

Name ANSWERS

Date _____

Evaluate each limit as a derivative. Do not use a calculator.

1. $\lim_{n \rightarrow 0} \frac{(-\frac{2}{5} + n)^2 - \frac{4}{25}}{n}$ is

- a)
- $-\frac{4}{5}$
- b)
- $\frac{5}{2}$
- c)
- $\frac{2}{5}$
- d)
- $\frac{4}{5}$
-
- e) no limit

$$c = -2/5 ; f(x) = x^2$$

3. $\lim_{x \rightarrow 64} \frac{x^{\frac{1}{3}} - 4}{x - 64} =$

- a)
- $\frac{1}{4}$
- b)
- $\frac{1}{16}$
- c)
- $\frac{1}{48}$
- d)
- $\frac{1}{8}$
- e) 16

$$c = 64 ; f(x) = x^{1/3}$$

5. $\lim_{n \rightarrow 0} \frac{10^n - 1}{n}$ is

- a) 1 b) 0 c)
- $\ln 10$
- d)
- $\log 1$
- e)
- e

$$c = 0 ; f(x) = 10^n$$

7. $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} =$

- a) 0 b)
- $-\frac{1}{4}$
- c)
- $\frac{1}{4}$
-
- d)
- $\frac{1}{2}$
- e) undefined

$$c = 4 ; f(x) = \sqrt{x}$$

9. What is $\lim_{h \rightarrow 0} \frac{\sqrt{9+h} - \sqrt{9}}{h}$?

- a)
- $\frac{1}{18}$
- b)
- $\frac{1}{6}$
- c) 6
-
- d) 18 e)
- $\frac{1}{2\sqrt{9+h}}$

$$c = 9 ; f(x) = \sqrt{x}$$

11. What is $\lim_{h \rightarrow 0} \frac{\cos(\frac{\pi}{6} + h) - \cos(\frac{\pi}{6})}{h}$?

- a) 0 b)
- $-\frac{1}{2}$
- c)
- $\frac{1}{2}$
-
- d)
- $\frac{\sqrt{3}}{2}$
- e)
- $-\frac{\sqrt{3}}{2}$

$$c = \pi/6 ; f(x) = \cos x$$

2. What is $\lim_{h \rightarrow 0} \frac{\sqrt[3]{27+h} - \sqrt[3]{27}}{h}$?

- a)
- $\frac{1}{27}$
- b)
- $\frac{1}{9}$
- c)
- $\frac{1}{81}$
- d)
- $\frac{1}{3}$
- e) 0

$$c = 27 ; f(x) = \sqrt[3]{x}$$

4. $\lim_{x \rightarrow 1} \frac{\ln x}{x - 1}$ is

- a) 1 b)
- ∞
- c) -1 d)
- $\ln 2$
- e)
- e

$$\frac{\ln x - 0}{x - 1}$$

$$c = 1 ; f(x) = \ln x$$

6. $\lim_{h \rightarrow 0} \frac{e^{2(x+h)} - e^{2x}}{h}$ is

- a) 1 b) 0 c)
- $2e$
- d)
- $2e^x$
- e)
- e^2

$$c = x ; f(x) = e^{2x}$$

8. What is $\lim_{h \rightarrow 0} \frac{(4+h)^3 - 4^3}{h}$?

- a)
- $8h$
- b) 16 c) 48 d) 64 e) 8

$$c = 4 ; f(x) = x^3$$

10. What is $\lim_{h \rightarrow 0} \frac{\sin(\frac{\pi}{3} + h) - \sin(\frac{\pi}{3})}{h}$?

- a) 0 b)
- $-\frac{1}{2}$
- c)
- $\frac{1}{2}$
-
- d)
- $\frac{\sqrt{3}}{2}$
- e)
- $-\frac{\sqrt{3}}{2}$

$$c = \pi/3 ; f(x) = \sin x$$

12. $\lim_{x \rightarrow 3} \frac{\frac{1}{x} - \frac{1}{3}}{x - 3} =$

- a) 0 b)
- $-\frac{1}{9}$
- c)
- $\frac{1}{27}$
- d)
- $\frac{1}{9}$
- e)
- $\frac{1}{3}$

$$c = 3 ; f(x) = \frac{1}{x}$$