Office Hours!

Instructor:

Peter M. Garfield, garfield@math.ucsb.edu
South Hall 6510

Office Hours:

Monday: TBA
Tuesday: TBA

Final Exam:

Wednesday: 4:00–7:00PM

HW 23 Problem #4

A commuter railway has 800 passengers per day and charges each one two dollars per day. For each 4 cents that the fare is increased, 5 fewer people will go by train. What is the greatest profit that can be earned?

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"Profit" in this case must mean "Revenue"

W '14 Problem #9

Carol's chocolate cookies cost \$2 each and she sells 2200 at this price. For each cent she raises the price she sells 5 fewer cookies. The ingredients for 10 cookies cost \$2.
If Carol increases the price of a cookie by x cents:

(a) How many cookies will she sell?

(b) How many dollars profit does she make on each cookie?

(c) Express the total profit (in \$) in terms of x.

(d) What should x be to make the most profit?

(e) What should the price in \$ of one cookie be to make the most profit?

W '15 Problem #8

Let $f(x) = 20\sqrt{x}$.

(a) Find $f'(4)$.
[Simplify your answer to something like 7/3.]

(b) Find the tangent line approximation to $y = f(x)$ at $x = 4$.

(c) Use this to approximate the value of $20\sqrt{5}$.

W '15 Problem #3(c)

Compute $\dfrac{d}{dx}\Big((3x^2+5)/x^k\Big)$.

[Here k is a constant.]

Review: Rates of Change

(1) Suppose $f(x) = x^2 - x$.

(a) What is the average rate of change of $f(x)$ between $x = 1$ and $x = 3$?

A $= 1$ B $= 2$ C $= 3$ D $= 4$ E $= 5$

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(b) What is the instantaneous rate of change of $f(x)$ at $x = 3$?

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(2) The table to the right shows the number total number of people treated in a hospital up to and including the day shown during a flu outbreak.

days	0	3	7	9
cases	0	18	56	81

(a) On average, how many people were treated per day during the first week?

$$\text{A} = 56 \quad \text{B} = 38 \quad \text{C} = 81 \quad \text{D} = 8$$

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Jason & Marie

- Jason Bourne and Marie Kreutz are 270 miles apart at noon.
- Marie drives towards Jason at constant speed M starting at noon.
- Jason sets out at 2pm driving towards Marie at constant speed J.
- They meet at 4pm.

(1) Which of the following equations is true?

A $J + M = 270$ B $2J = 4M$ C $J - M = 270$

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- At 3pm, they are 100 miles apart.

(2) Which of the following equations is true?

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(3) What was Jason's speed ?

$$\text{A} = 35 \quad \text{B} = 45 \quad \text{C} = 55 \quad \text{D} = 65 \quad \text{E} = 75$$

