

## 7.7: Exponential & Power Functions

Write an exponential function  $y = ab^x$  whose graph passes through the given points.

A)  $(1, 6), (3, 24)$

1st Equation

$$6 = ab^1$$

$$a = \frac{6}{b}$$

2nd Equation

$$24 = ab^3$$

$$24 = \frac{6}{b} \cdot b^3$$

$$24 = \frac{6b^3}{b^1}$$

$$\frac{24}{6} = \frac{6b^2}{6}$$

$$4 = b^2$$

$$b = 2$$

$$a = \frac{6}{2}$$

$$a = 3$$

$$y = 3 \cdot 2^x$$

B) (2, 8), (3, 32)

$$y = ab^x$$

1<sup>st</sup> Eqn

2<sup>nd</sup> Eqn

$$\frac{8}{b^2} = \frac{ab^2}{b^2}$$

$$32 = ab^3$$

$$a = \frac{8}{b^2}$$

$$32 = \frac{8}{b^2} \cdot b^3$$

$$a = \frac{8}{4^2}$$

$$32 = 8b$$

$$a = \frac{8}{16}$$

$$b = 4$$

$$a = \frac{1}{2}$$

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

Ex) Write a power function  $y = ax^b$  whose graph passes through the given points.

A) (2, 1), (7, 6)

1<sup>st</sup> Eqn

$$1 = a 2^b$$

$$a = \frac{1}{2^b}$$

$$\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}$$

$$a = \frac{1}{2^b}$$

$$a = \frac{1}{2^{1.43}}$$

$$a = \frac{1}{2.69}$$

$$a = .371$$

2<sup>nd</sup> Eqn

$$6 = a 7^b$$

$$6 = \frac{1}{2^b} \cdot 7^b$$

$$6 = \frac{7^b}{2^b}$$

$$6 = \left(\frac{7}{2}\right)^b$$

$$\log_{\frac{7}{2}} 6 = \log_{\frac{7}{2}} \left(\frac{7}{2}\right)^b$$

$$\log_{\frac{7}{2}} 6 = b$$

$$b = \frac{\log 6}{\log \frac{7}{2}}$$

$$b = 1.43$$

$$y = .371 x^{1.43}$$

B) (3, 4), (6, 15)

Eqn 1

$$4 = a \cdot 3^b$$

$$a = \frac{4}{3^b}$$

$$a = \frac{4}{3^{1.91}}$$

$$a = .491$$

$$y = .49 x^{1.91}$$

Eqn 2

$$15 = a \cdot 6^b$$

$$15 = \frac{4}{3^b} \cdot 6^b$$

$$15 = 4 \cdot \frac{6^b}{3^b}$$

$$15 = 4 \cdot 2^b$$

$$\frac{15}{4} = 2^b$$

$$\log_2 \frac{15}{4} = \log_2 2^b$$

$$\log_2 \frac{15}{4} = b$$

$$b = \frac{\log \frac{15}{4}}{\log 2}$$

$$b = 1.91$$

# HW: 7.7 Worksheet