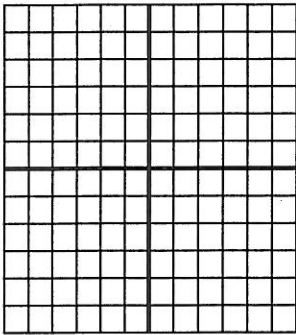


AFM – Power Functions

Definition:

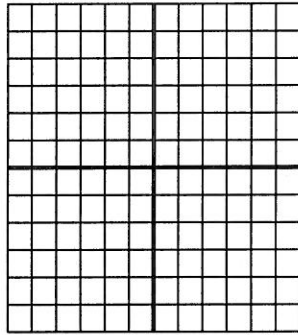
Which 4 parent functions that we learned in Unit 1 were power functions?



Domain:

Range:

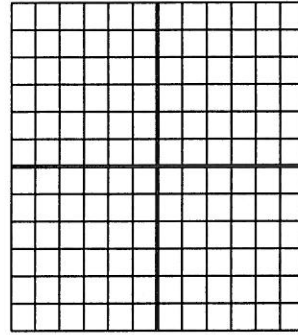
Symmetry:



Domain:

Range:

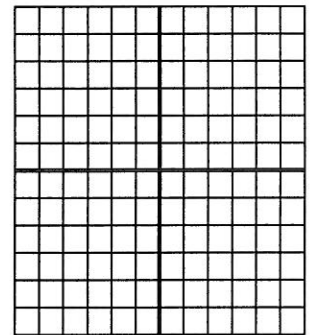
Symmetry:



Domain:

Range:

Symmetry:



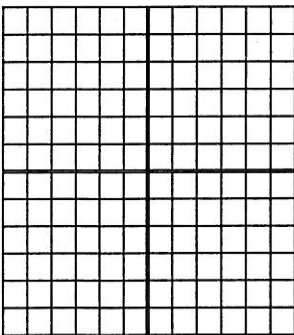
Domain:

Range:

Symmetry:

Graph and give domain/range/symmetry. Be sure to label at least 3 points on each.

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

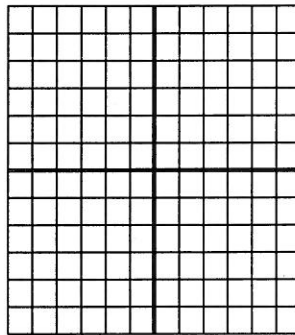


Domain:

Range:

Symmetry:

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

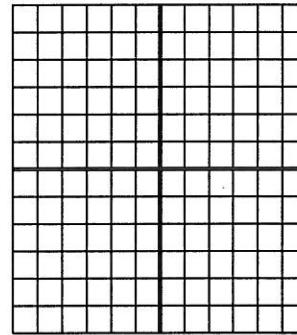


Domain:

Range:

Symmetry:

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



Domain:

Range:

Symmetry:

Write each of the equations above in the form of a power function: $y = x^n$

3. **Graphs of Power Functions:** The key to power function graphs is the exponent in $y = x^n$. If n is a positive even number or a positive odd number, you already know what these functions look like from your parent functions.

a) Use your knowledge of parent functions to fill in the 1st column of the chart below with a basic sketch.

	$n > 1$	$n < 0$	$0 < n < 1$
"Even"			
"Odd"			

b) Use your graphing calculator to graph the following functions and fill in the 2nd column in your chart.
 $y = x^{-2}$, $y = x^{-3}$, $y = x^{-4}$, $y = x^{-5}$, ...

c) Use your graphing calculator to graph the following functions and fill in the 3rd column in your chart.
 $y = x^{\frac{1}{2}}$, $y = x^{\frac{1}{3}}$, $y = x^{\frac{1}{4}}$, $y = x^{\frac{1}{5}}$, ...

d) Now go back to the functions given in question 2 and rewrite them in $y = x^a$ form.
 Which part of the chart above do they match?

4. Match the equations to one of the curves labeled in the figure below

$$y = -\frac{2}{3}x^4$$

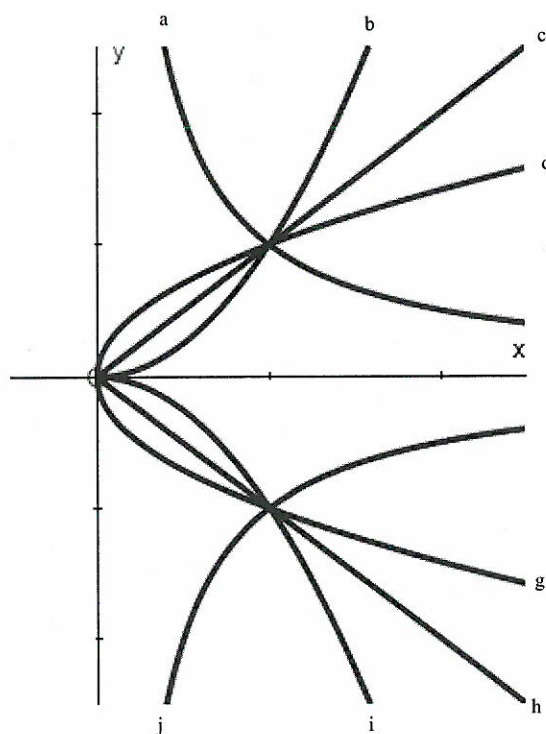
$$y = \frac{1}{2}x^{-5}$$

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

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

$$y = -2x^{-2}$$

$$y = 1.7x^{\frac{2}{5}}$$



6. **Multiple Choice:** Which of the following exhibit inverse variation?

- A The distance traveled as a function of speed.
- B The total cost as a function of the number of items purchased.
- C The area of a circular swimming pool as a function of its radius.
- D The number of posts in a 20ft fence as a function of distance between posts.

For questions 7 and 8, write a power function to model the situation.

7. The surface area S of a sphere varies directly as the square of the radius r .

8. The period of time T for the full swing of a pendulum varies directly as the square root of the pendulum's length L .

9. The time it takes for a group of volunteers to build a house varies inversely with the number of volunteers v .

a) Write a power function to model this situation.

b) If 20 volunteers can build a house in 62.5 working hours, how many volunteers would be needed to build a house in 50 working hours. (*Hint:* Find the value of k first.)

10. The power P (in watts) produced by a windmill is proportional to the cube of the wind speed v (in mph).

a) Write a power function to model this situation.

b) If a wind of 10 mph generates 15 watts of power, how much power is generated by a wind speed of 40mph?

11. Write a power function for the following situation, and then use the equation to solve for the missing information. The intensity I of light varies inversely as the square of the distance D from the source. If the intensity of illumination on a screen 5 feet from a light is 2 foot-candles, find the intensity on a screen 15 feet from the light.