

Exponential Growth and Decay

The value of an Accord bought new for \$25,000 depreciates by 20% each year.

- a. exponential function: $25000(1-.2)^t$ b. growth or decay
- c. Using your equation, how much would your car cost after ___ years:
- 1 20,000
 - 8 4194.30
 - 11.5 1920.77
- d. If your car costs \$8,200, approximately how many years old would you expect it to be? between 4 + 5
- e. Will the graph ever reach zero? Why? no b/c the car will be worth 50k

10 people in our class are sick. The sickness spreads to additional students at a rate of 10.2% every day.

- a. exponential function: $5(1+.102)^t$ b. growth or decay
- c. Using your equation, how much many students would be sick after ___ days:
- 1 5.51
 - 8 10.87
 - 15 21.46
- d. If 14 people are sick, approximately how many days have passed? 10-11

You charge a \$300 iPod on a credit card that has a 12% interest rate. Interest is compounded monthly.

- a. exponential function: $300(1+\frac{.12}{12})^{12t}$ b. growth or decay
- c. Using your equation, how much will you owe after ___ years:
- 1 338.05
 - 3 429.23
 - 5 545.01

You invest \$1500 into a bank account for 8 years. If the bank offers 7.2% interest,

- how much will you have if the bank compounds: $1500(1+\frac{.072}{n})^{8n}$
- a. Yearly 2577.28
 - b. Quarterly 2613.32
 - c. Daily 2625.87
 - d. Continuously 2668.36

Twenty years ago, a diamond ring was purchased for \$500. The value of the ring increased by 8% each year.

- a. exponential function: $500(1+.08)^t$ b. growth or decay
- c. Using your equation, how much was the ring worth after ___ years:
- 5 734.66
 - 10 1079.46
 - 20 2330.49
- d. If the ring is worth \$1300, approximately how many years have passed? between 12-13

6. You purchase a stereo system for \$830. The value of the stereo system decreases 13% each year.

a. exponential function: $830(1-0.13)^x$ b. growth or **decay**

c. Using your equation, how much was the stereo worth after ____ years:

• 5 413.69

• 8 272.42

• 10 206.19

d. If the stereo is worth \$460, approximately how many years have passed?

4-5

7. You invest \$500 into a savings account that is compounded daily at an interest rate of 4%

a. How much do you have after 10 years?

$500(1 + \frac{0.04}{365})^{365t}$
745.90

b. How much do you have after 15 years?

911.03

c. How much do you have after 20 years?

1112.72

d. About how long does it take for your money to double?

17-18 yrs

e. How long would it take for your money to triple?

27-28

8. You invest \$2500 into a bank account for 5 years. If the bank offers 3.8% interest, how much will you have if the bank compounds:

a. Annually 3012.50

b. Monthly

$2500(1 + \frac{0.038}{n})^{nt}$
3022.22

c. Weekly 3022.91

d. Continuously

3023.12

9. If you have \$5000 to invest, would it be better to invest it in a fund that offers 2.3% interest compounded monthly or 2.2% interest compounded continuously? Why?

$5000(1 + \frac{0.023}{12})^{12t}$

$5000(e)^{0.022}$