2.3 Exponential Functions

AP Precalculus Name: _____ **CA #1**

Identify if the function is exponential growth or decay and justify your response.

1. $f(x) = 2.5\left(\frac{2}{3}\right)^x$

Exponential Growth or Decay

2. $f(x) = \frac{5}{3}\left(\frac{3}{5}\right)^x$

Exponential Growth or Decay

3. $f(x) = 5.7(0.2)^x$

Exponential Growth or Decay

4. $f(x) = 8(2.1)^x$

Exponential Growth or Decay

The following values are output values of an exponential function of the form $f(x) = a \cdot b^x$, where a and b are constants. Write the function along with the input value that represents the output value.

5. $7 \cdot 7 \cdot 7 \cdot 3.4$

$f(x) =$

where $x =$

6. $0.8 \cdot 0.8 \cdot 5.2$

$f(x) =$

where $x =$

7. $6 \cdot 1.3 \cdot 1.3 \cdot 1.3 \cdot 1.3$

$f(x) =$

where $x =$

8. $9 \cdot 9 \cdot 9$

$f(x) =$

where $x =$

Answer the questions for each exponential function.

9. $f(x) = \left(\frac{1}{5}\right)^x$

a. Is the function increasing or decreasing?

b. Is the function concave up or concave down?

c. Find $\lim_{x\to-\infty} f(x) =$

d. Find $\lim_{x\to\infty} f(x) =$

10. $f(x) = 3(4.5)^x$

a. Is the function increasing or decreasing?

b. Is the function concave up or concave down?

c. Find $\lim_{x\to-\infty} f(x) =$

d. Find $\lim_{x\to\infty} f(x) =$

11. $f(x) = -5(0.8)^x$

a. Is the function increasing or decreasing?

b. Is the function concave up or concave down?

c. Find $\lim_{x\to-\infty} f(x) =$

d. Find $\lim_{x\to\infty} f(x) =$

12. $f(x) = -2(6)^x$

a. Is the function increasing or decreasing?

b. Is the function concave up or concave down?

c. Find $\lim_{x\to-\infty} f(x) =$

d. Find $\lim_{x\to\infty} f(x) =$

Answers to 2.3 CA #1

1. Decay because $a > 0$ and $0 < b < 1$	2. Decay because $a > 0$ and $0 < b < 1$	3. Decay because $a > 0$ and $0 < b < 1$	4. Growth because $a > 0$ and $b > 1$
5. $f(x) = 3.4(7)^x$ where $x = 3$	6. $f(x) = 5.2(0.8)^x$ where $x = 2$	7. $f(x) = 6(1.3)^x$ where $x = 4$	
8. $f(x) = 9^x$ where $x = 3$	9. a. Decreasing b. Concave up c. $\lim_{x\to-\infty} f(x) = \infty$ d. $\lim_{x\to\infty} f(x) = 0$	10. a. Increasing b. Concave up c. $\lim_{x\to-\infty} f(x) = 0$ d. $\lim_{x\to\infty} f(x) = \infty$	11. a. Increasing b. Concave down c. $\lim_{x\to-\infty} f(x) = -\infty$ d. $\lim_{x\to\infty} f(x) = 0$	12. a. Decreasing b. Concave down c. $\lim_{x\to-\infty} f(x) = 0$ d. $\lim_{x\to\infty} f(x) = -\infty$