Fri Problems
3.4 #12, 4.3 #1
4.4 #6

3.4/ 12a) The change in value = $\boxed{k(6+h) - k(6)}$

b) The avg rate of change from A to B is just the slope of the line running through A & B.

$= \dfrac{k(6+h) - k(6)}{6+h-6} = \boxed{\dfrac{k(6+h) - k(6)}{h}}$

c) i) if $k(x)$ has avg. slope of -5 from 6 to $6+h$, which of the following must also:

A. $\dfrac{f(6+h) - f(6)}{6+h-6} = \dfrac{k(6+h)+2 - k(6) - 2}{h} = \dfrac{k(6+h) - k(6)}{h} = -5$, so $\boxed{\text{yes}}$

B. $\dfrac{g(6+h) - g(6)}{6+h-6} = \dfrac{k(6+h+2) - k(6+2)}{h} = \dfrac{k(8+h) - k(8)}{h} = ?$, so $\boxed{\text{no}}$

C. $\dfrac{h(6+h) - h(6)}{6+h-6} = \dfrac{2k(6+h) - 2(k(6))}{h} = 2\left(\dfrac{k(6+h) - k(6)}{h}\right) = -10$, so $\boxed{\text{no}}$

ii) it is h, as you can see in C.

4.3/ 1. a) the revenue is \$.07 • # of copies, so $\boxed{R(x) = .07x}$

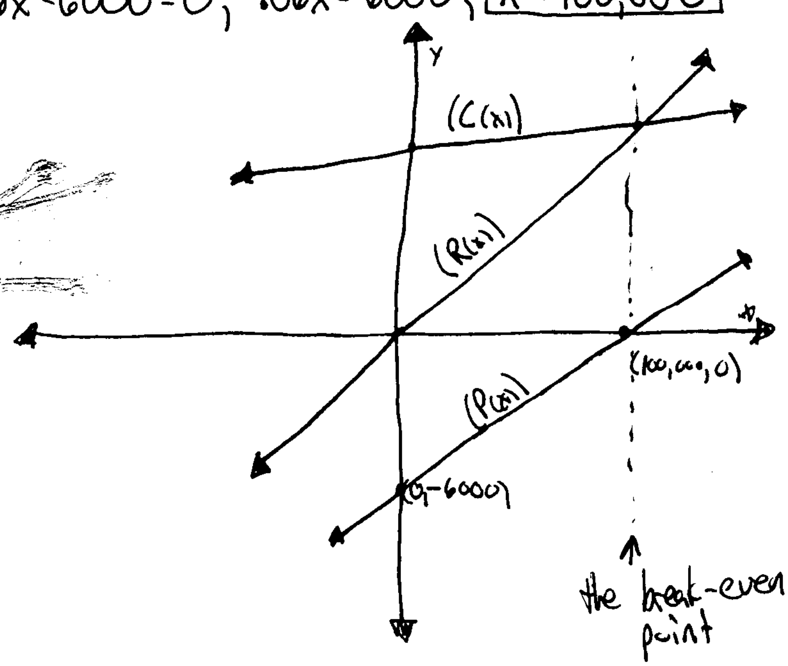
b) the cost is $\boxed{C(x) = 6000 + .01x}$

c) profit = revenue − cost, so $P(x) = R(x) - C(x) = .07x - 6000 - .01x$

so $\boxed{P(x) = .06x - 6000}$

d) $P(x) = 0 \Rightarrow .06x - 6000 = 0$, $.06x = 6000$, $\boxed{x = 100{,}000}$

e)



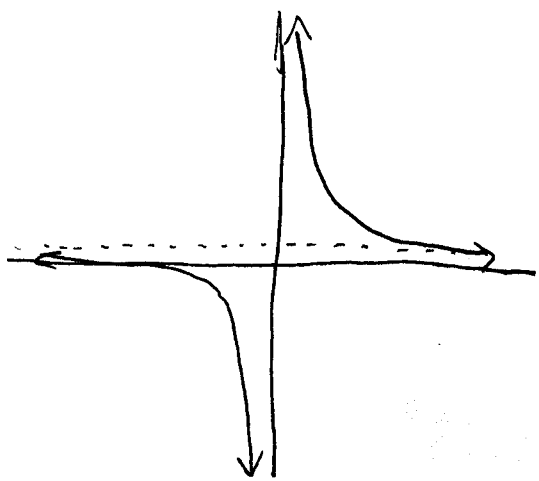
f) We can write the cost per copy as $\frac{C(x) = \text{cost}}{x = \text{copies}} = \frac{6000 + .1x}{x}$

so $\boxed{A(x) = \frac{6000}{x} + .01}$

g)

x	$A(x)$
0	Undefined
1	6000.01
10	600.01
100	60.01
1000	6.01
10,000	.61

h)



Asymptote at $x = 0$ and $y = .01$

4.4/ 6.a) $P_B(x)$ has no overtime, so it is just: $\boxed{P_B(x) = 14 \cdot x}$

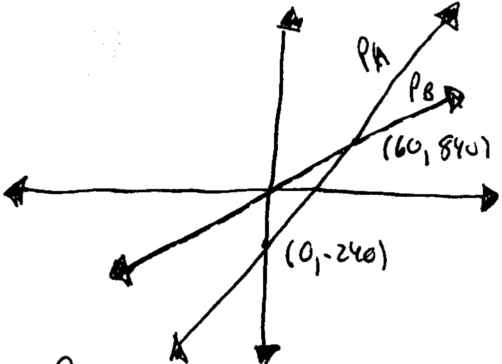
b) for $x \leq 40$, $\boxed{P_A(x) = 12 \cdot x}$. for $x > 40$, $P_A = 12 \cdot 40 + 12 \cdot (1.5(x-40))$ because you want only additional hours to earn extra.

So $\boxed{P_a(x) = 18x - 240}$

c) i) The plans are equivalent when $P_A(x) = P_B(x)$, so $18x - 240 = 14x$

$\Rightarrow 4x = 240 \Rightarrow \boxed{x = 60}$

c) ii)



So P_B is better for $x < 60$.

d) i) $P_B(x+y) = 14(x+y) = 14x + 14y = P_B(x) + P_B(y)$, so $\boxed{\text{True}}$

ii) $P_A(40+20) = P_A(60) = 18 \cdot 60 - 240 = 1080 - 240 = 840$
$P_A(40) + P_A(20) = 12 \cdot 40 + 12 \cdot 20 = 480 + 240 = 720$
So we've found a <u>counterexample</u>, so $\boxed{\text{False}}$