Exponential Functions P-Set

Given $f(x) = 6(1.2)^x$, evaluate each. Round to 3 decimal places.

1. $f(2)$
2. $f(-1.1)$
3. $f(5.8)$

The healing of a 200-square-centimeter wound depends on the amount of time since the wound occurred and can be modeled by

$$f(x) = 200\left(\frac{4}{5}\right)^x \quad x \geq 0$$

where x represents the number of days since the wound occurred and $f(x)$ represents the size of the wound in square centimeters.

4. Evaluate and interpret $f(7)$
5. How many days will it take for the wound to be half its original size?
6. Find and interpret the average rate of change of the function in the interval [1, 7].

The annual total assets in mutual funds in the US can be modeled by

$$f(x) = 126.67(1.217)^x \quad [1, 16]$$

where x represents the number of years since 1999 and $f(x)$ represents the annual total assets in mutual funds (in billions of dollars).

7. Evaluate and interpret $f(9)$
8. Find and interpret the average rate of change of the function in the interval [5, 15].

Use the simple interest formula $I = prt$, to find the total interest earned in an account given each of the following.

9. Deposit \$3000 at 6% interest for 5 years
10. Deposit \$500 at 4.5% interest for 2 years

If Mrs. Johanson deposits \$5000 into an account that yields 6.5% annual interest, how much will be in the account after 10 years if the interest is compounded

11. Annually
12. Monthly
13. Continuously

Under certain conditions, the spread of E. Coli can be modeled by

$$f(t) = 1,200,000e^{0.23t}$$

where t represents time in minutes and $f(t)$ represents the size of the bacteria colony.

14. Evaluate and interpret $f(0)$
15. Evaluate and interpret $f(5)$
16. Find and interpret the average rate of change in the interval [0,10].

Key

1. 8.64
2. 4.910
3. 17.274
4. $f(7) \approx 41.94$; after 7 days, the wound will be about 41.94 square cm.
5. After about 3.11 days
6. About -19.68; on average, the wound decreased by about 19.68 square cm each day between days 1 and 7.
7. $f(9) \approx 741.80$; in 2008, the annual total assets in mutual funds was about \$741.80 billion dollars.
8. About 207.19; on average, the total assets increased by about \$207.19 billion each year between 2004 and 2014.
9. \$900
10. \$45
11. \$9,385.69
12. \$9,560.92
13. \$9,577.70
14. $f(0) = 1,200,000$; initially, there are 1,200,000 bacteria present
15. $f(5) \approx 3,789,831.5$; after 5 minutes, there are about 3.79 million bacteria
16. About 1,076,901.9; in the first 10 minutes, the bacteria count grows by about 1,076,902 per minute.