

Math 3.

Exponential Functions

1. $y = 6^x$
 $f(x) = ab^x$

a - initial amount

b - decay factor

$$b = 1 - r$$

r - rate of decay

$y = 6^x$ - Exponential growth.

Growth factor = 6.

2. $f(x) = 1.5^x$

$f(x) = \left(\frac{3}{2}\right)^x$ - Exponential ~~decay~~ growth

~~Decay~~ Growth factor = $\frac{3}{2}$ or 1.5

3. $f(x) = 3(0.8)^x$ - Exponential decay

Decay factor = 0.8 or $\frac{4}{5}$

4. $y = 4\left(\frac{5}{6}\right)^x$ - Exponential decay

Decay factor = $\frac{5}{6}$ or 0.833

$$5. A = P \left(1 - \frac{r}{100}\right)^n$$

A = Amount
 P = Principal
 r = rate
 n = time

$$A = 29,000 \left(1 - \frac{12}{100}\right)^7$$

$$A = 29,000 (0.88)^7$$

$$A = \$11,851.60.$$

$$6. A = P \left(1 + \frac{r}{100}\right)^n$$

$$A = 350,000 \left(1 + \frac{2}{100}\right)^{10}$$

$$A = 350,000 (1.02)^{10}$$

$$A = \$426,648.05$$

$$7. A = P \left(1 + \frac{r}{100}\right)^n$$

$$A = 75,000 \left(1 + \frac{12.5}{100}\right)^{30}$$

$$A = 75,000 (1.125)^{30}$$

$$A = 2,568,247.90.$$

$$8. \quad y = ab^x$$

a - Initial amount

b - decay factor

$$b = 1 - r \quad x = 5.$$

$$r = 20\% = \frac{20}{100} = 0.2$$

$$b = 1 - 0.2 \\ = 0.8.$$

$$y = ab^x$$

$$98304 = a(0.8)^5$$

$$a = \frac{98304}{(0.8)^5}$$

$$a = 300,000.$$

$\therefore$ Original Value = \$300,000.

$$9. \quad V(n) = 42000(0.85)^n$$

$$a) \quad n = 0$$

$$V(0) = 42000(0.85)^0$$

$$V(0) = 42000$$

$\therefore$ Purchase price = \$ 42,000

$$b) \quad V(1) = 42000(0.85)^1$$

$$= 35,700$$

$$\text{Depreciation} = 42,000 - 35,700$$

$$= 6,300$$

$$\text{Rate} = \frac{6,300}{42,000} \times 100\%$$

$$= 15\%$$

$$c) \quad n = 3$$

$$V(n) = 42000(0.85)^n$$

$$V(3) = 42000(0.85)^3$$

$$= 25,793.25$$

$$d) . n = \frac{30}{12} = 2.5$$

$$V(2.5) = 42,000 (0.85)^2$$

$$V(2.5) = 27,976.70$$

$$= \$27,976.70.$$

$$e) V(s) = 42,000 (0.85)^s$$

$$V(5) = 18,635.60$$

$$V(0) = 42,000$$

$$\begin{aligned} \text{Difference} &= 42,000 - 18,635.60 \\ &= \$23,364.40 \end{aligned}$$