

Notes 2.4 – Linear & Exponential Functions

Warmup – Write the both kinds of equations from the two given points.

1. (3, 10) and (1, 4)

Slope:

$$\frac{10-4}{3-1} = \frac{6}{2} = 3$$

Point-Slope Form:

$$* y = 3(x-3) + 10$$

or

$$* y = 3(x-1) + 4$$

Slope-Intercept Form:

$$y = 3x - 3 + 4$$

$$y = 3x + 1$$

2. (2, 7) and (4, 2)

Slope:

$$\frac{7-2}{2-4} = \frac{5}{-2}$$

Point-Slope Form:

$$* y = -\frac{5}{2}(x-2) + 7$$

or

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

Slope-Intercept Form:

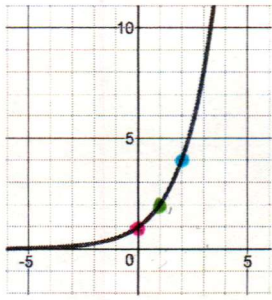
$$y = -\frac{5}{2}x + 10 + 2$$

$$y = -\frac{5}{2}x + 12$$

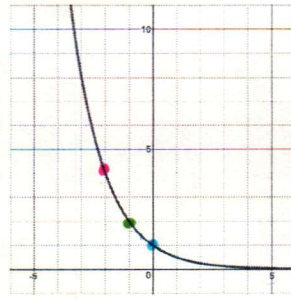
Lesson – Writing Exponential Equations

Type	General Form	Example
Exponential	$y = b(a)^x$ <p> ↑ common ratio y-int or value at $n=0$ </p>	$y = 3\left(\frac{1}{2}\right)^x$ <p> y-int: (0, 3) CR: $\frac{1}{2}$ </p>

Two types of exponential graph



Type: growth $a > 1$



Type: decay $0 < a < 1$

Common Ratio: $\boxed{\cdot 2}$

x	0	1	2	3
y	1	2	4	

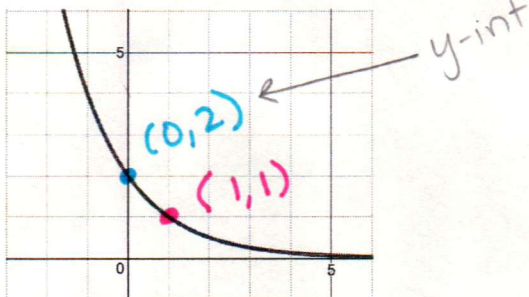
Finding the common ratio from a graph:

Use two consecutive points

$$\frac{y \text{ on the right}}{y \text{ on the left}} = \text{Common ratio}$$

Write an exponential equation from a graph.

a)



Type: decay

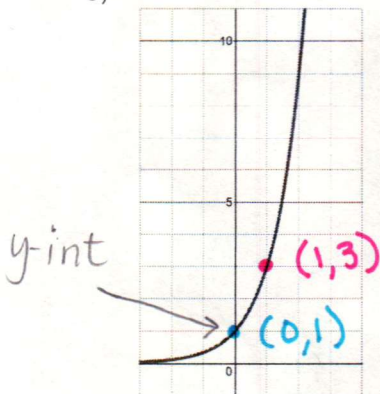
Common Ratio:

$$\frac{1}{2} \Rightarrow \boxed{\cdot \frac{1}{2}}$$

Equation:

$$\boxed{y = 2 \left(\frac{1}{2}\right)^x}$$

b)



Type: growth

Common Ratio:

$$\frac{3}{1} \Rightarrow \boxed{\cdot 3}$$

Equation:

$$\boxed{y = 1(3)^x}$$

Write an equation from two consecutive points.

c) ^{left} ^{right}
(0, 4) and (1, 2)

Common Ratio:

$$\frac{2}{4} \Rightarrow \boxed{\cdot \frac{1}{2}}$$

Type: decay

y-intercept: (0, 4)

Equation:

$$y = 4\left(\frac{1}{2}\right)^x$$

d) ^{left} ^{right}
(1, 6) and (2, 18)

Common Ratio:

$$\frac{18}{6} \Rightarrow \boxed{\cdot 3}$$

Type: growth

y-intercept: (0, 2)

x	0	1	2
y	2	6	18

↖ ÷ 3 ↗ · 3

Equation:

$$\boxed{y = 2(3)^x}$$

You must find the zero term, that is your y-intercept and starting point