Algebra RH HW #

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?

$P(t) = 48000(0.6)^t$

$P(10) = 48000(0.6)^{10}$

$P(10) = 290.237\ldots$ About 290 fish are expected after the 10th year.

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?

| Years | 0 | 1 | 2 |
|---|---|---|---|
| Value | 1400 | 1540 | 1694 |

$1694 \div 1540 = 1.1 \rightarrow 1540 \div 1.1 = 1400$

$P(t) = 1400(1.1)^t$

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

$P(7) = \$2{,}728.20$

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.

0.5 → the rate at which the compound is decreasing is 50% per year

300 → the initial number of milligrams of the substance before it began breaking down