Exercise 8.1

a. (workings in $1,000)

		1	2	3	4
Sales		4,000	4,000	4,000	4,000
Variable costs		(3,100)	(3,100)	(3,100)	(3,100)
Rent		(100)	(100)	(100)	(100)
Advertising		(40)	(40)	(40)	(40)
Campaign	(1,200)				
Sell license	75				
Fixed assets	(600)				200
Cash flow	(1,725)	760	760	760	960
Present value	(1,725)	690.9	628.1	571	655.7

b. Payback = 1,725/760 = 2.27 years.

c.

Annual depreciation = (1,725 – 200)/4 = 381.25. Average profit 760 – 381.25 = 378.75. Average investment = (1,725 + 200)/2 = 962.5.

AAR = 378.75/962.5 = 39.4%.

d.

(1,725)+ 690.9 + 628.1 + 571 + 655.7 = 820.7.

e.

IRR must be higher than 10%. At 29% NPV is still positive (+21.6). At 30% NPV becomes negative (-8.6).

Exercise 8.2

a. Change of cash flows ($1,000)

	0	1	2	3	4	5
Material		40	40	40	40	40
Labor		120	120	120	120	120
Variable		50	50	50	50	50
Insurance		(9)	(9)	(9)	(9)	(9)
Maintenance		(20)	(20)	(20)	(20)	(20)
New equipment	(700)					100
Training	(15)					
Sale old equipment	50					
Total	(665)	181	181	181	181	281

b.

After three years the cumulative cash flows total $543,000. That's still $122,000 below the initial investment. It will take $122,000/$181,000 = 0.67 years to recover this amount. The payback period is 3.67 years.

c.

The Total profit = 4*$181,000 + $281,000 - $665,000 = $340,000.

Average profit per year = $340,000/5 = $68,000.

The average investment in this project is ($665,000 + $100,000) / 2 =$382,500.

The AAR than is $68,000 / $382,500 = 17.8%.

d.

The NPV is ($1,000):

$-665 + 181/(1.10) + 181/(1.10)^2 + 181/(1.10)^3 + 181/(1.10)^4 + 281/(1.10)^5 = 83.224.$