing: $(-3, 0) \cup (4, +\infty)$
   Decreasing: $(0, 4)$
   (2) x-intercept: $(-2, 0)$ $(2, 0)$, $(5, 0)$ Need
   y-intercept: $(0, 2)$



7. (1) Domain: $[-4, +\infty)$
   Range: $[-2, +\infty)$
   (3) Increasing: ~~$(-2, 0)$~~ $\cup$ ~~$(4, +\infty)$~~
   Decreasing: ~~$(-4, -2)$~~ $\cup$ ~~$(0, 2)$~~
   Constant: ~~$(1, 4)$~~
   (2) x-intercepts: $(-3, 0)$ $(-1, 0)$ $(1, 0)$ $(5, 0)$
   y-intercept: $(0, 1)$



8. (1) Domain: $[-6, 4)$
   Range: ~~$(-2,$~~ $3]$
   (3) Increasing: ~~$(-6, -3)$~~ $\cup$ $(0, 4)$
   Decreasing: ~~$(-3, 0)$~~
   (2) x-intercept: $(-5, 0)$ $(-2, 0)$ $(3, 0)$
   y-intercept: $(0, -2)$



Determine the key features of each graph.

9. **Domain:** $[-3, 2)$

   Range: $[-5, 4]$

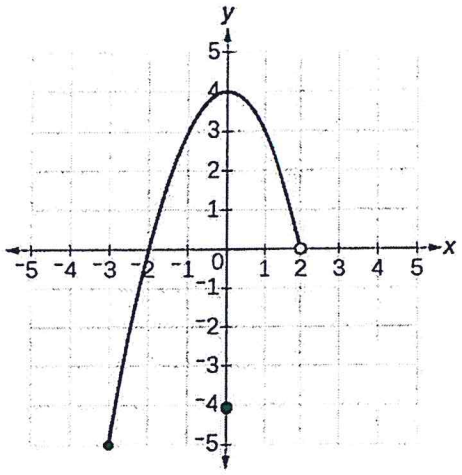
   Increasing: $(-3, 0)$

   Decreasing: $(0, 2)$

   Constant: none

   X-intercepts: $(-2, 0)$, $(2, 0)$

   Y-intercepts: $(0, 4)$



10. **Domain:** $[0, 7]$

    Range: $[-2, 4]$

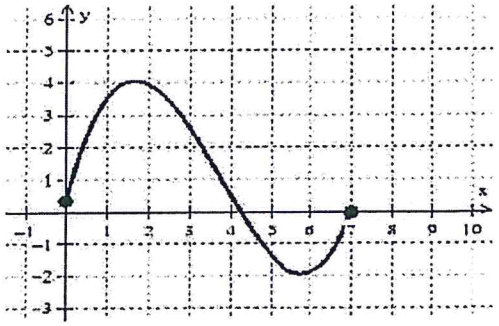
    Increasing: $(0, 1.5) \cup (6, 7)$

    Decreasing: $(1.5, 6)$

    Constant: none

    X-intercepts: $(4.25, 0)$

    Y-intercepts: $(0, 0.5)$



11. **Domain:** $[-6, 4)$

    Range: $[-6, 4]$

    Increasing: $(2, 4)$

    Decreasing: $(-3, 2)$

    Constant: $(-6, -3)$

    X-intercepts: $(-1, 0)$

    Y-intercepts: $(0, -2)$