

p.176
 10. find extrema + intervals where incr./decr.
 $f(x) = (x-1)^2(x+2)$

$$f'(x) = 2(x-1)(x+2) + (x-1)^2(1)$$

$$f'(x) = 2(x-1)(x+2) + (x-1)^2 = 0$$

$$(x-1)(2x+4+x-1) = 0$$

$$(x-1)(3x+3) = 0$$

$$3(x-1)(x+1) = 0$$

$$x = 1, -1$$

x	-2	-1	0	1	2
f'(x)	+		-		+

$(-\infty, -1)$: incr.

-1 : max

$(-1, 1)$: Decr.

1 : min

$(1, \infty)$: increasing

Calc based Physics

$$x(t) = v_0 t + \frac{1}{2} a t^2 + x_0$$

$$x(t) = -5t + 18t^2 + 5$$

Velocity: first derivative of position wrt time

$$v(t) = x'(t)$$

$$\underline{v(t) = -5 + 36t}$$

Acceleration: • first derivative of velocity wrt time
• 2nd derivative of position wrt time