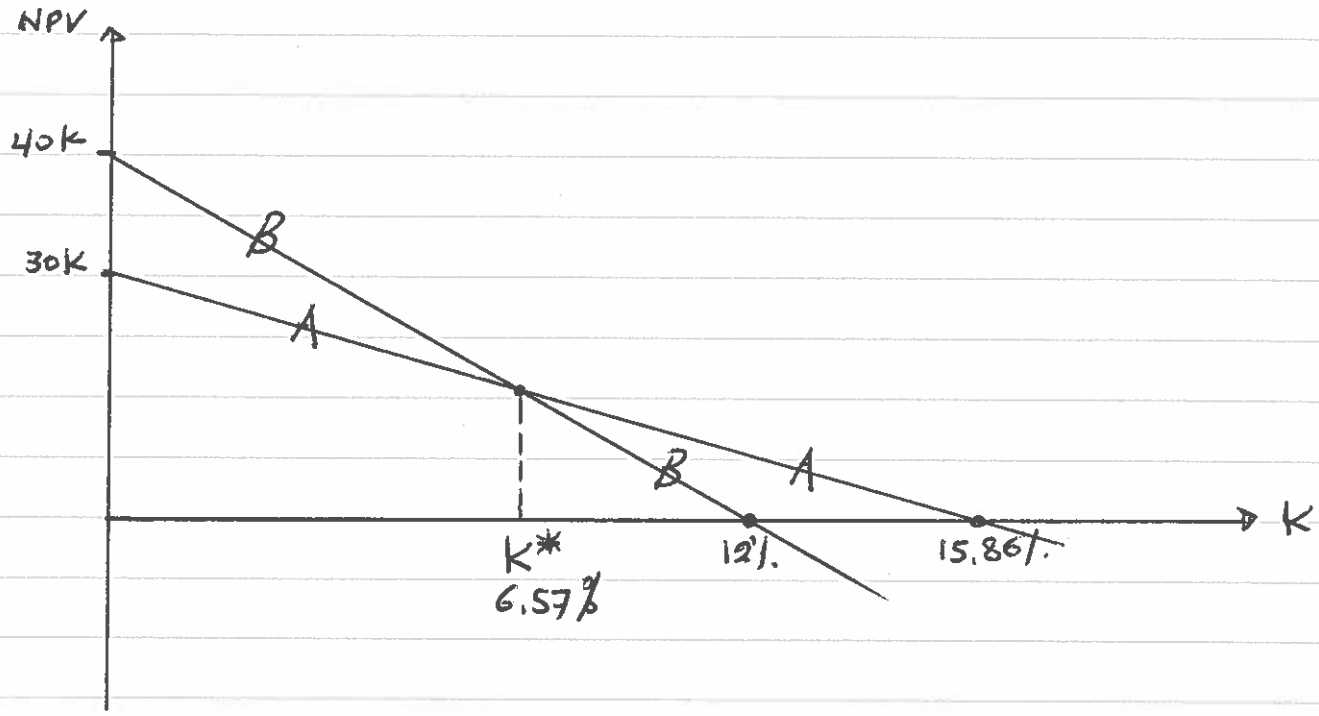
Solutions to additional Practice problems on chapter 13 (set 1)

1) a) b) Use your financial calculator to find a & b

Press [CF] [2nd] [CLR work] to clear the CF worksheet the initial CF_0 appears. Key in a value for CF_0 (-100,000) in this question, and press enter. To select an additional CF variable, press [↓], the CO_1 value appear and so on. Once all your CFs have been entered, press on [IRR] → [CPT]. It is that simple.

