

Name:

Key

Date:

Hour:

Algebra 1

WS 6.4 Exponential Growth/Decay and Compound Interest

1. A new 2018 Honda Accord was valued at \$25,000. It depreciates at a rate of 13% a year.

a. What is the value in 2021?

$$25,000(1-0.13)^3$$

$$\boxed{\$16,462.58}$$

b. What will be the value in 2034?

$$25,000(1-0.13)^{16}$$

$$\boxed{\$2693.07}$$

2. The amount of a certain drug in the bloodstream decreases by 30% in 1 hour. A person take 125 mg of the drug.

a. What is the concentration of the drug in the bloodstream after 3 hours?

$$125(1-0.3)^3$$

$$\boxed{42.875 \text{ mg}}$$

b. What is the concentration of the drug in the bloodstream after 1 day?

$$1 \text{ day} = 24 \text{ hrs} \quad 125(1-0.3)^{24}$$

$$\boxed{0.024 \text{ mg}}$$

Do the following situations model exponential growth or decay?

3. Atmospheric pressure decreases as the height above sea level increases, at a rate of 12% per 1000m. growth

4.  $y = 120,000(1.1)^t$  growth

5. The value of a house appreciates at 12% a year. growth

6.  $y = 120,000(0.9)^t$  decay

7. The value of a car depreciates at 12% a year. decay

8. A savings account earns interest at a rate of 4% a quarter. growth

9. A savings account compounds its interest quarterly at a rate of 8%. If you invest \$1500 what will the principal be in...

a. 9 months = 0.75 yrs  
 $1500 \left(1 + \frac{0.08}{4}\right)^{(4 \cdot 0.75)}$   
 $\$1591.81$

b. 5 years  
 $1500 \left(1 + \frac{0.08}{4}\right)^{(4 \cdot 5)}$   
 $\$2228.92$

10. A house appreciates in value at a rate of 5%. The house is valued at \$130,000 in 2010. What is the value in 2020?

$$130,000(1 + 0.05)^{10} = \$211,756.30$$

11. A car depreciates in value at a rate of 10%. The car currently has a value of \$12,000. What will its value be in 10 years?

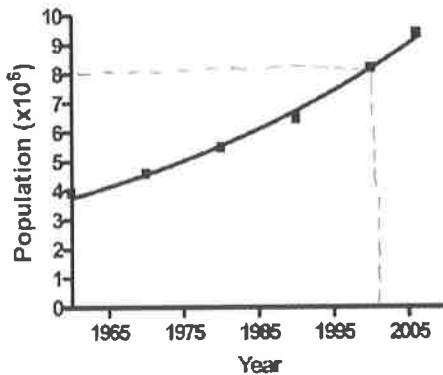
$$12,000(1 - 0.1)^{10} = \$4184.14$$

12. You invest \$500 in an account with 8.5% interest rate for 9 years. How much money will you have at the end of the 9 years?

$$500(1 + 0.085)^9 = \$1041.93$$

13. When did the Georgia's population double compared to its population in 1960?

Georgia - total population



about the year 2000

14. You decide to sell your iPhone. You initially paid \$300 for it. It has been 2 years and each year the value depreciated by 35%. How much is it worth?

$$300(1 - 0.35)^2 = \$126.75$$

15. A savings account compounds interest quarterly. The interest rate is 12% and you deposit \$5000 into the account. You want to double your money. How long will you have to wait?

- a. 6.12 years      b. 5.86 years      c. 23.45 years      d. 1.53 years

$$10,000 = 5000 \left(1 + \frac{0.12}{4}\right)^{(4t)}$$