

Growth and Decay $A(t) = A_0(1+r)^t$

1. Milk cost \$4.15 a gallon, if it increases at a rate of 5% per year, how much will it cost 10 years from now?

$$A(10) = 4.15(1 + .05)^{10}$$

$$6.76$$

2. When my son Kevin was born, how much money should I have put into a savings account, so that at the time he was ready for college (18 years later) I would have \$50,000? Assume a growth rate of 8%

$$50,000 = A_0(1 + .08)^{18}$$

$$A_0 = 12,512.45$$

3. A house bought for \$330,000 in 1990 was sold for \$650,000 in 2008. To the nearest percent, what was the annual rate of appreciation?

3.89%

$$650,000 = 330,000(1+r)^{18}$$

$$1.96969 = (1+r)^{18}$$

$$1.038371 = 1+r$$

$$.03837 = r$$

4. Yearly expenses at a private university have increased from \$24,000 to \$47,500 in the last 6 years. What has been the average annual growth rate in expenses?

$$47,500 = 24,000(1+r)^6$$

$$r = .12$$

12%

5. The population of Kenya reached 25,000,000 people in 1990. When will it reach 50,000,000 people? Assume an annual rate of increase of 4.1%

2008

$$50,000,000 = 25,000,000(1.041)^t$$

$$\log 2 = t \log 1.041$$

$$t = 17.25 \text{ (17 yrs, 3 months)}$$

6. How long will it take \$200 to triple, if it grows at a rate of 5% per year.

$$600 = 200(1.05)^t$$

$$\log 3 = t \log 1.05$$

t = 22.52 yrs

Growth and Decay

$$A(t) = A_0(1+r)^t$$

7. Gasoline cost \$55 a barrel, if it increases at a rate of 5% per year, how much will it cost 10 years from now?

$$A(10) = 55(1+.05)^{10}$$

$$\boxed{89.59}$$

8. My son's college savings increases at a rate of 7% per year. If I have \$15,000 now, how much will I have 8 years from now?

$$A(8) = 15,000(1.07)^8$$

$$\boxed{25,772.79}$$

9. A plasma TV cost \$5000 10 years ago. Now you can buy a similar one for \$1200, what has been the rate of decrease?

$$1200 = 5000(1+r)^{10}$$

$$.24$$

$$r = \boxed{13.3\%}$$

10. Yearly expenses at a state university have increased from \$15,000 to \$20,500 in the last 4 years. What has been the average annual growth rate in expenses?

$$20,500 = 15,000(1+r)^4$$

$$r = .0812$$

$$\boxed{8.12\%}$$

11. The population of Las Vegas was 139,126 in 1960. When will it reach 1,600,000 people. Assume an annual rate of increase 70.1%.

$$\boxed{1965}$$

$$1,600,000 = 139,126(1+.701)^t$$

$$4.597$$

12. How long will it take \$1000 to triple, if it grows at a rate of 6% per year?

$$3000 = 1000(1.06)^t$$

$$3 = (1.06)^t$$

$$\boxed{18.85 \text{ yr}}$$

$$18 \text{ yrs } 10 \text{ mos.}$$