

1.1 Power Functions

BLM 1-3

1. State the degree and the leading coefficient of each polynomial.

a) $y = -2x^5 + 3x^3 - 1$

b) $y = 3x + 5x^2$

c) $y = \frac{x^4}{3} - 3x^3 + x - 6$

2. Complete the table for the following functions.

$y = 3x$

$y = -2x^7$

$y = -3x^4$

$y = 4x^5$

$y = -x^2$

$y = \frac{2}{3}x^6$

$y = -\frac{1}{6}x^3$

$y = 2x^{10}$

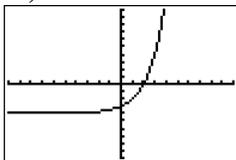
End Behaviour	Function	Reasons
Extends from quadrant 3 to quadrant 1		
Extends from quadrant 2 to quadrant 4		
Extends from quadrant 2 to quadrant 1		
Extends from quadrant 3 to quadrant 4		

3. Consider each graph.

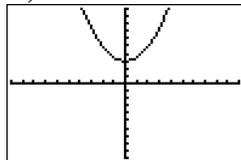
i) Does it represent a power function, an exponential function, a periodic function, or none of these?

ii) Identify any symmetry.

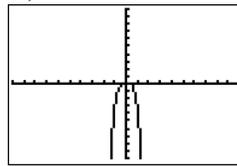
a)



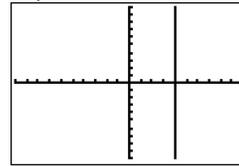
b)



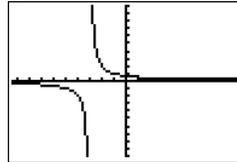
c)



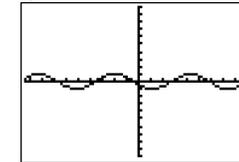
d)



e)



f)



4. a) Graph $y = x^4$, $y = -3x^4$, and $y = \frac{1}{2}x^4$ on the same set of axes.

the same set of axes.

- b) Compare and describe the key features of the graphs.

5. a) Graph $y = x^5$, $y = (x + 3)^5$, and $y = (x - 3)^5$ on the same set of axes.

- b) Describe the similarities and differences among the graphs in part a).

- c) Make a conjecture about the relationship between the graphs of $y = x^n$ and $y = (x - h)^n$, where $h \in \mathbb{R}$ and n is an odd whole number.

6. The surface area of a spherical snowball is given by the function $S(r) = 4\pi r^2$, where r is the radius of the snowball, in centimetres, and $r \in [0, 12]$.

- a) Graph $S(r)$.

- b) State the domain and the range.

- c) Describe the similarities and differences between the graphs of $S(r)$ and $y = x^2$.

7. a) Describe the relationship between the graph of $y = x^3$ and the graph of

$$y = -\frac{1}{2}(x + 1)^3 - 4$$

- b) Predict the relationship between the graph of $y = x^5$ and the graph of

$$y = -\frac{1}{2}(x + 1)^5 - 4$$

- c) Verify the accuracy of your prediction by graphing the functions in part b).