

## Derivatives #1

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1.  $y = x^5 \tan x$
- a.  $5x^4 \tan x$   
b.  $x^5 \sec^2 x$   
c.  $5x^4 \sec^2 x$   
d.  $5x^4 + \sec^2 x$   
e.  $5x^4 \tan x + x^5 \sec^2 x$
- \_\_\_\_\_ 2.  $y = \frac{2-x}{3x+1}$
- a.  $\frac{7}{(3x+1)^2}$   
b.  $\frac{6x-5}{(3x+1)^2}$   
c.  $\frac{9}{(3x+1)^2}$   
d.  $\frac{7}{(3x+1)^2}$   
e.  $\frac{7-6x}{(3x+1)^2}$
- \_\_\_\_\_ 3.  $y = \sqrt{3-2x}$
- a.  $\frac{1}{2\sqrt{3-2x}}$   
b.  $\frac{1}{\sqrt{3-2x}}$   
c.  $\frac{(3-2x)^{3/2}}{3}$   
d.  $\frac{1}{3-2x}$   
e.  $\frac{2}{3}(3-2x)^{3/2}$
- \_\_\_\_\_ 4.  $y = \frac{2}{(5x+1)^3}$
- a.  $\frac{30}{(5x+1)^2}$   
b.  $-30(5x+1)^{-4}$   
c.  $\frac{-6}{(5x+1)^4}$   
d.  $\frac{-10}{3}(5x+1)^{-4/3}$   
e.  $\frac{30}{(5x+1)^4}$
- \_\_\_\_\_ 5.  $y = 3x^{2/3} - 4x^{1/2} - 2$
- a.  $2x^{1/3} - 2x^{-1/2}$   
b.  $3x^{-1/3} - 2x^{-1/2}$   
c.  $\frac{9}{5}x^{5/3} - 8x^{3/2}$   
d.  $\frac{2}{x^{1/3}} - \frac{2}{x^{1/2}} - 2$   
e.  $2x^{-1/3} - 2x^{-1/2}$

## Limits #1

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

— 6  $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^2 + 4}$  is

a. 1  
b. 0  
c.  $\frac{-1}{2}$

- d. -1  
e.  $\infty$

— 7  $\lim_{x \rightarrow \infty} \frac{4 - x^2}{x^2 - 1}$

a. 1  
b. 0  
c. -4

- d. -1  
e.  $\infty$

— 8  $\lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 2x - 3}$

a. 0  
b. 1  
c.  $\frac{1}{4}$

- d.  $\infty$   
e. none of these

— 9  $\lim_{x \rightarrow 0} \frac{x}{x}$

a. 1  
b. 0  
c.  $\infty$

- d. -1  
e. nonexistent

— 10  $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4}$

a. 4  
b. 0  
c. 1

- d. 3  
e.  $\infty$

Exam

Name \_\_\_\_\_

+ 1 - No Calculator 55 min 28 Questions

If  $f(x) = 5x^3$ , then  $f(8) =$

- (A) 10                      (B)  $\frac{40}{3}$                       (C) 40                      (D) 80                      (E)  $\frac{160}{3}$

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$\lim_{x \rightarrow 2} \frac{5x^2 - 3x + 1}{4x^2 + 2x + 5}$  is

- (A) 0                      (B)  $\frac{4}{5}$                       (C)  $\frac{3}{11}$                       (D)  $\frac{5}{4}$                       (E)  $\infty$

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If  $f(x) = \frac{3x^2 + x}{3x^2 - x}$  then  $f(x)$  is

- (A) 1  
(B)  $\frac{6x^2 + 1}{6x^2 - 1}$   
(C)  $\frac{-6}{(3x - 1)^2}$   
(D)  $\frac{-2x^2}{(x^2 - x)^2}$   
(E)  $\frac{36x^2 - 2x}{(x^2 - x)^2}$

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If  $x^2 - 2xy + 3y^2 = 8$ , then  $\frac{dy}{dx} =$

- (A)  $\frac{8 + 2y - 2x}{6y - 2x}$   
(B)  $\frac{3y - x}{y - x}$   
(C)  $\frac{2x - 2y}{6y - 2x}$   
(D)  $\frac{1}{3}$   
(E)  $\frac{y - x}{3y - x}$

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If  $g(x) = \frac{1}{32}x^4 - 5x$  find  $g(4)$ .