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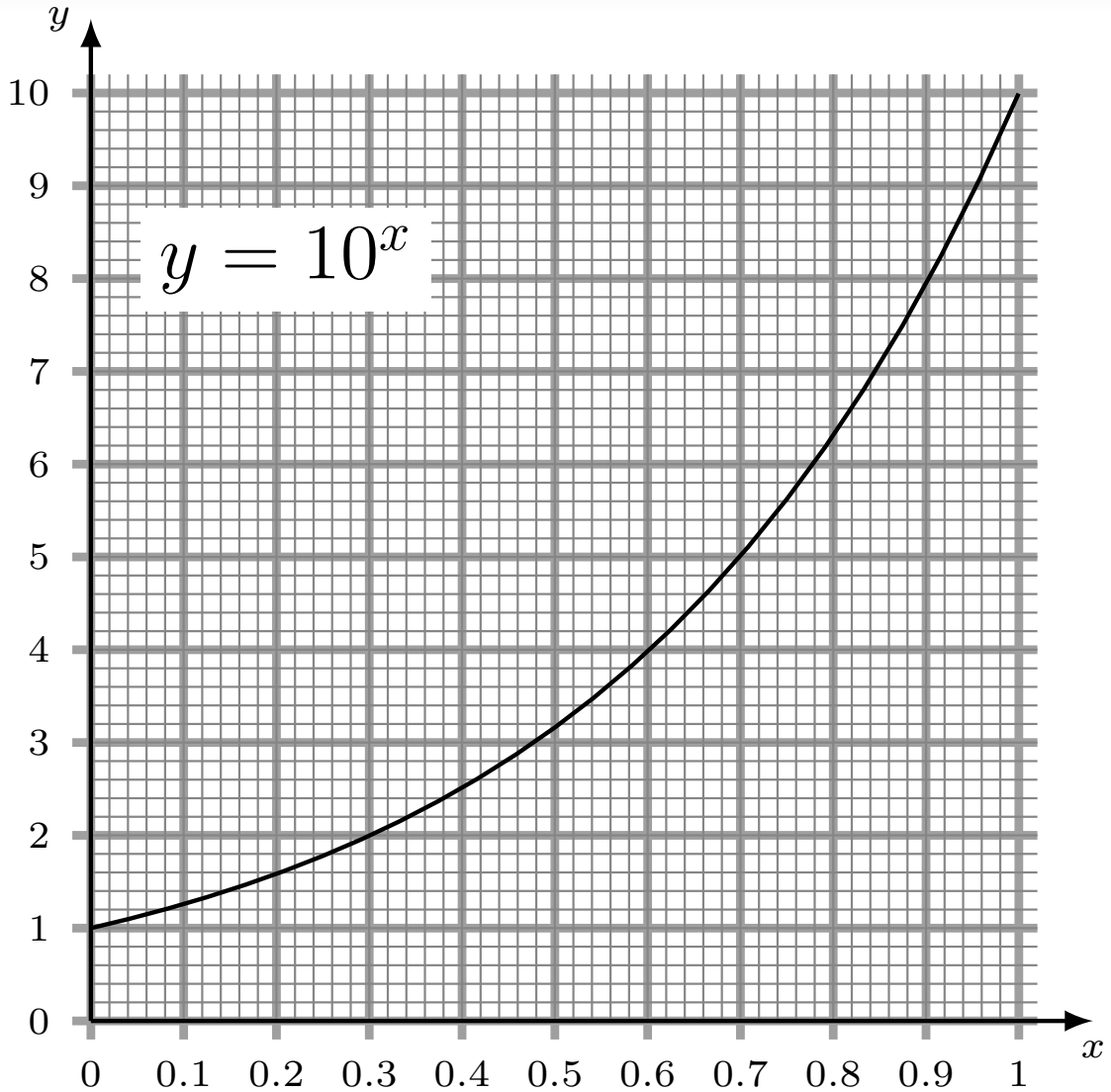


