

Exercise Set 4 (Calculator)

1

BACTERIA CULTURE POPULATION

Minutes	0	1	2	3
Culture A	520	720	920	1,120
Culture B	500	600	720	864

Which of the following equations best expresses the population, P , of bacteria culture A, as a function of t , in minutes?

- A) $P = 200t + 520$
- B) $P = 520(1.4)^t$
- C) $P = 2,000(t - 0.5)^2$
- D) $P = 520t + 200$

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Which of the following equations best expresses the population, P , of bacteria culture B, as a function of t , in minutes?

- A) $P = 100t + 500$
- B) $P = 500(1.2)^t$
- C) $P = 2,000(t - 0.5)^2$
- D) $P = 500t + 100$

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After 2 minutes, the population of culture A is what percent greater than the population of culture B?

- A) 16.7%
- B) 20.0%
- C) 27.8%
- D) 127.8%

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If culture A continues to grow at a constant rate, at what time should its population reach 2,000?

- A) 7 minutes 4 seconds
- B) 7 minutes 24 seconds
- C) 7 minutes 40 seconds
- D) 8 minutes 20 seconds

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By what percent did the population of culture B increase over the first 3 minutes?

- A) 36.4%
- B) 42.1%
- C) 72.8%
- D) 172.8%

Questions 6–8 refer to the following information

TALENT SHOW TICKETS

	Adult	Child	Senior	Student
Tickets Sold	84	40	16	110
Total Revenue	\$630	\$200	\$96	\$495

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According to the table above, how much is the price of one senior ticket?

- A) \$4.00
- B) \$6.00
- C) \$12.00
- D) \$16.00

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How much more is the cost of one adult ticket than the cost of one student ticket?

- A) \$0.50
- B) \$1.50
- C) \$2.50
- D) \$3.00

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Which is closest to the average (arithmetic mean) price of the 250 tickets sold?

- A) \$5.54
- B) \$5.59
- C) \$5.68
- D) \$5.72

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What is the median price of the 250 tickets sold?

- A) \$5.00
- B) \$5.50
- C) \$5.75
- D) \$6.00

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If a meeting must take place on the third Tuesday of the month, what is the earliest date of the month on which it could take place?

- A) the 14th
- B) the 15th
- C) the 22nd
- D) the 27th

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What is the latest date of the month on which the meeting could take place?

- A) the 13th
- B) the 14th
- C) the 21st
- D) the 26th

Questions 12–21 refer to the following information

U.S. ENERGY CONSUMPTION
(Quadrillion BTU (QBTU))

	Fossil Fuels	Nuclear	Non-nuclear Renewables	Total
1950	31.63	0.00	2.98	34.61
1970	63.52	0.24	4.07	67.84
1990	72.33	6.10	6.04	84.47
2010	81.11	8.43	8.09	97.63

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From 1970 to 1990, the percent increase in the U.S. consumption of nuclear energy was closest to

- A) 96%
- B) 240%
- C) 2,400%
- D) 3,400%

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In a pie graph representing total U.S. energy consumption in 2010, the sector representing non nuclear renewables would have a central angle measuring approximately

- A) 8°
- B) 12°
- C) 24°
- D) 30°

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Nuclear energy and renewable energy are often grouped together in the category “non-greenhouse” energy. In 1970, approximately what percent of non-greenhouse energy was nuclear?

- A) 0.4%
- B) 5.6%
- C) 5.9%
- D) 6.4%

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In 2010 what percent of non-greenhouse energy consumption was nuclear?

- A) 9%
- B) 29%
- C) 49%
- D) 51%

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In the four years shown, what percent of the total energy consumed was due to non-nuclear renewables?

- A) 5.6%
- B) 6.8%
- C) 7.4%
- D) 7.9%

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What was the percent increase in fossil fuel energy consumption between 1950 and 2010?

- A) 28%
- B) 61%
- C) 124%
- D) 156%

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The “renewability index” is defined as the fraction of total U.S. energy consumption that comes from non-nuclear renewable energy. What was the percent increase in the renewability index from 1970 to 2010?

- A) 17%
- B) 37%
- C) 47%
- D) 99%

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For how many of the years shown above did fossil fuels account for less than 90% of the annual U.S. energy consumption?

- A) One
- B) Two
- C) Three
- D) Four

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Between 1950 and 2010, the average annual rate of increase in the consumption of non-nuclear renewable energy was closest to

- A) 0.085 QBTU/yr
- B) 0.128 QBTU/yr
- C) 1.70 QBTU/yr
- D) 2.27 QBTU/yr

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Between 1970 and 2010, the annual consumption of fossil fuels in the U.S. increased nearly linearly. If this linear trend were to continue, which of the following is closest to the level of U.S. fossil fuel consumption we would expect for 2035 (in quadrillion BTUs)?

- A) 90
- B) 91
- C) 92
- D) 93