

BE-Precalc TUESDAY 11-17-09

- ① A bee colony starts at 500 and is increasing 14% per week. What is the expected population in 22 weeks?

Ex 3 Pg 707

$$N = N_0(1+r)^w$$

r = RATE PER WEEK
 w = NUMBER OF WEEKS

$$N = 500(1.14)^{22}$$

$$N = 8931$$

Homework review: Pg. 708 # 8, 9.

$$\#8 \Rightarrow A = 3750(1-.25)^2 = \$2109.38$$

$$\#9 \Rightarrow \frac{(9,145,219 - 8,863,052)}{7} = \frac{282,167}{7}$$

$$\% \text{ change} = \frac{\text{CHANGE}}{\text{ORIGINAL}} \cdot 100$$

$$\Rightarrow \frac{40,310 \text{ people}}{\text{Yr}} \Rightarrow \frac{40310}{8863052} \cdot 100 = .45 \frac{\%}{\text{Yr}}$$

$$P = P_0(1+r)^{13} = 9145219(1.0045)^{13} = 9694900$$

Compound Interest — Exponential Growth

BUT — interest rate is Always given per year. But compounding periods may be semi-annual, quarterly, monthly, weekly, daily, etc.

(2 times per year) (4 times per year)

So you must adjust the RATE and time to match!

EX \$1000, invested AT 4% compounded twice per year, in 7 years?

$$A = 1000 \left(1 + \frac{r}{2} \right)^{2 \cdot t}$$

↑
RATE per
6 MONTHS
is $\frac{4\%}{2} = 2\% = .02$

Number of periods
⇒ 2 years
⇒ 14

$$\begin{aligned} A &= 1000 \left(1 + \frac{.04}{2} \right)^{2 \cdot 7} \\ &= 1000 (1.02)^{14} \\ &= \$1319.48 \end{aligned}$$

The general compound interest formula is:

$$A = A_0 \left(1 + \frac{r}{n}\right)^{nt}$$

n = Number of compounding periods per year

↓
Usually use P for Principal

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

P = STARTING INVESTMENT

t = years

r = rate/year

A = Final Amount

EX4
PG 707

Money Market Account AT 5% compounded daily (365 days) if \$2000 is invested for 7 years

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

$$A = 2000 \left(1 + \frac{0.05}{365}\right)^{365 \cdot 7}$$

$$A = \$2838.07$$

Homework: Pg. 7 10 # 31
