$\boxed{3.1}$

#25 $f(x) = 3x - 7$ at $(3,2)$ tangent line to

secant line slope

$m_{sec} = \frac{f(x+h) - f(x)}{h}$ at $x=3$, then

$m_{sec} = \frac{f(3+h) - f(3)}{h} = \frac{3(3+h) - 7 - (3(3) - 7)}{h}$

$= \frac{\cancel{9} + 3h - \cancel{7} - \cancel{2}}{h} = \frac{3\cancel{h}}{\cancel{h}} = 3$

$\Rightarrow$ the slope is always 3 (which we already knew because it's a line)

$\Rightarrow$ slope of any tangent is also 3.

#29 $f(x) = x^3$ at $x = 2$ (tangent line slope + then eqn of tangent line

$m_{sec} = \frac{f(2+h) - f(2)}{h} = \frac{(2+h)^3 - 2^3}{h}$

$= \frac{\cancel{2^3} + 3(2^2 h) + 3(2h^2) + h^3 - \cancel{2^3}}{h}$

$= \frac{12h + 6h^2 + h^3}{h} = \frac{\cancel{h}(12 + 6h + h^2)}{\cancel{h}}$

$= 12 + 6h + h^2 \Rightarrow m_{tan} = 12 + 6(0) + 0^2 = 12$

$\Rightarrow$ tangent line: $m = 12$ pt $(2, 8)$

$f(2) = 2^3 = 8$

$$y - 8 = 12(x - 2)$$
$$y - 8 = 12x - 24$$
$$\boxed{y = 12x - 16}$$

#41 set it up as points; we know when (stretch, weight)
(x, y)

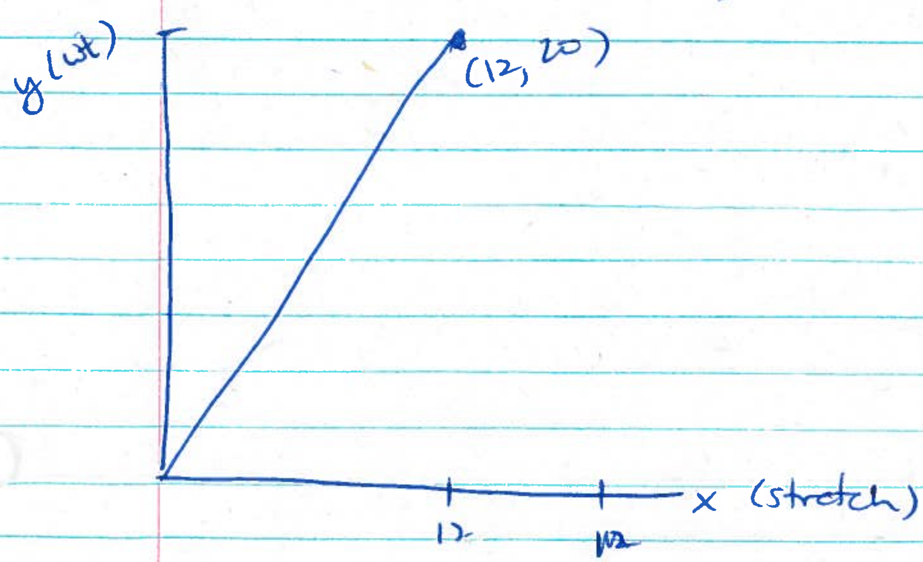
stretch $= x = 0$ in, $y =$ weight $= 0$ lbs
and $x = 6$ in, $y = 10$ lbs

$\Rightarrow$ i.e. line goes thru $(0,0)$ and $(6,10)$

$m = \frac{10}{6} = \frac{5}{3}$

$$y = \frac{5}{3}x$$

if $x =$ stretch $= 9.5$ in, then $y = \frac{5}{3}(9.5) = 15.8\bar{3}$ lbs



#51 think of value as functn of time
$V = v(t)$ so pts are ordered pairs

(t, v)

We know when $t=0$, $v = \$215{,}000$
($t=0$ is when it's purchased)
when $t = 10$ yrs, $V = \$35{,}000$

rate of depreciation is the slope of the line connecting the two pts.

$(0, 215000)$ $(10, 35000)$

$$m = \frac{215000 - 35000}{0 - 10} = -18{,}000 \ (\$/\text{yr})$$

this means that for each additional year, the value decreases by $18000