Calculus
Review – Chain Rule

Find the derivative of each of the following functions.

1. $y=(3x+7)^8$

2. $y=\sin(3x^2)$

3. $y=(\tan x)^6$

4. $y=(\csc(2x))^6$

5. $y=x^2(3x-4)^5$

6. $y=\dfrac{3x}{\sin(4x)}$

7. $y=(5x+3)^4(3x-1)^3$

8. $y = \tan(3x)$
Find the equation of the tangent line at $x = \pi$.

9. $y = (4x - 2)^3$
Find the equation of the tangent line at x = 0.

10. $y = (4x - 2)^3$
Find the second derivative.

CALCULUS
WORKSHEET ON IMPLICIT DIFFERENTIATION

Find $\frac{dy}{dx}$.

1. $y^3 + y^2 - x^2 = -4$

2. $x^2 + xy - y^2 = 3$

3. $x^3y^3 - y = x$

4. $\sin x = x(1 + \tan y)$

5. $y = \sin(xy)$

Find the second derivative, $\frac{d^2y}{dx^2}$.

6. $x^2 + y^2 = 25$

7. $x^2 + xy = 5$

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8. Given the curve $y^2x + y^2x^2 = 6$.

(a) Find $\frac{dy}{dx}$.

(b) Evaluate $\frac{dy}{dx}$ at the point (2, 1).

(c) Write an equation for the tangent line to the curve at the point (2, 1).

d) same as (c) but normal line

CALCULUS AB

2004

SECTION II, Part B

Time—45 minutes

Number of problems—3

No calculator is allowed for these problems.

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4. Consider the curve given by $x^2 + 4y^2 = 7 + 3xy$.

   (a) Show that $\frac{dy}{dx} = \frac{3y - 2x}{8y - 3x}$.

   (b) Show that there is a point P with x-coordinate 3 at which the line tangent to the curve at P is horizontal. Find the y-coordinate of P.

   (c) Find the value of $\frac{d^2y}{dx^2}$ at the point P found in part (b). Does the curve have a local maximum, a local minimum, or neither at the point P? Justify your answer.
