

Families of Functions: Parent Functions

- For each parent function listed below, use your resources (textbook, devices, calculator, classmates) to answer the following questions.
- We will go over these as a class tomorrow.

1) CONSTANT FUNCTION: $y = c$ (c is any number)

Graph the function. (Label the axes)

Analyze the properties:

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

Range (interval notation): $[c, c]$

Increasing interval(s) none

Decreasing interval(s) none

x-intercept(s) at (Give ordered pair) none

y-intercept at (Give ordered pair) $(0, c)$

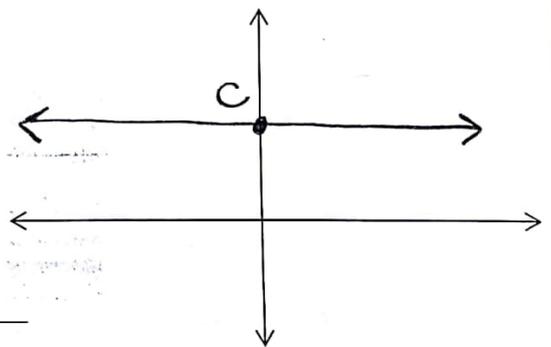
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? even

End Behavior: $\lim_{x \rightarrow \infty} f(x) =$ c

$\lim_{x \rightarrow -\infty} f(x) =$ c



2) LINEAR/IDENTITY FUNCTION: $y = x$

Graph the function. (Label the axes)

Analyze the properties:

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

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

Increasing interval(s) $(-\infty, \infty)$

Decreasing interval(s) none

x-intercept(s) at (Give ordered pair) $(0, 0)$

y-intercept at (Give ordered pair) $(0, 0)$

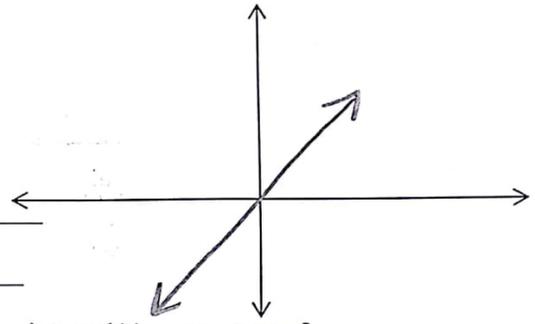
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? odd

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = -\infty$



3) ABSOLUTE VALUE: $y = |x|$

Graph the function. (Label the axes)

Calculator: MATH \rightarrow NUM \rightarrow abs(x)

Analyze the properties:

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

Range (interval notation): $[0, \infty)$

Increasing interval(s) $(0, \infty)$

Decreasing interval(s) $(-\infty, 0)$

x-intercept(s) at (Give ordered pair) $(0, 0)$

y-intercept at (Give ordered pair) $(0, 0)$

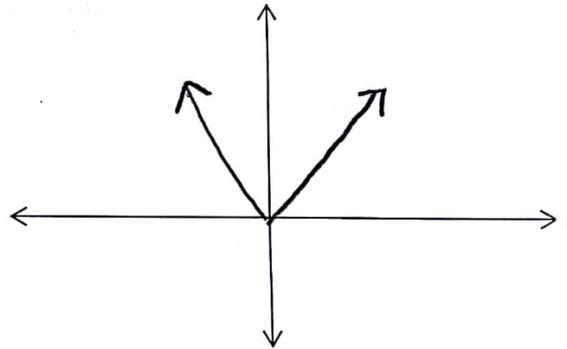
Local minimum? (Give ordered pair) $(0, 0)$

Local maximum? (Give ordered pair) none

Even, odd, or neither? even

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = \infty$



4) QUADRATIC: $y = x^2$

Graph the function. (Label the axes)

Analyze the properties:

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

Range (interval notation): $[0, \infty)$

Increasing interval(s) $(0, \infty)$

Decreasing interval(s) $(-\infty, 0)$

x-intercept(s) at (Give ordered pair) $(0, 0)$

y-intercept at (Give ordered pair) $(0, 0)$

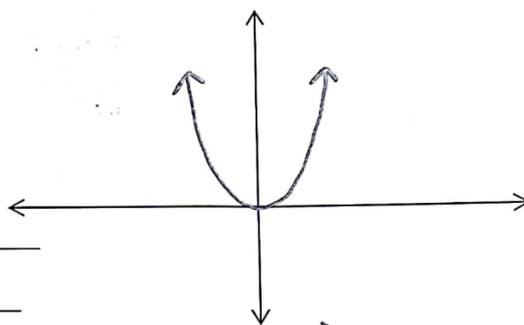
Local minimum? (Give ordered pair) $(0, 0)$

