

AP Calculus BC
Unit 8 - Day 2 - Assignment

Name: Answer Key*

1. 2003 #1 (AB but suitable for BC) - No Calc: If $y = (x^3 + 1)^2$, then $\frac{dy}{dx} =$

a. $(3x^3)^2$

c. $2(3x^3 + 1)$

e. $6x^2(x^3 + 1)$

b. $2(x^3 + 1)$

d. $3x^2(x^3 + 1)$

$2(x^3 + 1)^1 (3x^2)$
 $= 6x^2(x^3 + 1)$

2. 2003 #9 (AB & BC) - No Calc: If $f(x) = \ln(x + 4 + e^{-3x})$, then $f'(0)$ is

a. $-\frac{2}{5}$

c. $\frac{1}{4}$

e. nonexistent

b. $\frac{1}{5}$

d. $\frac{2}{5}$

$f'(x) = \frac{1 - 3e^{-3x}}{x + 4 + e^{-3x}}$

$f'(0) = \frac{1 - 3e^{-3(0)}}{0 + 4 + e^{-3(0)}} = \frac{1 - 3(1)}{4 + 1} = \frac{-2}{5}$

3. 2003 #1 (BC) - Calc OK: If $y = \sin(3x)$, then $\frac{dy}{dx} =$

$\cos(3x)(3)$

a. $-3 \cos(3x)$

c. $-\frac{1}{3} \cos(3x)$

e. $3 \cos(3x)$

b. $-\cos(3x)$

d. $\cos(3x)$

4. 1997 #4 (BC) - No Calc: $\frac{d}{dx} [x(x^2)] = \frac{d}{dx} [x^3] =$

a. $1 + 2x$

c. $3x^2$

e. $x^2 + x^3$

b. $x + x^2$

d. x^3

$3x^2$

5. 1997 #5 (BC) - No Calc: If $f(x) = (x-1)^{\frac{3}{2}} + \frac{e^{x-2}}{2}$, then $f'(2) =$

a. 1

c. 2

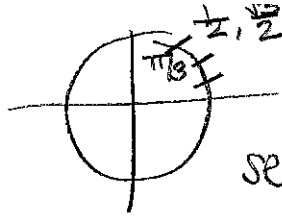
e. $\frac{3+e}{2}$

b. $\frac{3}{2}$

d. $\frac{7}{2}$

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

$f'(x) = \frac{3}{2}(x-1)^{1/2} + \frac{1}{2}e^{x-2}(1)$
 $f'(2) = \frac{3}{2}(2-1)^{1/2} + \frac{1}{2}e^{2-2}(1)$
 $= \frac{3}{2}(1)^{1/2} + \frac{1}{2}e^0 = \frac{3}{2} + \frac{1}{2} = \frac{4}{2} = 2$



$$\sec x = \frac{1}{\cos x}$$

$$f'(x) = 2 \sec^2(2x)$$

$$f'\left(\frac{\pi}{6}\right) =$$

$$2 \sec^2\left(2 \cdot \frac{\pi}{6}\right)$$

$$= 2 \sec^2\left(\frac{\pi}{3}\right)$$

$$= 2(2)^2$$

$$= 2(4) = 8$$

6. 1998 #28 (AB but suitable for BC) - No Calc: If $f(x) = \tan(2x)$, then $f''\left(\frac{\pi}{6}\right) =$

a. $\sqrt{3}$

c. 4

e. 8

b. $2\sqrt{3}$

d. $4\sqrt{3}$

7. 2003 #14 (AB but suitable for BC) - No Calc: If $y = x^2 \sin 2x$, then $\frac{dy}{dx} =$

a. $2x \cos 2x$

c. $2x(\sin 2x + \cos 2x)$

e. $2x(\sin 2x + x \cos 2x)$

b. $4x \cos 2x$

d. $2x(\sin 2x - x \cos 2x)$

$$2x(\sin 2x + x \cos 2x)$$

8. 2003 #4 (AB but suitable for BC) - No Calc: If $y = \frac{2x+3}{3x+2}$, then $\frac{dy}{dx} =$

a. $\frac{12x+13}{(3x+2)^2}$

c. $\frac{5}{(3x+2)^2}$

e. $\frac{2}{3}$

b. $\frac{12x-13}{(3x+2)^2}$

d. $\frac{-5}{(3x+2)^2}$

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

$$\frac{6x+4 - 6x-9}{(3x+2)^2} = \frac{-5}{(3x+2)^2}$$

9. 1997 #2 (AB but suitable for BC) - No Calc: If $f(x) = x\sqrt{2x-3}$, then $f'(x) =$

a. $\frac{3x-3}{\sqrt{2x-3}}$

c. $\frac{1}{\sqrt{2x-3}}$

e. $\frac{5x-6}{2\sqrt{2x-3}}$

b. $\frac{x}{\sqrt{2x-3}}$

d. $\frac{-x+3}{\sqrt{2x-3}}$

$$(1)(2x-3)^{1/2} + (x)\left(\frac{1}{2}(2x-3)^{-1/2}(2)\right)$$

$$\frac{\sqrt{2x-3} \cdot \sqrt{2x-3} + x}{\sqrt{2x-3}} = \frac{2x-3+x}{\sqrt{2x-3}} = \frac{3x-3}{\sqrt{2x-3}}$$

10. 2003 #26 (AB but suitable for BC) - No Calc: What is the slope of the line tangent to the curve $3y^2 - 2x^2 = 6 - 2xy$ at the point $(3, 2)$?

a. 0

c. $\frac{7}{9}$

e. $\frac{5}{3}$

b. $\frac{4}{9}$

d. $\frac{6}{7}$

$$6y\left(\frac{dy}{dx}\right) - 4x = 0 + (-2)(y) + (-2x)(1) \frac{dy}{dx}$$

$$6y \frac{dy}{dx} - 4x = -2y - 2x \frac{dy}{dx}$$

$$\frac{dy}{dx}(6y + 2x) = 4x - 2y$$

$$\frac{dy}{dx} = \frac{4x - 2y}{6y + 2x}$$

$$\rightarrow \frac{4(3) - 2(2)}{6(2) + 2(3)} = \frac{12 - 4}{12 + 6} = \frac{8}{18} = \frac{4}{9}$$