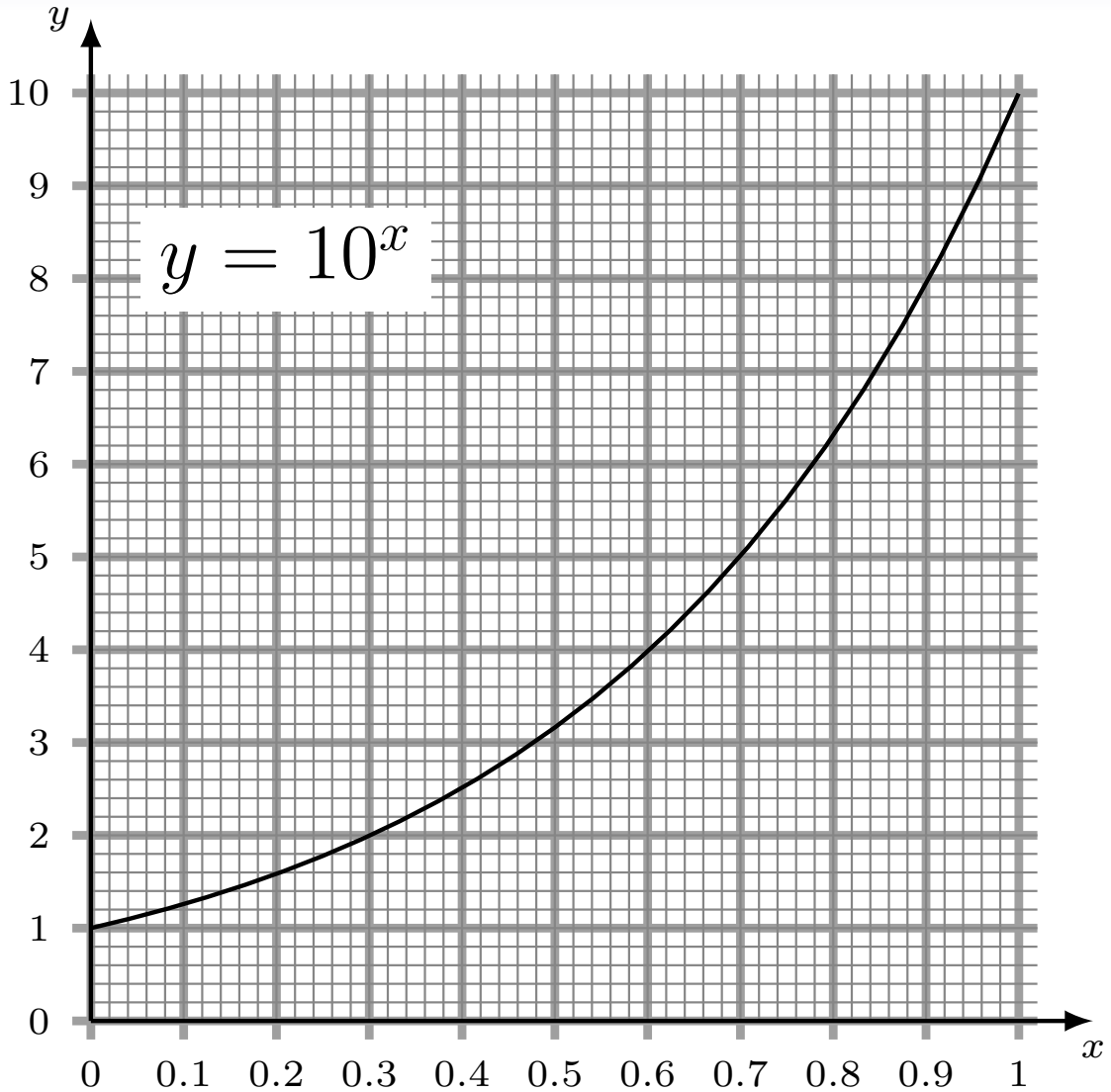
Use the graph of $y = 10^x$ to find:

(A) $10^{3.65}$

(B) Solve $10^x = 73$

(C) The slope of the graph at $x = 0.65$

(D) The average rate of change of 10^x between $x = 0.1$ and $x = 0.6$



Use the graph of $y = 10^x$ to find:

