

Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) solve problems involving exponential equations graphically, including problems arising from real-world context.
- b) use graphing technology to find the x -value of an exponential function, for a given value of the function.

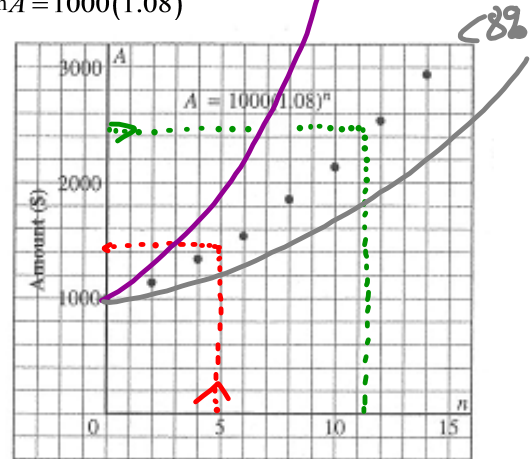
1.4.1: Applications of Exponential Functions

Date: Feb. 13/17

Ex. 1 Suppose you invest \$1000 at 8% per year, compounded annually. The amount, A dollars, of your investment after n years is represented by the equation $A = 1000(1.08)^n$

Using the graph:

- a) Estimate the value of the investment after 5 years.
- b) Estimate how many years it takes for the investment to grow to \$2500.
- c) Describe how both the graph and the equation change in each case.
 - i) The original investment is greater than, or less than, \$1000.
 - ii) The interest rate is greater than, or less than, 8%.



a) if $n=5$ b) $A=2500$
 $A = \$1475$ $n = 11.8 \text{ years}$

Ex. 2 Suppose you invest \$1000 at 8% per year, compounded quarterly.

- a) Write an exponential function to model this.
- b) Estimate the value of the investment after 3 years.
- c) Estimate how many years it takes for the investment to grow to \$2800.

a) $A = P(1+i)^n$
 $P = 1000$
 $i = \frac{0.08}{4}$
 $n = 4n$

b) if $t = 3 \text{ years}$
 $n = 3 \times 4 = 12$
 $A = 1000(1.02)^{12}$
 $= 1268.241$
 $= \$1268.24$

c) $A = 2800$
 $2800 = 1000(1.02)^{4n}$
 * Can't solve this yet

\therefore using TI-84 $n = 12.99$
 $\therefore 13 \text{ years to have } \$2800.$

Ex. 3 A tire with a slow puncture loses pressure at the rate of 4%/min. The tire's initial pressure is 300 kPa.

a) Write an exponential function to model this.

$$P = P_0 (100\% - 4\%)^n$$

$$= 300(0.96)^n$$

b) What is the tire's pressure after: i) 1 min?

ii) 2 min?

iii) 10 min?

$\text{bi) } n=1$ $P = 300(0.96)^1$ $= 288 \text{ kPa}$	$\text{ii) } n=2$ $P = 300(0.96)^2$ $= 276.48 \text{ kPa}$	$\text{iii) } n=10$ $P = 300(0.96)^{10}$ $\approx 199.45 \text{ kPa}$
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c) Use graphing technology to determine when

the tire's pressure will be i) 160 kPa

ii) 120 kPa

$$\text{i) } 160 = 300(0.96)^n$$

$$y_1 = 300(0.96)^n$$

$$y_2 = 160$$

$$n \approx 15.398$$

$$= 15.40 \text{ min}$$

15 min	0.398
	x 60
	24 Sec.

$$\text{ii) } 120 = 300(0.96)^n$$

$$y_1 = 300(0.96)^n$$

$$y_2 = 120$$

$$n \approx 22.45$$

Read pp.326-328, then complete p.329 #7,11,2,4,5 Extra practice: p.330 #9,10

Review the learning goals. Were we successful today?

Homework: 1.4.1

Read pp.326-328

pp. 329-331 # 7, 11, 2, 4, 5

Extra Practice p.330 # 9, 10

Answer any remaining homework questions

Students ask for "at desk" clarification.