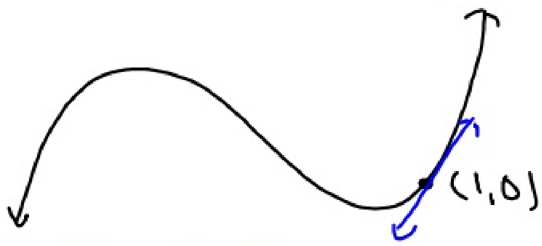
1-19-18 1st Trig

<u>Review</u>

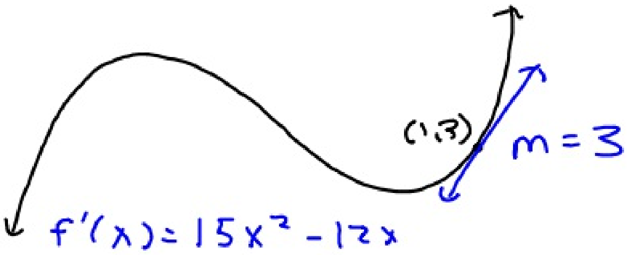
① Give the slope of the line tangent to
$f(x) = x^3 + 3x^2 - 5x + 1$ at $(1,0)$.

$f'(x) = 3x^2 + 6x - 5$



$f'(1) = 3\cdot 1^2 + 6\cdot(1) - 5$
$= 4$
slope is 4

② Give the equation of the line that is tangent to
$f(x) = 5x^3 - 6x^2 + 4$ at $(1,3)$.



$f'(x) = 15x^2 - 12x$

$f'(1) = 15\cdot 1^2 - 12\cdot 1 = 3$

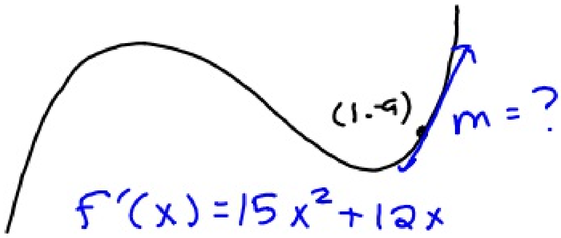
$y - y_1 = m(x - x_1)$

$y - 3 = 3(x - 1)$

$y - 3 = 3x - 3$
$\underline{\ \ +3 \qquad\quad +3}$
$y = 3x$

1-19-18 4th Trig

① Give the slope of the tangent line to
$f(x) = 5x^3 + 6x^2 - 20$ at $(1,-9)$.

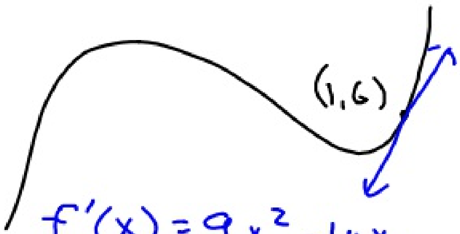


$f'(x) = 15x^2 + 12x$

$f'(1) = 15 \cdot 1^2 + 12 \cdot 1$

$= 27$

② Give the equation of the line tangent to
$f(x) = 3x^3 - 5x^2 + 8$ at $(1,6)$.



$f'(x) = 9x^2 - 10x$

$f'(1) = 9 \cdot 1^2 - 10 \cdot 1$

$= -1$

$m = -1 \quad (1,6)$

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

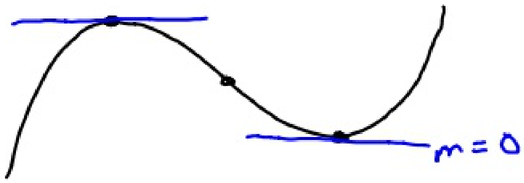
$y - 6 = -1(x - 1)$

$y - 6 = -x + 1$

$\quad +6 \qquad\quad +6$

$y = -x + 7$

③ Find the critical points on $f(x) = x^3 - 6x^2 + 5$.



$f'(x) = 3x^2 - 12x$

$3x^2 - 12x = 0$

$3x(x-4) = 0$

$3x = 0 \qquad x - 4 = 0$

$x = 0 \qquad x = 4$

$f(x) = x^3 - 6x^2 + 5$

$x=0 \quad f(0) = 0^3 - 6(0)^2 + 5 = 5$

$(0,5)$ ← relative maximum

$x=4 \quad f(4) = 4^3 - 6 \cdot 4^2 + 5 = -27$

$(4,-27)$ ← relative minimum

Point of Inflection

$f'(x) = 3x^2 - 12x$

$f''(x) = 6x - 12$

$6x - 12 = 0$

$x = 2$

$x=2 \quad f(2) = 2^3 - 6(2)^2 + 5$

$= 8 - 24 + 5$

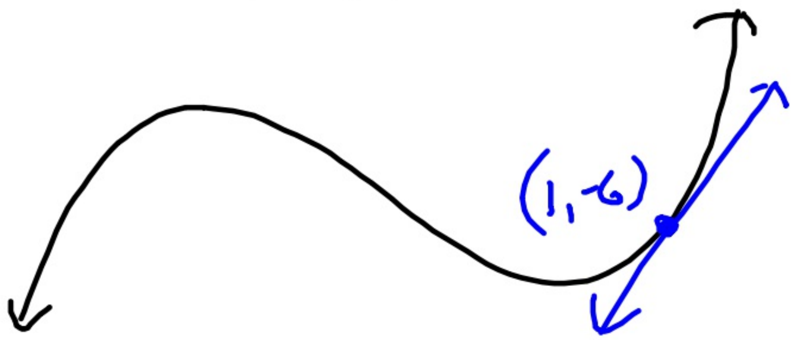
$= -11$

$(2,-11)$ ← Point of Inflection

1-19-18 3rd Trig

Review

① Give the slope of the line tangent to $f(x) = x^3 - 8x^2 + 1$ at $(1, -6)$.



$f'(x) = 3x^2 - 16x$

$f'(1) = 3 \cdot 1^2 - 16 \cdot 1 = -13$

$m = -13$