

3-24-14
3rd Try

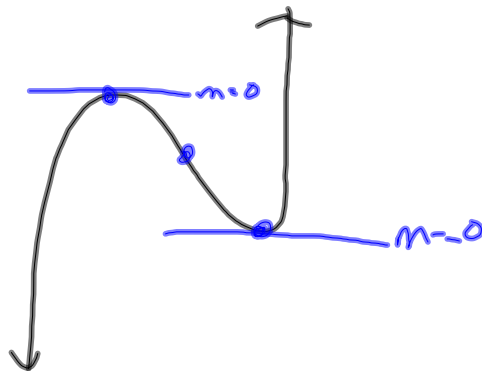
Give polynomial of least degree that has roots of 2, 10.

$$(x-2)(x-10)=0$$
$$x^2-12x+20$$

Give polynomial of least degree that has roots of $3i, -3i, 10$

$$(x-3i)(x+3i)(x-10)=0$$
$$(x^2 - \overset{-1}{\boxed{9}})(x-10)$$
$$(x^2+9)(x-10)$$
$$x^3-10x^2+9x-90$$

Critical Points



$$\textcircled{10} \quad f(x) = x^3 + 3x^2 + 4$$

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

$$3x^2 + 6x = 0$$

$$3x(x + 2) = 0$$

$$x = 0$$

$$x = -2$$

$$f(0) = 0^3 + 3(0)^2 + 4 = 4 \quad (0, 4)$$

$$f(-2) = (-2)^3 + 3(-2)^2 + 4 = 8 \quad (-2, 8)$$

Point Inflection:

$$f''(x) = 6x + 6$$

$$6x + 6 = 0$$

$$x = -1$$

$$f(-1) = (-1)^3 + 3(-1)^2 + 4 = 6 \quad (-1, 6)$$

Find critical points
of $f(x) = x^3 - 15x^2 + 72x$

$$f'(x) = 3x^2 - 30x + 72$$

$$3x^2 - 30x + 72 = 0$$

$$\cancel{3}(x^2 - 10x + 24) = 0$$

$$(x - 4)(x - 6) = 0$$

$$x - 4 = 0$$

$$x - 6 = 0$$

$$x = 4$$

$$x = 6$$

$$f(4) = 4^3 - 15(4)^2 + 72(4) = 112$$

$(4, 112)$

$$f(6) = 6^3 - 15(6)^2 + 72(6) = 108$$

$(6, 108)$

Point of Inflection

$$f''(x) = 6x - 30$$

$$6x - 30 = 0$$

$$x = 5$$

$$f(5) = 5^3 - 15(5)^2 + 72(5) = 110$$

$(5, 110)$

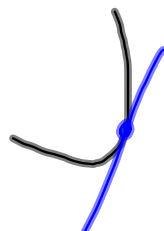
$$f(x) = \frac{-6}{x^4} - \frac{2}{x} + \frac{x}{3}$$

$$= -6x^{-4} - 2x^{-1} + \frac{1}{3}x^1$$

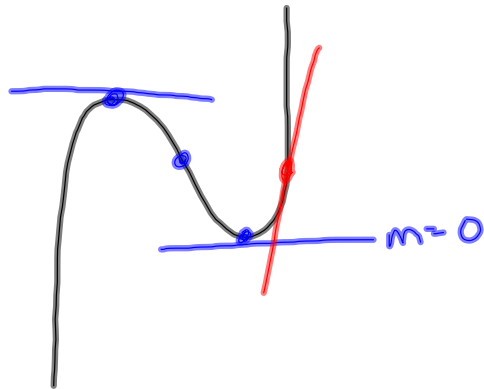
$$f'(x) = 24x^{-5} + 2x^{-2} + \frac{1}{3}$$

$$= \frac{24}{x^5} + \frac{2}{x^2} + \frac{1}{3}$$

Give slope of line tangent
to $f(x) = 8x^4 + 2x$ at $(\underline{1}, 10)$


$$f'(x) = 32x^3 + 2$$
$$f'(1) = 32(1)^3 + 2$$
$$= 34$$

3-24-14
4th Trig



Find the slope of the
line tangent to

$$f(x) = 5x^4 - 2x^2 \text{ at } (1, 3).$$

$$f'(x) = 20x^3 - 4x$$

$$f'(1) = 20(1)^3 - 4(1)$$

$$\begin{aligned} & 20 - 4 \\ & = 16 \end{aligned}$$

Find the equation of that
tangent line (1, 3)
m = 16

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

$$y - 3 = 16(x - 1)$$

$$\begin{array}{r} y - 3 = 16x - 16 \\ +3 \qquad \qquad +3 \end{array}$$

$$y = 16x - 13$$