

9.

ANSWERS

1. a)

Machine A	Machine B
Payback period: 2,67 years or 2 years and 8 months	Payback period: 2,5 years or 2 years and 6 months

Workings

	Estimated Cash flows €		Estimated Cash flows €	
Year 1	70.000	} 2 years	70.000	} 2 years
Year 2	80.000		70.000	
Year 3	90.000	60*/90x12	80.000	40**/80x12
Year 4	90.000		80.000	

*210.000-(70.000+80.000)

**180.000-(70.000+70.000)

b) **Project B** should be undertaken *because it has a shorter payback period* 2 years and 6 months compared to Project A which has a payback period of 2 years and 8 months

Θα αναληφθεί το **Project B** γιατί έχει μικρότερη περίοδο αποπληρωμής.

Το **Project B** έχει περίοδο αποπληρωμής 2 έτη και 6 μήνες ενώ το

Project A έχει περίοδο αποπληρωμής 2 έτη και 8 μήνες.

3 (a) I.

Payback period		
YP 4,65 years Or 4 years and 7,8 months Ranking 3 (Σειρά κατάταξης)	WQ 2,72 years Or 2 years and 8,6 months 1	XR 3,74 years Or 3 years and 8,8 months 2

II. Accounting rate of return

$$\text{Μέση απόδοση (ARR)} = \frac{\text{Μέσα ετήσια μελλοντικά καθαρά κέρδη (Annual Average Profits)}}{\text{Αρχικό κόστος επένδυσης (Initial cost of investment)}}$$

Profits = Cash flows - Depreciation

$$\text{YP: } \text{ARR} = \frac{3.000}{68.000} \times 100 = 4,41\%$$

$$\text{WQ: } \text{ARR} = \frac{5.000}{68.000} \times 100 = 7,35\%$$

$$\text{XR: } \text{ARR} = \frac{3.250}{68.000} \times 100 = 4,78\%$$

Workings:

Annual profits	YP €	WQ €	XR €
Year 1	12.000 - 12.000* = 0	25.000 - 20.000* = 5.000	18.000 - 15.000* = 3.000
Year 2	10.000 - 12.000 = (2.000)	25.000 - 20.000 = 5.000	18.000 - 15.000 = 3.000
Year 3	15.000 - 12.000 = 3.000	25.000 - 20.000 = <u>5.000</u>	18.000 - 15.000 = 3.000
Year 4	18.000 - 12.000 = 6.000	Total 15.000	19.000 - 15.000 = <u>4.000</u>
Year 5	20.000 - 12.000 = <u>8.000</u> Total 15.000 Aver.15.000/5 = 3.000		Total 13.000 Aver.13.000/4 = 3.250
	*Annual Dep'n = 12.000 (68.000 - 8.000):5	*Annual Dep'n = 20.000 (68.000 - 8.000):3	*Annual Dep'n = 15.000 (68.000 - 8.000):4

3. III.

		YP		WQ		XR	
Year	8%	Net cash flow	Present Value	Net Cash flow	Present Value	Net Cash flow	Present Value
		€	€	€	€	€	€
0	1,00	(68.000)	(68.000)	(68.000)	(68.000)	(68.000)	(68.000)
1	0,926	12.000	11.112	25.000	23.150	18.000	16.668
2	0,857	10.000	8.570	25.000	21.425	18.000	15.426
3	0,794	15.000	11.910	33.000**	26.202	18.000	14.292
4	0,735	18.000	13.230	-	-	27.000***	19.845
5	0,681	28.000*	19.068	-	-		
NPV		(4.110)		2.777		(1.769)	

*20.000 + 8.000

**25.000 + 8.000

***19.000 + 8.000

(b) Project WQ is the project with the fastest payback period, is the only project which gives a positive NPV and it has the highest ARR so it should be the project chosen

Θα επιλεγεί το Project WQ γιατί είναι το έργο με την ταχύτερη περίοδο επανείσπραξης, είναι το μόνο έργο που δίνει θετική καθαρή παρούσα αξία (NPV) και έχει την υψηλότερη μέση απόδοση (ARR).

