Ch. 1: 1

With respect to the selection of alternatives, state one thing that engineering economy will help you to do and one thing that it will not.

Engineering economy will help me decide what the most economically viable investment is. It will not help me decide how different investments will interact with each other.

6

*What is meant by the term **intangible factors**?*

Intangible factors are non-economic, and can be hard to quantify. Some examples are: goodwill, convenience, friendship and morale.

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When an interest rate, such as 3%, does not include the time period, the time period is assumed to be what?

1 year.

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How many years would it take for an investment of $280,000 to accumulate to at least $425,000 at 15% per year interest?

Year	current value		amount earned	
0	280,000.00	=A3*(1.15)	--	--
1	322,000.00	=A4*(1.15)	$42,000.00	=A3*(0.15)
2	370,300.00	=A5*(1.15)	$48,300.00	=A4*(0.15)
3	**425,845.00**	**=A6*(1.15)**	$55,545.00	=A5*(0.15)

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A company that manufactures general-purpose transducers invested $2 million 4 years ago in high-yield junk bonds. If the bonds are now worth $2.8 million, what rate of return per year did the company make on the basis of (a) simple interest and (b) compound interest?

Simple Interest			**Compound Interest**		
Year	Value	Formula	Year	Value	Formula
0	$2,000,000	--	0	$2,000,000	--
1	--	--	1	$2,175,400	=E2*(1+$E$8)
2	--	--	2	$2,366,183	=E3*(1+$E$8)
3	--	--	3	$2,573,697	=E4*(1+$E$8)
4	$2,800,000	--	4	$2,799,410	=E5*(1+$E$8)
Rate	0.1	=(2.8 / 2 -1)/ 4		0.0877	

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Vision Technologies, Inc. is a small company that uses ultra-wideband technology to develop devices that can detect objects (including people) inside buildings, behind walls, or below ground. The company expects to spend $100,000 per year for labor and $125,000 per year for supplies before a product can be marketed. If the company wants to know the total equivalent future amount of the company's expenses at the end of 3 years at 15% per year interest, identify the engineering economy symbols involved and the values of the ones that are given.

P	--	
F	?	
A	($225,000)	
i	15%	
n	3	
$781,312.50	=FV(B4,B5,B3)	

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Construct a cash flow diagram for the following: $10,000 outflow at time zero, $3000 per year inflow in years 1 through 5 at an interest rate of 10% per year, and an unknown future amount in year 5.

	Cash Flow	Formula	Value	Formula
	-			
0	$10,000.00	-10000		
1	$3,000.00	3000		
2	$3,300.00	=B3*1.1		
3	$3,630.00	=B4*1.1		
4	$3,993.00	=B5*1.1		
5	$4,392.30	=B6*1.1	($34,420.40)	=FV(0.1,5,3000,10000)

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What are the values of the engineering economy symbols P, F, A, I, and n, in the following Excel functions? Use a "?" for the symbol that is to be determined.

a. FV(8%,10,2000,10000)
   Rate = i = 8%
   Nper = n = 10
   Pmt = A = 2000
   Pv = P = 10000

b. PMT(12%,30,16000)
   Rate = i = 12%
   Nper = n = 30
   Pv = P = 16000

c. PV(9%,15,1000,700)
   Rate = i = 9%
   Nper = n = 15
   Pmt = A = 1000
   Fv = F = 700