Exercise 13-1 (10 minutes)

1.

Item	*Year(s)*	*Cash Flow*	*12% Factor*	*Present Value of Cash Flows*
Annual cost savings..	1-10	$4,000	5.650	$ 22,600
Initial investment	Now	$(25,000)	1.000	(25,000)
Net present value.....				$ (2,400)

2.

Item	*Cash Flow*	*Years*	*Total Cash Flows*
Annual cost savings..	$4,000	10	$ 40,000
Initial investment	$(25,000)	1	(25,000)
Net cash flow			$ 15,000

Exercise 13-2 (30 minutes)

1. Annual savings over present method of delivery $5,400
   Added contribution margin from expanded deliveries
   (1,800 pizzas × $2 per pizza) 3,600
   Annual cash inflows..... $9,000

2. $$\text{Factor of the internal rate of return} = \frac{\text{Investment required}}{\text{Annual cash inflow}}$$

$$= \frac{\$45,000}{\$9,000} = 5.000$$

Looking in Exhibit 13B-2, and scanning along the six-year line, we can see that the factor computed above, 5.000, is closest to 5.076, the factor for the 5% rate of return. Therefore, to the nearest whole percent, the internal rate of return is 5%.

3. The cash flows are not even over the six-year life of the truck because of the extra $13,000 cash inflow that occurs in the sixth year. Therefore, the approach used above cannot be used to compute the internal rate of return. Using trial-and-error or some other method, the internal rate of return turns out to be about 11%:

	Year(s)	*Amount of Cash Flows*	*11% Factor*	*Present Value of Cash Flows*
Initial investment	Now	$(45,000)	1.000	$(45,000)
Annual cash inflows..	1-6	$9,000	4.231	38,079
Salvage value	6	$13,000	0.535	6,955
Net present value.....				$ 34

As expected, the extra cash inflow in the sixth year increases the internal rate of return.

Exercise 13-3 (15 minutes)

The equipment's net present value without considering the intangible benefits would be:

Item	*Year(s)*	*Amount of Cash Flows*	*15% Factor*	*Present Value of Cash Flows*
Cost of the equipment…	Now	$(750,000)	1.000	$(750,000)
Annual cash savings…...	1-10	$100,000	5.019	501,900
Net present value……...				$(248,100)

The annual value of the intangible benefits would have to be large enough to offset the $248,100 negative present value for the equipment. This annual value can be computed as follows:

$$\frac{\text{Required increase in present value}}{\text{Factor for 10 years}} = \frac{\$248,100}{5.019} = \$49,432$$

Exercise 13-4 (10 minutes)

1. The project profitability index for each proposal is:

Proposal	*Net Present Value (a)*	*Investment Required (b)*	*Project Profitability Index (a) ÷ (b)*
A	$34,000	$85,000	0.40
B	$50,000	$200,000	0.25
C	$45,000	$90,000	0.50
D	$51,000	$170,000	0.30

2. The ranking is:

Proposal	*Project Profitability Index*
C	0.50
A	0.40
D	0.30
B	0.25

Note that proposals D and B have the highest net present values of the four proposals, but they rank at the bottom of the list in terms of the project profitability index.