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Answer: 4500

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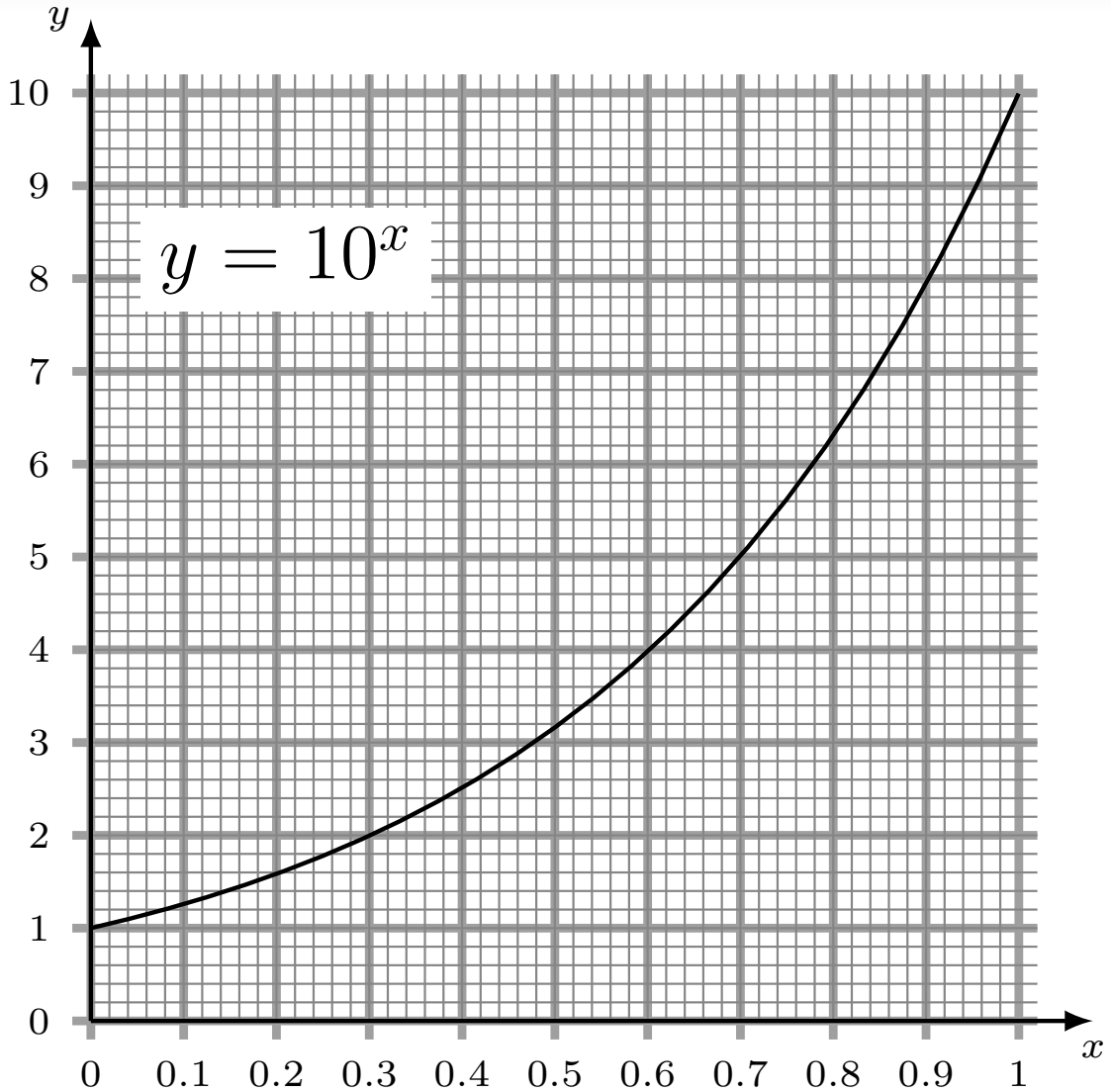