Local maximum? (Give ordered pair) none

Even, odd, or neither? even

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = \infty$



5) CUBIC: $y = x^3$

Graph the function. (Label the axes)

Analyze the properties:

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

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

Increasing interval(s) $(-\infty, 0) \cup (0, \infty)$

Decreasing interval(s) none

x-intercept(s) at (Give ordered pair) $(0, 0)$

y-intercept at (Give ordered pair) $(0, 0)$

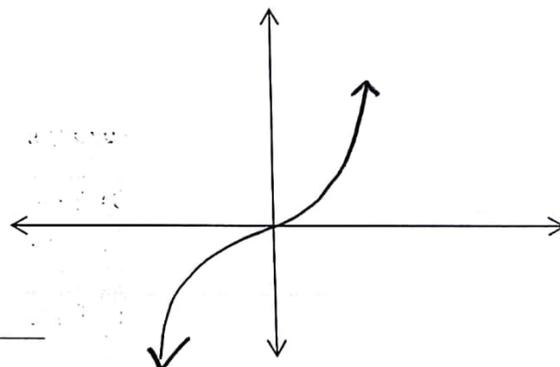
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? odd

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = -\infty$



6) SQUARE ROOT: $y = \sqrt{x}$

Graph the function. (Label the axes)

Analyze the properties:

Domain (interval notation): $[0, \infty)$

Range (interval notation): $[0, \infty)$

Increasing interval(s) $(0, \infty)$ Decreasing interval(s) none

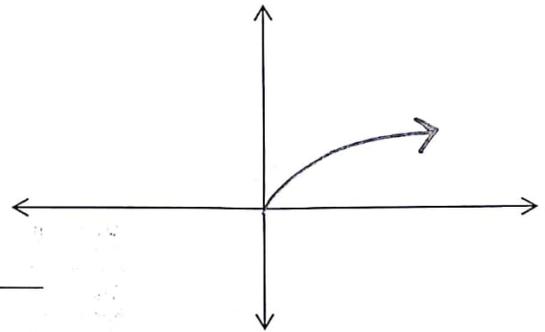
x-intercept(s) at (Give ordered pair) $(0, 0)$ y-intercept at (Give ordered pair) $(0, 0)$

Local minimum? (Give ordered pair) none Local maximum? (Give ordered pair) none

Even, odd, or neither? neither

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = \text{DNE}$
(does not exist)



7) CUBE ROOT: $y = \sqrt[3]{x}$

Graph the function. (Label the axes)

Calculator: MATH \rightarrow 4

Analyze the properties:

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

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

Increasing interval(s) $(-\infty, 0) \cup (0, \infty)$ Decreasing interval(s) none

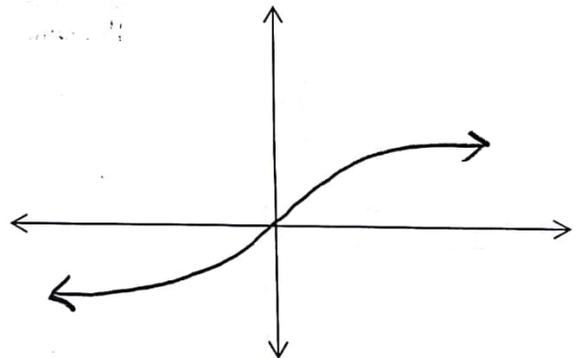
x-intercept(s) at (Give ordered pair) $(0, 0)$ y-intercept at (Give ordered pair) $(0, 0)$

Local minimum? (Give ordered pair) none Local maximum? (Give ordered pair) none

Even, odd, or neither? odd

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = -\infty$



8) RECIPROCAL: $y = \frac{1}{x}$

Graph the function. (Label the axes)

Analyze the properties:

