Answers

Complete the following practice problems:

$b > 1 \qquad 0 < b < 1$

1) Determine if the following exponential functions represent a growth or decay situation.

a) $y = 5(2)^x$

growth

b) $y = 100(.5)^x$

decay

c) $y = 80(1.3)^x$

growth

d) $y = 20(0.8)^x$

decay

e) $y = 20(1 + 0.025)^x$

growth

f) $y = 40(1 - 0.4)^x$

decay

2) Since 1980, the population of the city of Brownville has grown according to the mathematical model $y = 720{,}500(1.022)^x$, where x is the number of years since 1980. **growth**

initial = → growth factor
amount

a) Explain what the values 720,500 and 1.022 represent in this model.

$720{,}500 \rightarrow$ **Starting / initial amount.**

1.022 **growth factor**

b) What would the population be in 2000 if the growth continues at the same rate?

$2000 - 1980 = 20\ \text{years} \rightarrow X \qquad y = 720500(1.022)^{20}$

≈ 1113401

c) What was the population of Brownville in 1975? (**Hint:** you are finding the population before 1980)

$y = 720{,}500(1.022)^{-5}$

≈ 646218

back in time
back 5 years

3) A population of 800 beetles is growing each month at a rate of 5%.

$\rightarrow a$

$100 + 5\% = 105\% = 1.05$

a) Write an equation that expresses the number of beetles at time x.

$y = 800(1.05)^x$

b) About how many beetles will there be in 8 months? $\rightarrow X$

$y = 800(1.05)^8 \approx 1181.96 \approx 1181\ \text{beetles}$

4) Your new computer cost $1500 but it depreciates in value by about 18% each year.

decay $\qquad 100 - 18\% = 82\%$
$= 0.82$

a) Write an equation that would indicate the value of the computer at x years.

$y = 1500(.82)^x$

b) How much will your computer be worth in 6 years? $\rightarrow X$

$y = 1500(.82)^6 \approx \$456.01$