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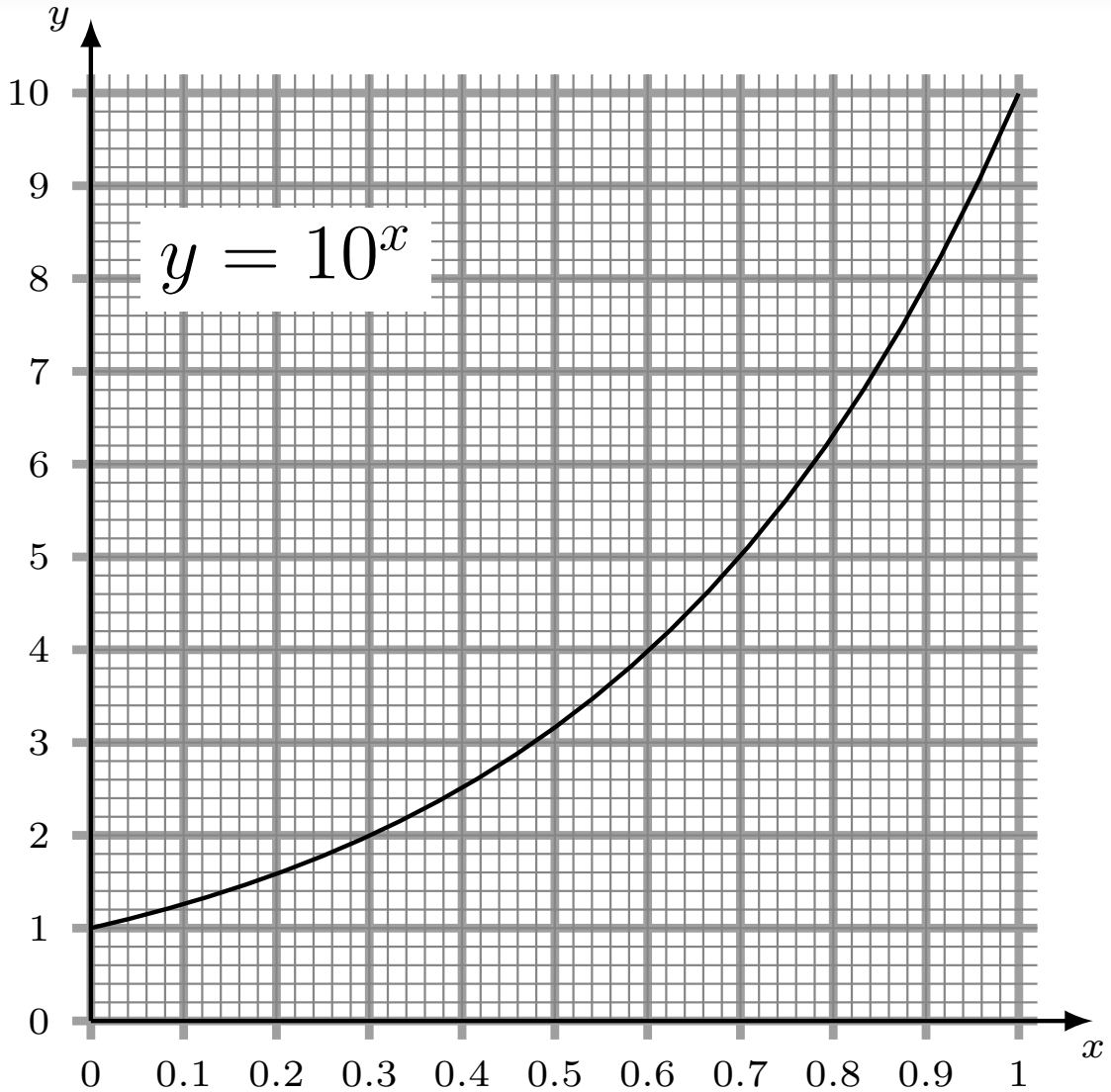