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

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

Increasing interval(s) none

Decreasing interval(s) $(-\infty, 0) \cup (0, \infty)$

x-intercept(s) at (Give ordered pair) none

y-intercept at (Give ordered pair) none

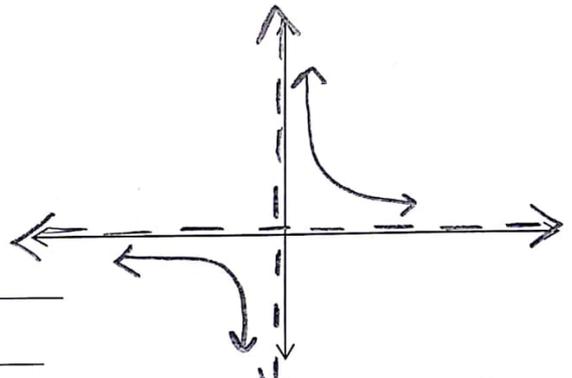
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? odd

End Behavior: $\lim_{x \rightarrow \infty} f(x) = 0$

$\lim_{x \rightarrow -\infty} f(x) = 0$



9) SQUARED RECIPROCAL: $y = \frac{1}{x^2}$

Graph the function. (Label the axes)

Analyze the properties:

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

Range (interval notation): $(0, \infty)$

Increasing interval(s) $(-\infty, 0)$

Decreasing interval(s) $(0, \infty)$

x-intercept(s) at (Give ordered pair) none

y-intercept at (Give ordered pair) none

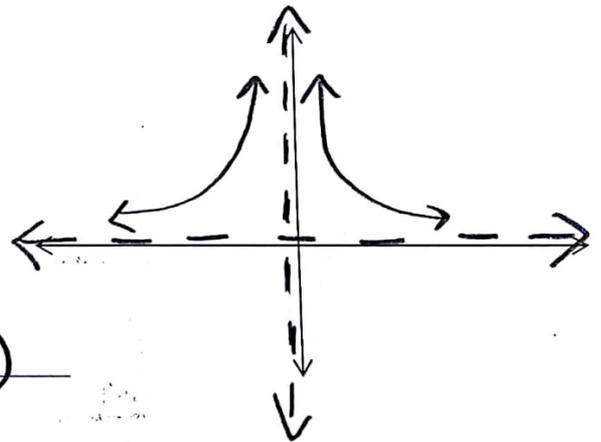
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? even

End Behavior: $\lim_{x \rightarrow \infty} f(x) = 0$

$\lim_{x \rightarrow -\infty} f(x) = 0$



10) EXPONENTIAL: $y = e^x$

Graph the function. (Label the axes)
Calculator: 2nd LN

Analyze the properties:

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

Range (interval notation): $(0, \infty)$

Increasing interval(s) $(-\infty, \infty)$

Decreasing interval(s) none

x-intercept(s) at (Give ordered pair) none

y-intercept at (Give ordered pair) $(0, 1)$

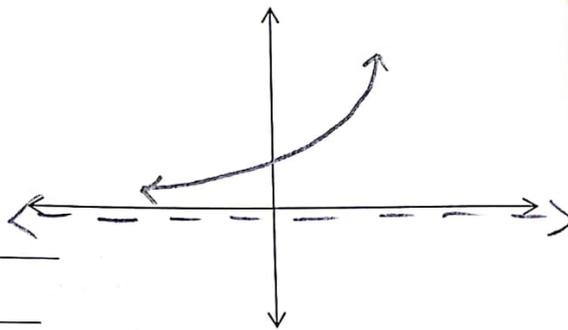
Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? neither

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow -\infty} f(x) = 0$



11) NATURAL LOGARITHM: $y = \ln x$

Graph the function. (Label the axes)

Analyze the properties:

Domain (interval notation): $(0, \infty)$

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

Increasing interval(s) $(0, \infty)$

Decreasing interval(s) none

x-intercept(s) at (Give ordered pair) $(1, 0)$

y-intercept at (Give ordered pair) none

Local minimum? (Give ordered pair) none

Local maximum? (Give ordered pair) none

Even, odd, or neither? neither

End Behavior: $\lim_{x \rightarrow \infty} f(x) = \infty$

$\lim_{x \rightarrow 0^+} f(x) = \text{DNE}$

