

## REVIEW

CALC 2  
UNIT 1 REVIEW – PART A

NAME: **Key**  
DATE:

## I. FIND THE DERIVATIVE OF EACH FUNCTION.

$$1.) y = 2x^4 - 2x^2 + \sqrt{x^3 - 1}$$

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

$$\frac{8x^3 - 4x + \frac{3x^2}{2}(x^3 - 1)^{-\frac{1}{2}}}{(x^2 - 1)^{\frac{1}{2}}}$$

$$C.R. \quad 2.) y = \sin^3(5x^2 + 2x)$$

$$30x^4 + 15x^2 - 6x - 3 - 20x^4 - 30x^2$$

$$\frac{(30x+6)\sin^2(5x^2 + 2x)\cos(5x^2 + 2x)}{10x^4 - 21x^2 - 3}$$

$$Q.R. \quad 3.) y = \frac{2x^3 + 3x}{5x^2 - 1}$$

$$\frac{(5x^2 - 1)(6x^2 + 3) - (2x^3 + 3x)(10x)}{(5x^2 - 1)^2}$$

$$P.R. \quad 4.) y = \cos(x^2) \tan(3x) \quad \cos(x^2) \sec^2(3x) \cdot 3$$

$$+ \tan(3x) \cdot \sin(x^2) \cdot 2x$$

$$Q.R. \quad 5.) y = (3x-1)^{-1}(x+4)$$

$$\frac{(x+4)}{(3x-1)^2} - \frac{3x-12}{(3x-1)^2}$$

$$6.) 3 = x^2y - 7xy^4$$

$$0 = x^2 \frac{dy}{dx} + 2xy - 7x(4y^3 \frac{dy}{dx}) - 7y^4$$

$$\frac{3\cos(x^2)\sec^2(3x) - 2x\tan(3x)\sin(x^2)}{(3x-1)^2}$$

$$-13 / (3x-1)^2$$

$$\frac{2xy - 7y^4}{28xy^3 - x^2}$$

Jmp.

II. USE THE DEFINITION OF THE DERIVATIVE TO FIND  $f'(x)$ 

$$7.) y = 2x^2 - 7x \quad \lim_{h \rightarrow 0} \frac{2(x+h)^2 - 7(x+h) - 2x^2 + 7x}{h}$$

$$4x - 7$$

$$\lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 - 7x - 7h - 2x^2 + 7x}{h} = \lim_{h \rightarrow 0} \frac{4xh + 2h^2 - 7h}{h} = \lim_{h \rightarrow 0} \frac{h(4x + 2h - 7)}{h} = 4x - 7$$

## III. ANSWER THE FOLLOWING QUESTIONS DEALING WITH TANGENT LINES

$$8.) \text{ Find the equation of the tangent line to } f(x) = \frac{1}{4}x^2 - 3 \text{ at } x = -2$$

$$m = f'(x) = \frac{1}{2}x = \frac{1}{2}(-2) = -1$$

$$y = \frac{1}{4}x^2 - 3$$

$$Y = -x - 4$$

$$-2 = -1 \cdot -2 + b$$

$$-4 = b$$

$$9.) \text{ Find the equation(s) of all horizontal tangent(s) to } y = x^3 - 3x - 4$$

$$y' = 3x^2 - 3$$

$$0 = 3(x^2 - 1)$$

$$x = \pm 1$$

$$(1, -6) \rightarrow y = -6$$

$$(-1, -2) \rightarrow y = -2$$

$$Y = -6, Y = -2$$

$$10.) \text{ Find the slope of the tangent line to } x^2y^2 + 4xy = y \text{ at the point } (2, 1)$$

$$m = -8/15$$

$$x^2(2y \frac{dy}{dx}) + 2xy^2 + 4x \frac{dy}{dx} + 4y = 1 \frac{dy}{dx}$$

$$\frac{2x^2y^2 + 4y}{1 - 4x - 2x^2y} = \frac{dy}{dx}(1 - 4x - 2x^2y)$$

$$\frac{2(2)(1^2) + 4(1)}{1 - 4(2) - 2(2^2)(1)} (2, 1) \rightarrow$$