$m = 6x - 2$, $m = 6(2) - 2$, $m = 10$

$y - y_1 = m(x - x_1)$

$y - 8 = 10(x - 2)$

$y - 8 = 10x - 20$

$y - 10x = -20 + 8$

$y - 10x = -12$

for a normal equation

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - 8 = \frac{-1}{10}(x - 2)$

cross multiply

$10y - 80 = -x + 2$

$10y + x = 2 + 80$

$10y + x = 82$

3 $y = \frac{x^3}{2}$ cut Points $(-1, -\frac{1}{2})$

$\frac{dy}{dx} = \frac{3x^2}{0}$ = undefined

4 $y = 1 + x - x^2$ cut Point $(-2, -6)$

$\frac{dy}{dx} = 1 - 2x$

$m = 1 - 2(-2)$

$m = 1 + 4 \quad m = 6$

$y - y_1 = m(x - x_1)$

$y - (-5) = 5(x - (-2))$

$y + 5 = 5(x + 2)$

$y + 5 = 5x + 10$

$y - 5x = 10 - 5$

$y - 5x = 5$

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MAT 104 <Equation and tangent>

For the curves on problem 1-5 at the points given find (a) the equation of the tangent and (b) the equation of the normal

1 $y = 2x^2$ at points $(1, 2)$

$\frac{dy}{dx} = 4x$

$m = \frac{dy}{dx} \Big| x = 1$

$m = 4x$, $m = 4(1)$ $m = 4$

$y - y_1 = m(x - x_1)$

$y - 2 = 4(x - x_1)$

$y - 2 = 4x - 4$

$y - 4x = -4 + 2$

$y - 4x = -2$

for normal equation

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - 2 = -1/4 (x - 1)$

cross multiply

$4y - 8 = -x + 1$

$4y + x = 1 + 8$

$4y + x = 7/2$

2 $y = 3x^2 - 2x$ at points $(2, 8)$

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

$m = \frac{dy}{dx} \Big| x = 2$

for normal equation

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - (-5) = -\frac{1}{5}(x - (-2))$

5 $y = 1/x$ at points $(3, 1/3)$

$y = x^{-1}$

$\frac{dy}{dx} = -x^{-2}$

$m = -3^{-2} = -1/3^2$

$m = -1/9$

$y - y_1 = m(x - x_1)$

$y - \frac{1}{3} = \frac{-1}{9}(x - 3)$

$\frac{3y - 1}{3} = -\frac{1}{9}(x - 3)$

$27y - 9 = -3x + 9$

$27y + 3x = 18$

for the normal equation

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - \frac{1}{3} = -1 \div \frac{1}{9}(x - 3)$

$y - \frac{1}{3} = 1 \times \frac{9}{1}(x - 3)$

$y - \frac{1}{3} = 9(x - 3)$

$\frac{3y - 1}{3} = 9(x - 3)$

$\frac{3y - 1}{3} = 9x - 29$

$3y - 1 = 27x - 81$

$3y - 27x = -81 + 1$

$3y - 27x = -80$

NO 4 cont'd

for normal equation

$y - y_1 = -1/m(x - x_1)$

$y - (-5) = -1/5(x - (-2))$

$y + 5 = -1/5(x + 2)$

cross multiplying

$5y + 25 = -1(x + 2)$

$5y + 25 = -x - 2$

$5y + x = -2 - 25$

$5y + x = -27$