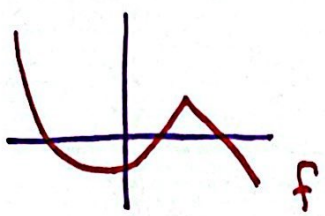
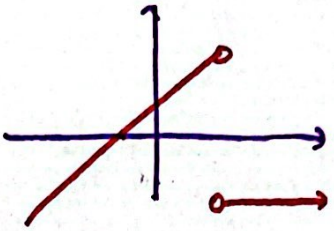
Hw 04 Solutions

2.8, #3) a) II
b) IV
c) I
d) III

2.8, #9)





2.8, #44) $x = -2$, Cusp pt
$x = 1$, Not Continuous
$x = 3$, Cusp pt

2.8, #48) Red function is f
Blue function is f'
$f'(-1)$ is positive
$f''(1)$ is 0
so $f'(-1) > f''(1)$

3.1, #12) $V(t) = t^{-3/5} + t^4$

$$V'(t) = -\frac{3}{5}t^{-8/5} + 4t^3 = \frac{-3}{5t^{8/5}} + 4t^3$$

$$= \frac{-3 + 20t^{23/5}}{5t^{8/5}}$$

3.1, # 37) $y = 2x^3 - x^2 + 2$, $(1,3)$

Note, when $x=1$, $y = 2-1+2 = 3$, so $(1,3)$ is on the graph.

$y' = 6x^2 - 2x$, $y'(1) = 6-2 = 4$.

So $\boxed{y-3 = 4(x-1)} \Rightarrow y-3 = 4x-4$

$\Rightarrow \boxed{y = 4x-1}$

3.1, # 59) The tangent is horizontal means

$y' = 0$

$\therefore$ ~~$y = x^3 + 3x^2 - 9x +$~~

$y = x^3 + 3x^2 - 9x + 10$

$y' = 3x^2 + 6x - 9$

$= 3(x^2 + 2x - 3)$

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

$\therefore x = 1, -3$

$y(1) = 1 + 3 - 9 + 10 = 5 \Rightarrow \boxed{(1,5)}$

$y(-3) = -27 + 27 + 27 + 10 \Rightarrow \boxed{(-3,37)}$