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Answer: 10

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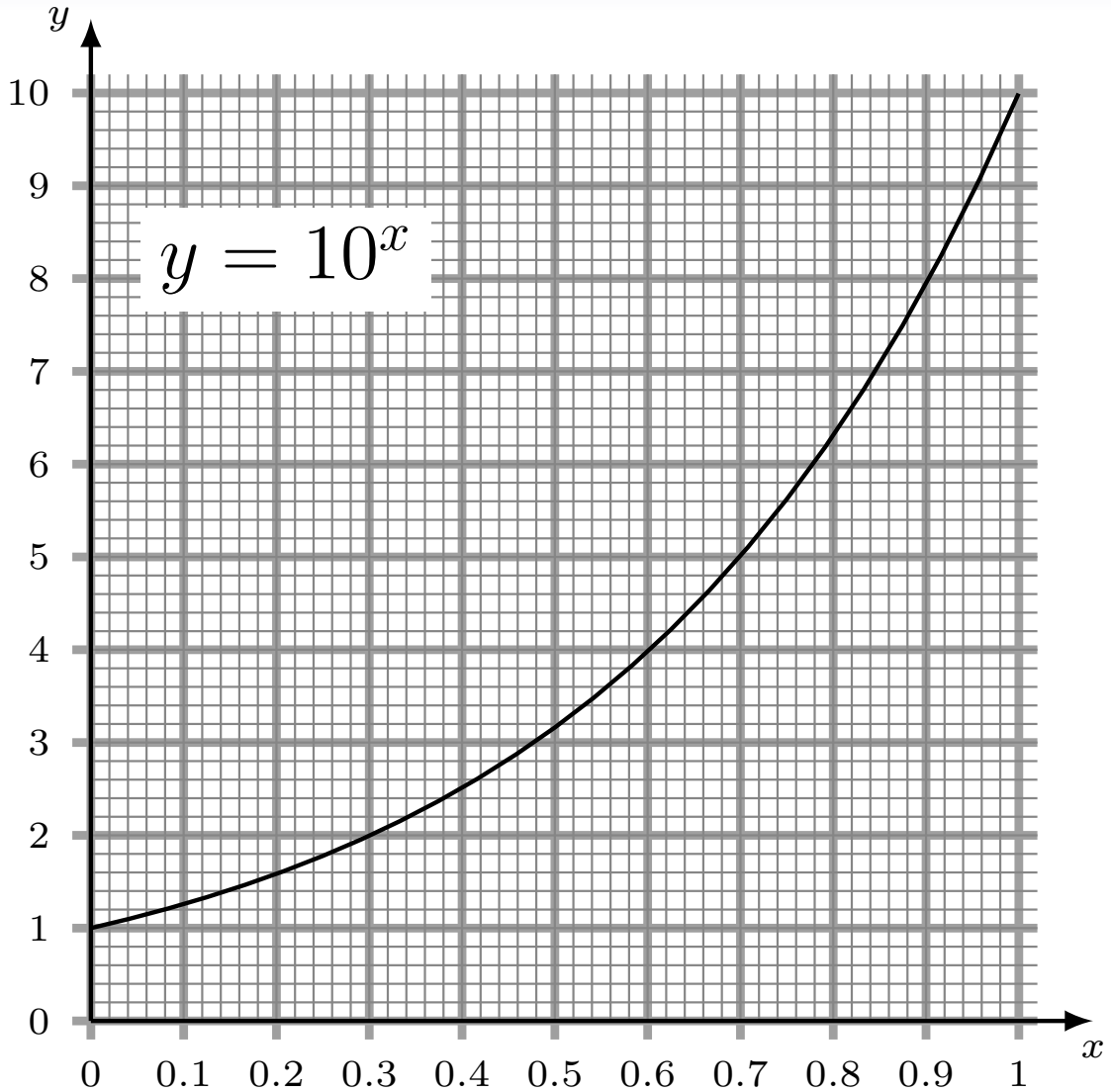

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Answer: 1.86

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Answer: 10

(D) The average rate of change of 10^x between $x = 0.1$ and $x = 0.6$

Answer: 5

Review: Lines!

1. Find the equation of the line with slope 3 that contains the point $(2, 5)$.

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$$y = 3x + 2 \qquad \text{and} \qquad y - 4x + 1 = 0$$

cross?

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Review: Logs!

3. Solve $3^x = 7$.

$$\text{A } x = 7/3 \qquad \text{B } x = \log(7/3)$$
$$\text{C } x = \log(7)/\log(3) \qquad \text{D } x = \log(7) - \log(3)$$

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Remember half-life:

- Half-life $= K$ years
- Initial amount $= A$
- Amount after t years is $= A \times 2^{-t/K}$

4. Let's start with 8 grams of an element with half-life of 5 years.

(a) How many grams remain after 10 years?

A $= 0$ B $= 2$ C $= 4$ D $= 8$

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A $= 0$ B $= 2$ C $= 4$ D $= 8$ B

(b) How many years until 3 grams remain?

A $= 8/3$ B $= -5\log(3/8)/\log(2)$

C $= -5\log(3/16)$ D $= \log(3/8) - \log(2)$

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