

Exponential Models:

$$y = ab^x$$

$$\text{Growth: } y = P(1+r)^t$$

$$\text{Decay: } y = P(1-r)^t$$

1. Your brother tells you a secret. You see no harm in telling two friends. After this second "passing" of the secret, 4 people now know the secret (your brother, you and two friends). If each of these friends now tells two new people, after the third "passing" of the secret, eight people will know. Write an equation to express the "passing" of the secret. If this pattern of spreading the secret continues, how many people will know the secret after 10 such "passings"?

$$y = ab^x$$

$$y = 1(2)^{10}$$

$$y = \boxed{1024}$$

2. Alexis was working in the biology lab on her cell project. She started her experiment with 500,000 cells. Every day, the cells die by a third. How many cells will be left after 6 days.

$$y = P(1-r)^t$$

$$y = 500000\left(1 - \frac{1}{3}\right)^6$$

$$y = 43895.75$$

$$y = \boxed{43895 \text{ cells}}$$

3. In 2000, the cost of tuition at a state university was \$4300. During the next 8 years, the tuition rose 4% each year. How much would it cost to attend college in 2010? In 2015?

$$2010: y = 4300(1 + .04)^{10}$$

$$2015: y = 4300(1 + .04)^{15}$$

$$y = \boxed{\$6365.05}$$

$$y = \boxed{\$7744.06}$$

4. A 2010 Honda Accord depreciates at a rate of 11% per year. The car was bought for \$25,000. How much is the car worth now? In 2020?

$$2018: y = 25000(1 - .11)^8$$

$$2020: y = 25000(1 - .11)^{10}$$

$$y = \boxed{\$9841.47}$$

$$y = \boxed{\$7795.43}$$

5. Each year the local country club sponsors a tennis tournament. Play starts with 128 participants. During each round, half of the players are eliminated.

Rounds	1	2	3	4
Number of Players left	64	32	16	8

How many players are left after 6 rounds?

$$y = 128\left(\frac{1}{2}\right)^6$$

$$y = \boxed{2 \text{ players}}$$

6. An insect population triples every 4 months. If the population started out with 24 insects, how many insects would be there in 16 months?

4 16
8
12

$$y = ab^x$$

$$y = 24(3)^4$$

$$y = \boxed{1944 \text{ insects}}$$

Equation for Compound Interest:

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

A = Future Amount

P = Starting Amount

r = rate as a decimal

t = time

n = Compounding period

Compounding Period	n
Annually	1
Quarterly	4
Monthly	12
Daily	365

8. Maria's parents invested \$14,000 at 6% per year compounded monthly. How much money will there be in the account after 10 years?

$$A = 14000 \left(1 + \frac{.06}{12} \right)^{12(10)}$$

$$A = \boxed{\$25,471.55}$$

9. Determine the amount of an investment if \$300 is invested at an interest rate of 3.5% compounded monthly for 22 years.

$$A = 300 \left(1 + \frac{.035}{12} \right)^{12(22)}$$

$$A = \boxed{\$647.20}$$