

7-1B Exponential Growth & Decay

- graph exponential growth & decay functions
- F.IF.7e, F.IF.8b

Exponential Growth and Decay

- populations
- bacteria
- credit payments, finance

Growth	Decay
$A(t) = a(1 + r)^t$	$A(t) = a(1 - r)^t$
$(1+r)$ is the growth factor .	$(1-r)$ is the decay factor .

$A(t)$ is the new amount

a is the initial amount

r is the percent of growth/decay t is time.

1. One serving of a Monster Energy drink has ~~86~~ 172 mg milligrams of caffeine. The average teen can eliminate approximately 12.5% of the caffeine from their system per hour. Monster Drinks usually contain 2 servings.

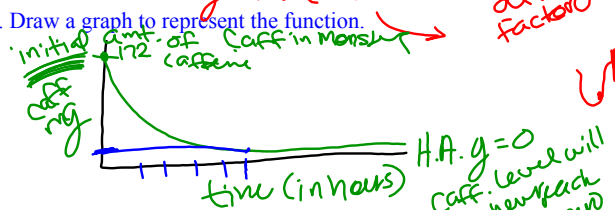


a. Write an equation to represent the amount of caffeine remaining after t hours of drinking a Monster Energy Drink (note: a Monster usually contains 2 servings).

$$A(t) = 172(1 - .125)^t$$

$$y = 172(.875)^x$$

b. Draw a graph to represent the function.



c. Estimate the amount of caffeine in a teen's body after 5 hours.

$$y = 172(.875)^5$$

$$y = 88.22 \text{ mg}$$

d. When will a teen have 10 mg of caffeine?

$$\approx 21 - 22 \text{ hours}$$

$$10 = 172(.875)^x$$

$$\frac{10}{172} = .875^x$$

2. In 2010, there were 85 rabbits in Central Park, the bunnies increase by 12% each year.



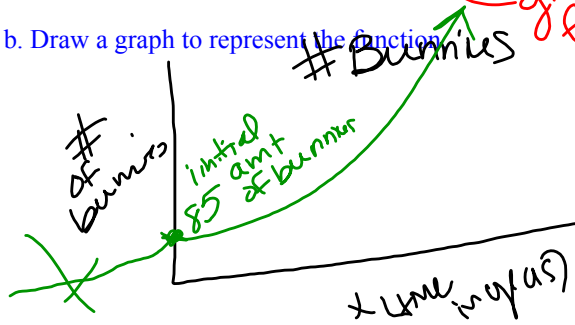
growth

a. Write an equation to represent the amount of rabbits in t amount of years since 2010.

$$y = 85(1.12)^x$$

growth factor 1.12

b. Draw a graph to represent the function



2017 (7, 188)

$$y = 85(1.12)^x$$

1,000,000 Bunnies

83 years

2093



7-1B Worksheet

Attachments

10-1A Key.notebook