Question from Reviews for Chapter 3 Test

Upper: #2, #5, #6, #13

#2 $f(x) = \frac{9}{x}$

$\boxed{\text{Step 1}}$ Find 1st derivative using the definition

Formula: $\frac{f(x+h)-f(x)}{h}$

add this in order to define $\left\{ \lim_{h \to \emptyset} \left(\frac{\frac{9}{x+h} - \frac{9}{x}}{h} \right) \right.$

$\boxed{\text{Step2}}$ Find LCD

$\lim_{h \to \emptyset} \left(\frac{9}{x+h} - \frac{9}{x} \right) \frac{1}{h}$ LCD $= x(x+h)$

$\boxed{\text{Step3}}$ $\lim_{h \to \emptyset} \left(\frac{9x - 9(x+h)}{x(x+h)} \right) \frac{1}{h}$

$\boxed{\text{Step 4}}$ Distribute

$\lim_{h \to \emptyset} \left(\frac{\cancel{9x} - \cancel{9x} - 9h}{x(x+h)} \right) \cdot \frac{1}{h}$

$\lim_{h \to \emptyset} \left(\frac{-9\cancel{h}}{x(x+h)} \right) \cdot \frac{1}{\cancel{h}}$

$\boxed{\text{Step5}}$ $\frac{-9}{x(x+\emptyset)}$ b/c set $h = \emptyset$ $= \boxed{\frac{-9}{x^2}}$

Using Short cut = $\boxed{\text{Step 1}}$ $f(x) = \frac{9}{x}$

$\boxed{\text{Step 2}}$ $f(x) = 9x^{-1}$

$\boxed{\text{Step3}}$ $f(x) = 9(-1) * x^{-1-1}$

$\boxed{\text{Step4}}$ $f(x) = -9x^{-2}$

$\boxed{\text{Step5}}$ Put back into original format

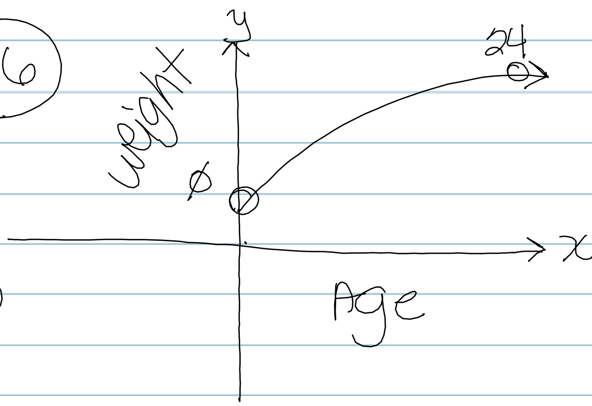
$\boxed{\frac{-9}{x^2}}$

#5 10 to 30 average rate of Δ = slope

Data points (10,40) and (30,60)

$$m = \frac{\Delta y}{\Delta x} = \frac{60-40}{30-10} = \frac{20}{20} = 1$$

#6



*3 on this upcoming test

look for Ø and 24
(0,8) and (24,26)

$$m = \frac{\Delta y}{\Delta x} = \frac{26-8}{24-0} = .75$$

round up to 0.8 lbs

#13 $f(x) = \frac{x^3}{2}$ or $\frac{1}{2}x^3 = 0.5x^3$ Data point (5,62.5)

Find = equation of tangent line

Find $f'(x) = \frac{1}{2}(3)x^{3-1} = 1.5x^2$

Slope of tangent line @ 5 $= f'(5) = 1.5(5)^2 = 37.5$

Step 2 Since we have no y-int we should use
$y - y_1 = m(x - x_1)$

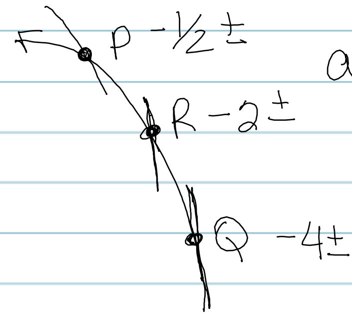
$= y - 62.5 = 37.5(x-5)$

$= 37.5x - 187.5 + 62.5$

$\boxed{y = 37.5x - 125}$ equation of tangent line @ (5,62.5)

Lower: (Limits) #1, #2, and #6

#1



all facing down, thus all negative

$\boxed{\text{Q = smallest slope because of negative \#'s}}$

#6 $C(x) = 9700 + 4x - \dfrac{x^2}{11{,}000}$ use: $\dfrac{f(x+h)-f(x)}{h}$

$x = 1300$; $h = 0.0001$

Step 1 Find $\dfrac{f(1300.0001) - f(1300)}{0.0001}$

Plug into calculator

Step 2 $9700 + 4(1300.0001) - \dfrac{(1300.0001)^2}{11{,}000} = 14{,}746.36401$

$9700 + 4(1300) - \dfrac{(1300)^2}{11{,}000} = 14746.36364$

Step 3 $\dfrac{14{,}746.36401 - 14746.36364}{0.0001}$

$\boxed{= 3.7}$

Step 4 $C'(x) = \left(9700 + 4x - \dfrac{x^2}{11{,}000}\right)' = 4 - \dfrac{2}{11{,}000}x$ using this equation

$C'(1300) = 4 - \dfrac{2}{11{,}000}(1300) = \boxed{3.7636}$