4 a.

Year	Net Cash flows* €	Discount factor	Present value €
0 (now)	(12.000)	1,000	(12.000)
1	8.000 - 4.000 = 4000	0,909	3.636
2	8.500 - 5.000 = 3.500	0,826	2.891
3	7.000 - 4.000 = 3.000	0,751	2.253
4	5.000 - 3.000 = 2.000	0,683	1.366
5	3.000 - 1.000 = 2.000	0,621	1.242
		Net Present Value	(612)

* The cash inflows are calculated from the revenue receipts less revenue expenditure.

b. Doros **should not** invest in the new machine as it will yield a **negative Net Present Value**.

Ο Δώρος δεν θα πρέπει να επενδύσει στο νέο μηχάνημα, γιατί η Καθαρή παρούσα αξία είναι αρνητική (χαμηλότερη του μηδέν).

5 a.

		A		B		C	
Year	9%	Net cash flow	Present Value	Net Cash flow	Present Value	Net Cash flow	Present Value
		€	€	€	€	€	€
0	1,00	(88.000)	(88.000)	(99.000)	(99.000)	(115.000)	(115.000)
1	0,917	44.000	40.348	47.000	43.099	50.000	45.850
2	0,842	44.000	37.048	47.000	39.574	49.000	41.258
3	0,772	40.000	30.880	47.000	36.284	48.000	37.056
4	0,708	40.000	28.320	45.000	31.860	44.000	31.152
NPV		48.596		51.817		40.316	

b. The managers should purchase machine B because it gives the highest positive NPV

Οι διευθυντές πρέπει να αγοράσουν το μηχάνημα Β επειδή δίνει την υψηλότερη θετική Καθαρή παρούσα αξία (NPV).

6.

Year	10%	Net cash flow	Net Present Value (positive)	30%	Net Cash flow	Present Value
		€	€		€	€
0	1,000	(700.000)	(700.000)	1,000	(700.000)	(700.000)
1	0,909	350.000	318.150	0,769	350.000	269.150
2	0,826	220.000	181.720	0,592	220.000	130.240
3	0,751	190.000	142.690	0,455	190.000	86.450
4	0,683	120.000	81.960	0,350	120.000	42.000
5.	0,621	100.000	62.100	0,269	100.000	26.900
5.	0,621	100.000*	62.100	0,269	100.000*	26.900
NPV		148.720		(118.360)		

*scrap value

a. Net Present value €148.720

b. Payback period: 2,68 years or 2 years and 8,2 months*

*130/190 x 12

c. $IRR = A + \left[\frac{a}{a-b} \times (B - A) \right]$

A = 10%

α = Θετική Καθαρή Παρούσα Αξία (148.720 ευρώ)

B = 30%

β = Αρνητική Καθαρή Παρούσα Αξία (118.360 ευρώ)

$$IRR = 10\% + \left[\frac{148.720}{148.720 + 118.360} \times (30\% - 10\%) \right]$$

$$IRR = 10\% + [0,5568 \times (30\% - 10\%)]$$

IRR = 21, 14%

d.

	Net Cash flows- Dep'n	Profits
1	350.000 - 120.000	230.000
2	220.000 - 120.000	100.000
3	190.000 - 120.000	70.000
4	120.000 - 120.000	0
5.	200.000 - 120.000	80.000
Total profits		480.000
Average profits: 480.000:5		96.000

Annual depreciation* = (700.000 - 100.000):5 years = 120.000

*Depreciation is calculated using the straight line method

$$ARR = \frac{\text{Annual Average Profits}}{\text{Initial cost of investment}} \times 100 = \frac{96.000}{700.000} \times 100 = 13,71\%$$