

**Section 9 – 2C: Finding x and y values for exponential functions**

**Finding the y Intercept for a **increasing** exponential function**

**To find the y intercept let  $x = 0$  and find the value for y**

Find the y intercept for

$$y = 4^x$$

$$\text{if } x = 0$$

$$y = 4^0$$

$$y = 1$$

$$(0,1)$$

**Example 1**

Find the y intercept for

$$y = 4^{x-3}$$

$$\text{if } x = 0$$

$$y = 4^{0-3}$$

$$y = 4^{-3}$$

$$y = \frac{1}{64}$$

$$(0, 1/64)$$

**Example 2**

Find the y intercept for

$$y = 3^{x+2}$$

$$\text{if } x = 0$$

$$y = 3^{0+2}$$

$$y = 3^2$$

$$y = 9$$

$$(0,9)$$

**Example 3**

Find the y intercept for

$$y = 3^x - 4$$

$$\text{if } x = 0$$

$$y = 3^0 - 4$$

$$y = 1 - 4$$

$$y = -3$$

$$(0, -3)$$

**Example 4**

Find the y intercept for

$$y = 5^x - 3$$

$$\text{if } x = 0$$

$$y = 5^0 - 3$$

$$y = 1 - 3$$

$$y = -2$$

$$(0, -2)$$

**Example 5**

Find the y intercept for

$$y = 4^{-x}$$

$$\text{if } x = 0$$

$$y = 4^{-0}$$

$$y = 4^0$$

$$y = 1$$

$$(0,1)$$

**Example 6**

Find the y intercept for

$$y = -4^x$$

$$\text{if } x = 0$$

$$y = -4^0$$

$$y = -(1)$$

$$y = -1$$

$$(0, -1)$$

## Finding the y Intercept for a **decreasing** exponential function

To find the y intercept let  $x = 0$  and find the value for y

Find the y intercept for

$$y = (1/2)^x$$

$$\text{if } x = 0$$

$$y = (1/2)^0$$

$$y = 1$$

$$(0,1)$$

### Example 7

Find the y intercept for

$$y = (1/2)^{x-3}$$

$$\text{if } x = 0$$

$$y = (1/2)^{0-3}$$

$$y = (1/2)^{-3}$$

$$y = 8$$

$$(0,8)$$

### Example 8

Find the y intercept for

$$y = (1/2)^{x+4}$$

$$\text{if } x = 0$$

$$y = (1/2)^{0+4}$$

$$y = (1/2)^4$$

$$y = 1/16$$

$$(0,1/16)$$

### Example 9

Find the y intercept for

$$y = 3^x - 4$$

$$\text{if } x = 0$$

$$y = 3^0 - 4$$

$$y = 1 - 4$$

$$y = -3$$

$$(0,-3)$$

### Example 10

Find the y intercept for

$$y = 5^x - 3$$

$$\text{if } x = 0$$

$$y = 5^0 - 3$$

$$y = 1 - 3$$

$$y = -2$$

$$(0,-2)$$

### Example 11

Find the y intercept for

$$y = 4^{-x}$$

$$\text{if } x = 0$$

$$y = 4^{-0}$$

$$y = 4^0$$

$$y = 1$$

$$(0,1)$$

### Example 12

Find the y intercept for

$$y = -4^x$$

$$\text{if } x = 0$$

$$y = -4^0$$

$$y = -(1)$$

$$y = -1$$

$$(0,-1)$$

Finding the value for y given a value for x  
for a **increasing** exponential function

**f (3)** means that **x = 3**  
**f (x)** can be replaced with the variable **y**

**Example 13**

$$f(x) = (3)^{x-1}$$

find  $f(-2)$

$$y = (3)^{-2-1}$$
$$y = (3)^{-3}$$
$$y = 1/27$$

$$(-2, 1/27)$$

**Example 14**

$$f(x) = (2)^{x+1}$$

find  $f(3)$

$$y = (2)^{3+1}$$
$$y = (2)^4$$
$$y = 16$$

$$(3, 16)$$

**Example 15**

$$f(x) = (4)^x + 3$$

find  $f(2)$

$$y = (4)^2 + 3$$
$$y = 16 + 3$$
$$y = 19$$

$$(2, 19)$$

**Example 16**

$$f(x) = (2)^x - 5$$

find  $f(4)$

$$y = (2)^4 - 5$$
$$y = 16 - 5$$
$$y = 11$$

$$(4, 11)$$

**Example 17**

$$f(x) = (7)^{-x}$$

find  $f(2)$

$$y = (7)^{-2}$$
$$y = 7^{-2}$$
$$y = 1/49$$

$$(2, 1/49)$$

**Example 18**

$$f(x) = -(3)^x$$

find  $f(-4)$

$$y = -(3)^{-4}$$
$$y = -(3^{-4})$$
$$y = -81$$

$$(3, -81)$$

Finding the value for y given a value for x  
for a **decreasing** exponential function

**f (1/2)** means that **x = 1/2**

**f (x)** can be replaced with the variable **y**

**Example 19**

$$f(x) = (1/2)^{x-1}$$

find  $f(-3)$

$$y = (1/2)^{-3-1}$$
$$y = (1/2)^{-4}$$
$$y = 16$$

$(-3, 16)$

**Example 20**

$$f(x) = (1/4)^{x+1}$$

find  $f(2)$

$$y = (1/4)^{2+1}$$
$$y = (1/4)^3$$
$$y = 1/64$$

$(2, 1/64)$

**Example 21**

$$f(x) = (1/4)^x + 5$$

find  $f(-1)$

$$y = (1/4)^{-1} + 5$$
$$y = 4 + 5$$
$$y = 9$$

$(-1, 9)$

**Example 22**

$$f(x) = (1/2)^x - 4$$

find  $f(-3)$

$$y = (1/2)^{-3} - 4$$
$$y = 8 - 4$$
$$y = 4$$

$(1/2, 4)$

**Example 23**

$$f(x) = (1/3)^{-x}$$

find  $f(-2)$

$$y = (1/3)^{-(-2)}$$
$$y = (1/3)^2$$
$$y = 1/9$$

$(-2, 1/9)$

**Example 24**

$$f(x) = -(1/4)^x$$

find  $f(2)$

$$y = -(1/4)^2$$
$$y = -(1/16)$$
$$y = -1/16$$

$(2, -1/16)$