- (A) -72
- (B) -32
- (C) -24
- (D) 24
- (E) 32

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$\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5}$  is

- (A) 0
- (B) 10
- (C) -10
- (D) 5
- (E) The limit does not exist.

17

If  $f(x) = \frac{x^2 - x + 2}{x^3 + 7}$ , find  $f'(x)$ .

- (A)  $\frac{(5x^4 - 1)}{(3x^2)}$
- (B)  $\frac{(5x^4 - 1) - (3x^2)}{(x^3 + 7)}$
- (C)  $\frac{(x^3 + 7)(5x^4 - 1) - (x^2 - x + 2)(3x^2)}{(x^3 + 7)}$
- (D)  $\frac{(x^2 - x + 2)(3x^2) - (x^3 + 7)(5x^4 - 1)}{(x^3 + 7)^2}$
- (E)  $\frac{(x^3 + 7)(5x^4 - 1) - (x^2 - x + 2)(3x^2)}{(x^3 + 7)^2}$

Name: \_\_\_\_\_

## Unit 2 Differentiation Exam

18 What is the slope of the line tangent to the curve  $3y^2 - 2x^2 = 6 - 2xy$  at the point  $(3, 2)$ ?

(A) 0

(B)  $\frac{4}{9}$

(C)  $\frac{7}{9}$

(D)  $\frac{6}{7}$

(E)  $\frac{5}{3}$

19 The slope of the line tangent to the graph of  $\ln(xy) = x$  at the point where  $x = 1$  is

(A) 0

(B) 1

(C)  $e$

(D)  $e^2$

(E)  $1 - e$

20 If  $f(x) = \frac{e^{2x}}{2x}$ , then  $f'(x) =$ 

(A) 1

(B)  $\frac{e^{2x}(1-2x)}{2x^2}$

(C)  $e^{2x}$

(D)  $\frac{e^{2x}(2x+1)}{x^2}$

(E)  $\frac{e^{2x}(2x-1)}{2x^2}$

21 Given  $y = \sqrt{x}$ , determine  $\frac{dy}{dx}$ .

(A)  $\frac{1}{2}\sqrt{x}$

(B)  $\frac{1}{2\sqrt{x}}$

(C)  $\frac{1}{2x}$

(D)  $\frac{1}{2}x^{-1}$

(E)  $\frac{1}{2}x$

22 If  $f(x) = \ln(\sqrt{x})$ , then  $f''(x) =$

(A)  $-\frac{2}{x^2}$

(B)  $-\frac{1}{2x^2}$

(C)  $-\frac{1}{2x}$

(D)  $-\frac{1}{2x^{\frac{3}{2}}}$

(E)  $\frac{2}{x^2}$

$x$	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
3	-3	6	-5	1
4	0	3	-3	9
5	3	-2	4	5

Answer numbers 6 – 7 based on the table above.

23 If  $h(x) = f(x)g(x)$ , then  $h'(5) =$

(A) 2

(B) 7

(C) 14

(D) 20

(E) 26

24 If  $h(x) = f(g(x))$ , then  $h'(4) =$

(A) -45

(B) -27

(C) -15

(D) 0

(E) 25

$x$	$g(x)$	$g'(x)$
1	3	4
2	8	3

Answer number 8 based on the table above.

25 If  $g(x)$  and  $g'(x)$  have the values shown in the table above, and  $f(x) = [g(x)]^2$ , then  $f'(2) =$

(A) 12

(B) 16

(C) 23

(D) 24

(E) 48