Algebra RH

Describing Relationships with Exponential Functions

1. The population of fish in a local stream is decreasing at an alarming rate. The original population was 48,000. After one year, the population was 28,800. After the 2nd year the population was 17,280. Write an exponential function, P(t), that models this situation where t represents time in years. If this trend continues, how many fish are expected to be living in the stream after the 10th year?

time (years) t	0	1	2
# of fish $P(t)$	48,000	28,800	17,280

$a = 48,000$

rate = .4

decay factor (ratio) = .6

$P(10) = 48000(.6)^{10} = 290.37 \approx 290$

$P(t) = 48,000(.6)^t$

2. A painting is sold to an art gallery. Over time, the painting increases in value exponentially. After one year, the painting is worth \$1,540. After the second year, the painting is worth \$1,694. Write an exponential function that models this situation. What will the painting be worth after seven years?

x	0	1	2
$f(x)$	1400	1540	1694

$a = 1,400$

$b = 1.1$ (ratio)

$\frac{1694}{1540} = 1.1$

x = # of years

$f(7) = 1400(1.1)^7$

$f(7) = 2728.20$

$f(x) = 1,400(1.1)^x$

$\boxed{\$2,728.20}$

3. The breakdown of a sample of a chemical compound is represented by the function p(t) = 300(0.5)^t, where p(t) represents the number of milligrams of the substance and t represents the time, in years. In the function p(t), explain what 0.5 and 300 represent.

$p(t) = 300(0.5)^t$

.5 each year, the sample of the compound loses one-half of its mass

300 the initial amount of mg in the compound is 300