$IRR_A = 15.86\%$ & $IRR_B = 12\%$

c)



$$NPV_A = -100{,}000 + \frac{60{,}000}{1+k} + \frac{40{,}000}{(1+k)^2} + \frac{20{,}000}{(1+k)^3} + \frac{10{,}000}{(1+k)^4}$$

at $K = \phi$, the NPV profile crosses the NPV axis at

$-100{,}000 + 130{,}000 = \$30{,}000$

$$NPV_B = -110{,}000 + \frac{20{,}000}{1+k} + \frac{40{,}000}{(1+k)^2} + \frac{40{,}000}{(1+k)^3} + \frac{50{,}000}{(1+k)^4}$$

at $K = 0$, the NPV profile crosses the NPV axis at $40,000

To find K^* (the cross over rate), we set $NPV_A = NPV_B$ (algebra)

$$-100{,}000 + \frac{60{,}000}{1+K} + \frac{40{,}000}{(1+k)^2} + \frac{20{,}000}{(1+k)^3} + \frac{10{,}000}{(1+k)^4} = -110{,}00 + \frac{20k}{(1+k)} + \frac{40k}{(1+k)^2} + \frac{40k}{(1+k)^3} + \frac{50k}{(1+k)^4}$$

$\Rightarrow K^* = 6.57\%$.

Alternatively, we can set $NPV_{(B-A)} = 0$, we get the following

t	CF
0	-10,000
1	-40,000
2	∅
3	20,000
4	40,000

and the IRR for $NPV_{(B-A)}$ is nothing but K^*
using BA II PLUS, we get 6.57%

d) For all K_s less than K^* because for any value of K to the left of K^*, the $NPV_B > NPV_A$.

2) a) $PBP = 2 + \frac{10,000 - 7000}{5000} = 2 + \frac{3}{5} = \boxed{2.60 \text{ years}}$
or 2 years & 7.2 months.

b)

t	CF	DCF	
0	-10,000		-10,000
1	3000	$3000/1.10$	= 2727 +
2	4000	$4000/1.10^2$	= 3306 +
3	5000	$5000/1.10^3$	= 3757 + 9790
4	5000	$5000/1.10^4$	= 3415

$\therefore DPb = 3 + \frac{(10,000 - 9790)}{3415} = \boxed{3.06}$ years.

c) $NPV = \frac{3000}{1.10} + \frac{4000}{1.10^2} + \frac{5000}{1.10^3} + \frac{5000}{1.10^4} - 10,000$

$= \boxed{\$3204.70}$

d) Using BA II PLUS, $IRR = \boxed{22.77\%}$

e) $PI = \frac{NPV + I_0}{I_0} = \frac{3204.70 + 10,000}{10,000} = 1 + \frac{3204.70}{10,000}$

$= \boxed{1.32}$

3) Set $NPV_A = NPV_B$ & solve for the cross over rate (algebra)

$$\frac{15000}{k^*} - 100,000 = \frac{18,000}{k^*} - 150,000$$

$$\frac{3000}{k^*} = 50,000 \Rightarrow k^* = \boxed{6\%}$$

4) → Payback does not take into account time value of money.
→ payback does not take into account any CFs that occur after the payback period.

5)

t	CF	DCF		
0	-1000			
1	400	$400/1.10$	$= 364$	+
2	300	$300/(1.10)^2$	$= 248$	+
3	500	$500/(1.10^3)$	$= 376$	988
4	400	$400/(1.10)^4$	$= 273$	

$$DPB = 3 + \frac{1000 - 988}{273} = \boxed{3.04 \text{ years}}$$

$IRR = 21.22\%$

$$NPV = \frac{400}{1.10} + \frac{300}{1.10^2} + \frac{500}{1.10^3} + \frac{400}{1.10^4} - 1000 = \boxed{\$260} \text{ accept}$$

6) The IRR rule cannot be used in this case. We have to use the NPV rule instead.

7) C

8) $PI = 1 + \frac{NPV}{I_0}$

If $NPV > 0 \Rightarrow PI > 1.0$ then II true
If $NPV > 0 \Rightarrow I_0 < PV(\text{project})$ then III true

If NPV > 0, shareholders wealth goes up, ∴ IV true

ans: E