Power Function

- $f(x) = kx^a$ where ***k*** and ***a*** are non-zero constants

Monomial Function

- $f(x) = k$
- $f(x) = kx^a$ where ***k*** is ***a*** constant and a is a positive integer

Determine whether the function is a power function, given that c, g, k, and π represent constants. For those that are power functions, state the power and constant of variation.

a) $f(x) = \frac{-1}{3}x^4$

Yes Power function

$K = \frac{-1}{3}$

Degree = 4

b) $f(x) = 5x^{4/3}$

Power

Constant = 5

Power $4/3$

Not monomial because $\frac{4}{3}$ not integer

c) $f(x) = \frac{k}{x^3} = Kx^{-3}$

Yes Power function

Constant = K

Power = -3

Not monomial Function

d) $f(x) = 6x^0$

No power function

$a = 0$

Monomial Function

d) $f(x) = 5(3)^x$

Exponential Function

For the functions above, determine which are monomial functions. For the functions that are monomials, give the degree and leading coefficient.

Extrema:
List all local and absolute minima and maxima

Local Extrema:
List just the maxima and minima on the interior of the graph

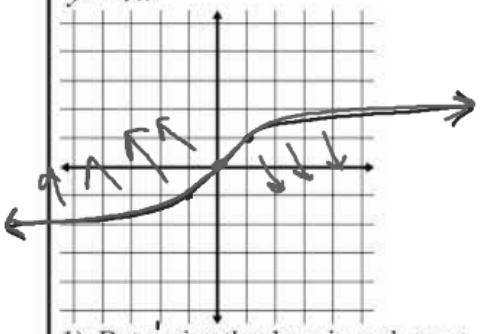
End Behavior:

$\lim_{x\to\infty} f(x) =$

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

Sketch a graph of the following functions

$y = \sqrt[3]{x}$



1) Determine the domain and range

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

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

2) Is the function even, odd or undefined for $x < 0$

odd

3) Intervals of Increase or Decrease

Inc $(-\infty,\infty)$

4) Find any extrema.

None

5) Determine the end behavior

$\lim_{x\to\infty} f(x) = \infty$

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

6) Find any asymptotes

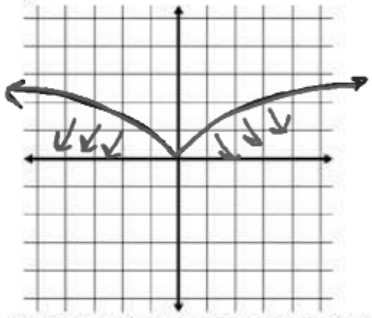
None

7) Intervals of Concavity

Concave up $(-\infty,0)$

Concave Down $(0,\infty)$

$y = x^{2/3}$



1) Determine the domain and range

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

R: $[0,\infty)$

2) Is the function even, odd or undefined for $x < 0$

even

3) Intervals of Increase or Decrease

Dec $(-\infty,0)$

Inc $(0,\infty)$

4) Find any extrema.

min $(0,0)$

5) Determine the end behavior

$\lim_{x\to\pm\infty} f(x) = \infty$

6) Find any asymptotes

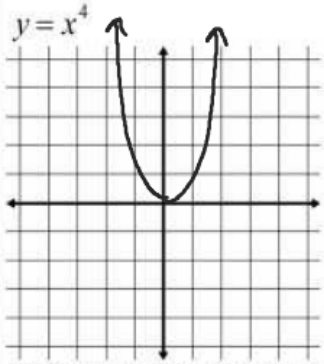
None

7) Intervals of Concavity

Concave Down $(-\infty,0)$ $(0,\infty)$

Sketch a graph of the following functions

$y = x^4$



1) Determine the domain and range

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

R: $[0, \infty)$

2) Is the function even, odd or undefined for $x < 0$

even

3) Intervals of Increase or Decrease

Dec $(-\infty, 0)$

Inc $(0, \infty)$

4) Find any extrema.

min $(0,0)$

5) Determine the end behavior

$\lim_{x \to \pm\infty} f(x) = \infty$

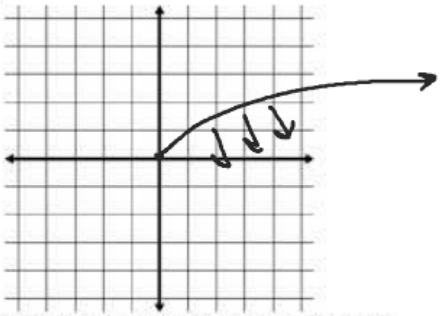
6) Find any asymptotes

None

7) Intervals of Concavity

Concave up $(-\infty, \infty)$

$y = \sqrt[4]{x}$



1) Determine the domain and range

D: $[0, \infty)$

R: $[0, \infty)$

2) Is the function even, odd or undefined for $x < 0$

3) Intervals of Increase or Decrease

Inc $(0, \infty)$

4) Find any extrema.

Min $(0,0)$

5) Determine the end behavior

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

6) Find any asymptotes

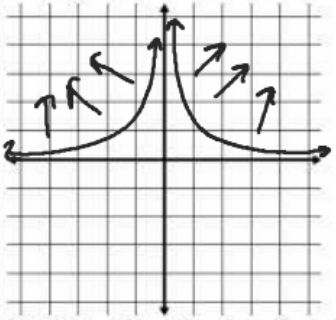
None

7) Intervals of Concavity

Concave Down $(0, \infty)$

Sketch a graph of the following functions

$y = \frac{1}{x^2}$



1) Determine the domain and range

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

R: $(0, \infty)$

2) Is the function even, odd or undefined for $x < 0$

3) Intervals of Increase or Decrease

4) Find any extrema.

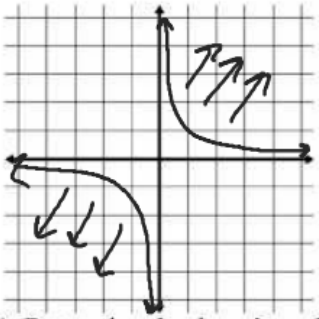
5) Determine the end behavior

$\lim_{x \to \pm\infty} f(x) = 0$

6) Find any asymptotes

7) Intervals of Concavity

$y = x^{-3}$



1) Determine the domain and range

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

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

2) Is the function even, odd or undefined for $x < 0$

3) Intervals of Increase or Decrease

4) Find any extrema.

5) Determine the end behavior

6) Find any asymptotes

7) Intervals of Concavity