

Quiz #2: Monday, Sep 19

Name: _____ Solution Key _____

Recitation R02 (M)

An initial investment of 5000 grows at 20% per year.

1. (5 points) Write a function $P(t)$ that gives the value of the investment after t years.

Solution: The growth factor is 1.2, so the function $P(t) = 5000(1.2)^t$.

2. (5 points) Find the value of the investment after 2 years.

Solution: The value is $P(2) = 5000(1.2)^2 = 5000(1.44) = 7200$.

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Recitation R02 (M)

The village of Northwesthampton, NY, has a population of 4000 in 2011 and grows at 25% per year.

1. (5 points) Write a function $P(t)$ that gives the Northwesthampton population t years after 2011.

Solution: The growth factor is 1.25, so the function is $P(t) = 4000(1.25)^t$.

2. (5 points) What is the population in 2013?

Solution: In 2013, $t = 2013 - 2011 = 2$, so the population is $P(2) = 4000(1.25)^2$. Simplifying, $P(2) = 5000(1.25) = 6250$.

Quiz #2: Tuesday, Sep 20

Name: _____ Solution Key _____

Recitation R04 (Tu)

A colony of *S. aureus* contains 800 bacteria at noon and 3200 at 2 pm.

1. (5 points) Write a function $P(t)$ that gives the population of the colony t hours after noon.

Solution: Assuming exponential growth, we know that $P(t) = 800a^t$, where we need to solve for a . Since $P(2) = 3200$, $3200 = 800a^2$, so $a^2 = 4$, and $a = 2$. Then $P(t) = 800(2)^t$.

2. (5 points) What is the population at 3 pm?

Solution: At 3 pm, $P(3) = 800(2)^3 = 800(8) = 6400$.

Quiz #2: Tuesday, Sep 20

Name: _____ Solution Key _____

Recitation R04 (Tu)

A 250-gram sample of the element calconium-273 contains only 10 grams of calconium after 2 days.

1. (5 points) Write a function $P(t)$ that gives the amount of calconium remaining after t days.

Solution: Assuming exponential decay, we know that $P(t) = 250a^t$, where we need to solve for a . Since $P(2) = 10$, $10 = 250a^2$, so $a^2 = \frac{1}{25}$, and $a = \frac{1}{5}$. Then $P(t) = 250 \left(\frac{1}{5}\right)^t$.

2. (5 points) How many grams are left after 3 days?

Solution: At 3 pm, $P(3) = 250 \left(\frac{1}{5}\right)^3$. Simplifying, $P(3) = 250 \left(\frac{1}{125}\right) = 2$.

Quiz #2: Wednesday, Sep 21

Name: _____ Solution Key _____

Recitation R03 (W)

The value of a used car t years old is given by $P(t) = 15,000 \left(\frac{4}{5}\right)^t$.

1. (5 points) How much is the car worth initially? What is the percent rate of decrease?

Solution: The car is initially worth \$15,000. The growth rate is $\frac{4}{5} - 1 = -0.2$, so the percent rate of decrease is 20%.

2. (5 points) Find the value of the car after 2 years.

Solution: The value after 2 years is $P(2) = 15000 \left(\frac{4}{5}\right)^2$, which simplifies to \$9600.

Quiz #2: Wednesday, Sep 21

Name: _____ Solution Key _____

Recitation R03 (W)

The population of a city is $1,600,000 \left(\frac{5}{4}\right)^t$, where t is the number of years after 2011.

1. (5 points) What is the population of the city in 2011? What is the percent growth rate?

Solution: The population of the city is 1,600,000. The growth rate is $\frac{5}{4} - 1 = \frac{1}{4}$, so the percent growth rate is 25%.

2. (5 points) Find the population of the city in 2013.

Solution: In 2013, $t = 2013 - 2011 = 2$, so the population is $P(2) = 1,600,000 \left(\frac{5}{4}\right)^2 = 2,500,000$.