

Exponential Functions - Section Test

(Answers)

1.

$$y = 5^x$$

$$\text{if } x = 2 \text{ then } y = 5^2 = 25.$$

2.

$$y = 2^x$$

$$\text{if } x = -2 \text{ then } y = 2^{-2} = \frac{1}{2^2} = \frac{1}{4}, 0.25 \text{ as a decimal}$$

3.

$$4^x = 16$$

$$16 = 4 \times 4 = 4^2$$

$$\text{So, } x = 2$$

4.

$$10^x = \frac{1}{100}$$

$$\frac{1}{100} = \frac{1}{10^2} = 10^{-2}$$

$$\text{So, } x = -2$$

5.

$$y = a^x$$

$$x = 2, y = 16$$

$$16 = 4 \times 4 = 4^2 = a^2$$

$$a = 4$$

6.

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

$$x = 1, y = \frac{1}{2}$$

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

$$a = 2$$

7.

$$A = 500$$

$$500(1.02)^{10} = 609.49721 = \text{£}609.50$$

8.

$$h < 90\text{cm}$$

$$90 > 90 \times \left(\frac{3}{4}\right)^n$$

$$1 > \left(\frac{3}{4}\right)^n$$

$$\text{If } n = 1$$

$$1 > \frac{3}{4} \text{ is true}$$

So, the first bounce with height less than than the height from which the ball was dropped is the first bounce.

9.

$$P = 2500(2 - 3^{-x})$$

$$P = 2500\left(2 - \frac{1}{3^x}\right)$$

As x increases, $\frac{1}{3^x}$ tends towards zero so,

$$(2 - 3^{-x}) \text{ tends towards } (2 - 0) = 2$$

$$\text{So, } P = 2500(2 - 3^{-x}) \text{ tends towards } P = 2500(2) = 5000$$

As time increases, the population of the island tends towards 5000.

10.

$$y = a^x + a^{-x}$$

$$x = 1, y = \frac{26}{5}$$

$$\frac{26}{5} = a^1 + a^{-1} = a + \frac{1}{a}$$

$$\frac{26}{5} = \frac{a^2}{a} + \frac{1}{a} = \frac{a^2 + 1}{a}$$

$$a = 5$$