

## AP Calculus TEST: 2.1-2.8, NO CALCULATOR

Put the correct CAPITAL letter in the space to the left of each question.

\_\_\_\_1. If  $x^2 + y^2 = 25$ , what is the value of  $\frac{d^2y}{dx^2}$  at the point  $(4,3)$ ?

- (A)
- $-\frac{25}{27}$
- (B)
- $-\frac{7}{27}$
- (C)
- $\frac{7}{27}$
- (D)
- $\frac{3}{4}$
- (E)
- $\frac{25}{27}$

\_\_\_\_2.

The slope of the line tangent to the curve  $y^2 + (xy+1)^3 = 0$  at  $(2, -1)$  is

- (A)
- $-\frac{3}{2}$
- (B)
- $-\frac{3}{4}$
- (C) 0      (D)
- $\frac{3}{4}$
- (E)
- $\frac{3}{2}$

\_\_\_\_3.

$$\frac{d}{dx} \cos^2(x^3) =$$

- (A)
- $6x^2 \sin(x^3) \cos(x^3)$
- 
- (B)
- $6x^2 \cos(x^3)$
- 
- (C)
- $\sin^2(x^3)$
- 
- (D)
- $-6x^2 \sin(x^3) \cos(x^3)$
- 
- (E)
- $-2 \sin(x^3) \cos(x^3)$

\_\_\_\_4.

An equation of the line tangent to the graph of  $y = \frac{2x+3}{3x-2}$  at the point  $(1,5)$  is

- (A)
- $13x - y = 8$
- (B)
- $13x + y = 18$
- (C)
- $x - 13y = 64$
- 
- (D)
- $x + 13y = 66$
- (E)
- $-2x + 3y = 13$

\_\_\_\_5.

If  $u$ ,  $v$ , and  $w$  are nonzero differentiable functions, then the derivative of  $\frac{uv}{w}$  is

- (A)  $\frac{uv' + u'v}{w'}$       (B)  $\frac{u'v'w - uvw'}{w^2}$       (C)  $\frac{uvw' - uv'w - u'vw}{w^2}$   
(D)  $\frac{u'vw + uv'w + uvw'}{w^2}$       (E)  $\frac{uv'w + u'vw - uvw'}{w^2}$

\_\_\_\_6.

If  $x^3 + 3xy + 2y^3 = 17$ , then in terms of  $x$  and  $y$ ,  $\frac{dy}{dx} =$

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

\_\_\_\_7.

The  $\lim_{h \rightarrow 0} \frac{\tan 3(x+h) - \tan 3x}{h}$  is

- (A) 0      (B)  $3 \sec^2(3x)$       (C)  $\sec^2(3x)$       (D)  $3 \cot(3x)$       (E) nonexistent

\_\_\_\_8.

Let  $f$  be a differentiable function such that  $f(3) = 15$ ,  $f(6) = 3$ ,  $f'(3) = -8$ , and  $f'(6) = -2$ . The function  $g$  is differentiable such that  $f(g(x)) = x = g(f(x))$  for all  $x$ . What is the value of  $g'(3)$ ?

- (A)  $-\frac{1}{2}$       (B)  $-\frac{1}{8}$       (C)  $\frac{1}{6}$       (D)  $\frac{1}{3}$       (E) Cannot be determined from given information