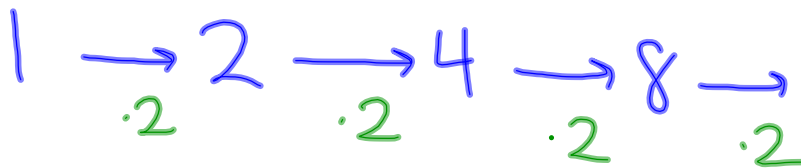


6.1 Exponential Growth & Decay

- Obj: 1. Determine the multiplier for growth/decay.
2. Write & evaluate exponential expressions.

1 bacteria doubles every hour



exponential expression: $1 \cdot 2^x$
 initial population multiplier

Feb 6-10:37 AM

The US population in 1990 was 248,718,301 and is projected to grow at a rate of 8% per decade. Predict the population in 2010 and 2025.

$$\text{multiplier: } 1 + .08 = 1.08$$

$$248,718,301 \cdot 1.08^x$$

$$2010: 248,718,301 (1.08)^2 = 290,105,026$$

$$2025: 248,718,301 (1.08)^{3.5} = 325,604,866$$

Feb 6-11:06 AM

Find the multiplier:

a. 6% <u>decay</u>	b. .04% growth	c. 2.6% decay
.06	.0004	1 - .026
1 - .06	1 + .0004	.974
= .94	1.0004	

Feb 6-11:13 AM

The pop. of Brazil in 1996 was 162,661,000.
It was projected to grow at a rate of 7.7%
per decade. Find pop. in 2016 & 2020.

multiplier: $1 + .077 = 1.077$

$$162661000 \cdot (1.077^x)$$

$$2016: 162661000 (1.077^2) = 188675211$$

$$2020: 162661000 (1.077^{2.4}) = 194357420$$

Feb 6-11:17 AM

Caffeine is eliminated at a rate of 15% per hr.
 It peaks at 30 mg. Predict the amount left after
1 hr and 4 hrs (round to the nearest tenth).

$$\text{multiplier: } 1 - .15 = .85$$

$$30 (.85^x)$$

$$1 \text{ hr: } 30 (.85)^1 = 25.5$$

$$4 \text{ hrs: } 30 (.85)^4 = 15.7$$

Feb 6-11:24 AM

A vitamin is eliminated at a rate of 20% per hr.
 It peaks at 300 mg. Predict the
 amount left after 2 hrs & 7 hrs.

$$\text{multiplier: } 1 - .2 = .8$$

$$300 (.8^x)$$

$$300 (.8)^2 = 192$$

$$300 (.8)^7 = 62.9$$

Feb 6-11:28 AM