

## 12: Power Functions --- Answers

1. Linear functions model things where there is a constant rate of change. Power functions will model something in which the rate changes.
2.
  - a)  $y = x^2$
  - b)  $y = x^{1/6}$
  - c)  $y = x^{-2}$
  - d)  $y = x^{1/2}$
  - e)  $y = x^6$
  - f)  $y = x^{-1/2}$
3. For any real number  $a$ ,  $1^a = 1$ .
4.
  - a) 4
  - b) 16,384
  - c) 625
  - d)  $\approx 5.623$
5.
  - a)  $3\sqrt[5]{x^9}$
  - b)  $\sqrt[3]{x^4}$
  - c)  $6\sqrt[5]{x^{54}}$
  - d)  $8\sqrt[4]{x^7}$
6. The exponent is greater than 1 or less than 0.
7. The exponent is between 0 and 1.
8.
  - a) 5
  - b) 2
  - c)  $\approx 5.25$
9.
  - a) It is not a linear function because the rate of change does not remain constant.
  - b) Since the graph is concave down so  $0 < p < 1$ .
10. If the exponent is positive on a power function, the y-intercept will be 0. If the exponent is negative there is no y-intercept.
11.
  - a) Yes;  $f(x) = x^5$ .
  - b) Yes;  $f(x) = 4x^2$ .
  - c) Yes;  $f(x) = x^{3/10}$ .
  - d) No; since  $f(0) \neq 0$ .
12.
  - a) Yes;  $y = x^{3/4}$ .
  - b) Yes;  $y = 2x^5$  (if we ignore when  $x = 0$ .)
  - c) No (this is a linear function if we ignore when  $x = 0$ .)
13. Very well. For Neptune,  $d^{3/2} = 164.32$  (rounded), compared to 164.82.  
For Pluto,  $d^{3/2} = 248.54$  (rounded), compared to 248.6.