APPENDIX E

Time Value of Money

SOLUTIONS TO BRIEF EXERCISES

BRIEF EXERCISE E-1

(a) Interest = p X i X n
I = €9,000 X .05 X 15 years
I = €6,750

Accumulated amount = €9,000 + €6,750 = €15,750

(b) Future value factor for 15 periods at 5% is 2.07893 (from Table 1)

Accumulated amount = €9,000 X 2.07893 = €18,710.37

BRIEF EXERCISE E-2

(1)	**Case A**	**5%**	**3 periods**	**(2)**	**Case A**	**3%**	**8 periods**
	Case B	**6%**	**8 periods**		**Case B**	**4%**	**12 periods**

BRIEF EXERCISE E-3

FV = p X FV of 1 factor
= £8,400 X 1.36857
= £11,495.99

BRIEF EXERCISE E-4

FV of an annuity of 1 = p X FV of an annuity factor
= $60,000 X 16.86994
= $1,012,196.40

BRIEF EXERCISE E-5

FV = (p X FV of 1 factor) + (p X FV of an annuity factor)
= (€8,000 X 2.40662) + (€1,000 X 28.13238)
= €19,252.96+ €28,132.38
= €47,385.34

BRIEF EXERCISE E-6

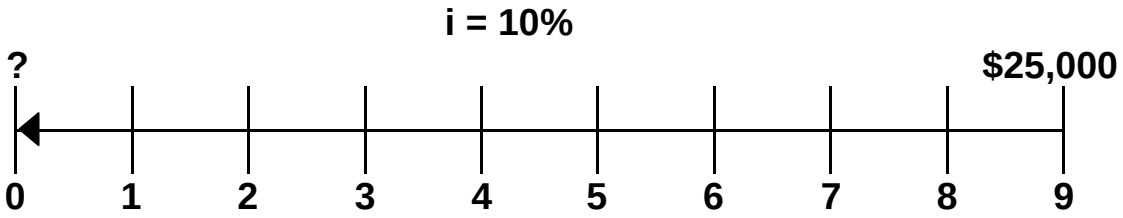
FV = p X FV of 1 factor
= $35,000 X 1.46933
= $51,426.55

BRIEF EXERCISE E-7

		(a)	(b)
(1)	CASE A	6%	14 periods
	CASE B	8%	11 periods
	CASE C	3%	16 periods
(2)	CASE A	10%	20 periods
	CASE B	10%	7 periods
	CASE C	4%	10 periods

BRIEF EXERCISE E-8

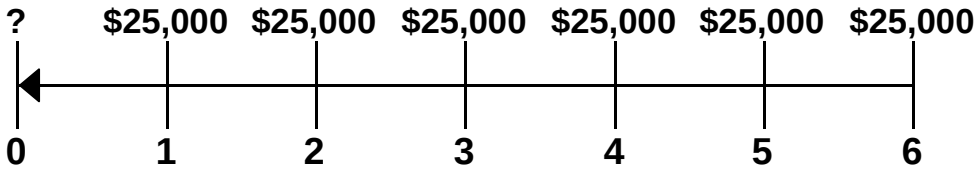
(a)



Discount rate from Table 3 is .42410 (9 periods at 10%). Present value of $25,000 to be received in 9 years discounted at 10% is therefore $10,602.50 ($25,000 X .42410).

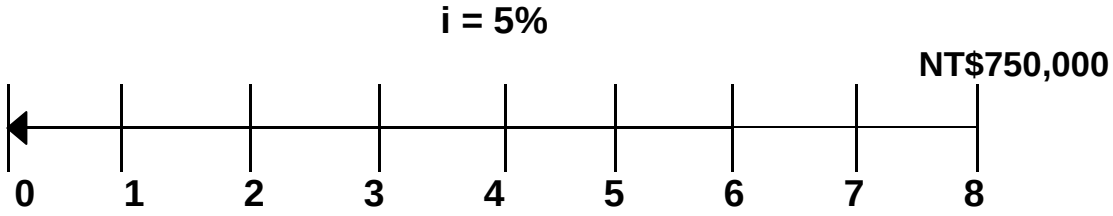
BRIEF EXERCISE E-8 (Continued)

(b) **i = 9%**



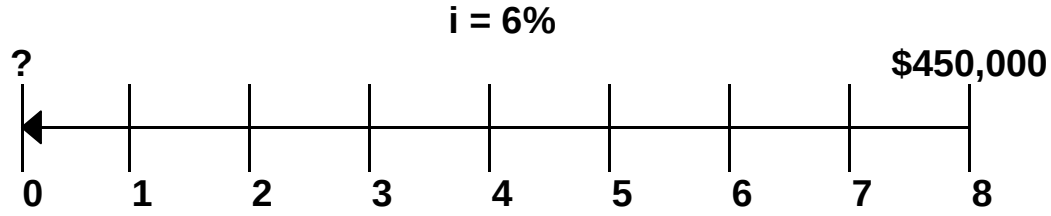
Discount rate from Table 4 is 4.48592 (6 periods at 9%). Present value of 6 payments of $25,000 each discounted at 9% is therefore $112,148.00 ($25,000 X 4.48592).

BRIEF EXERCISE E-9



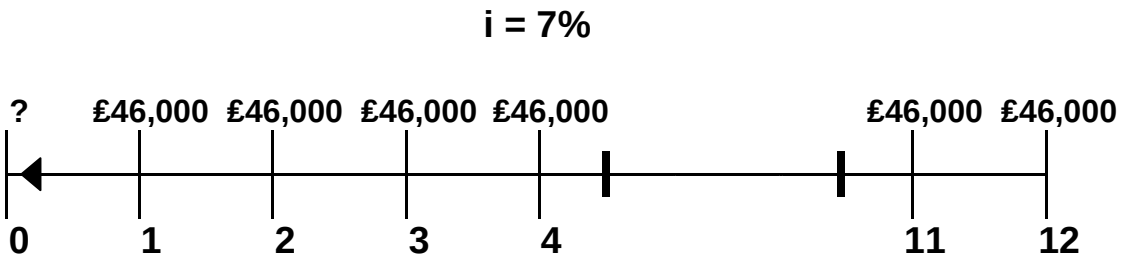
Discount rate from Table 3 is .67684 (8 periods at 5%). Present value of NT$750,000 to be received in 8 years discounted at 5% is therefore NT $507,630 (NT$750,000 X .67684). Pingtung Ltd. should therefore invest NT$507,630 to have NT$750,000 in eight years.

BRIEF EXERCISE E-10



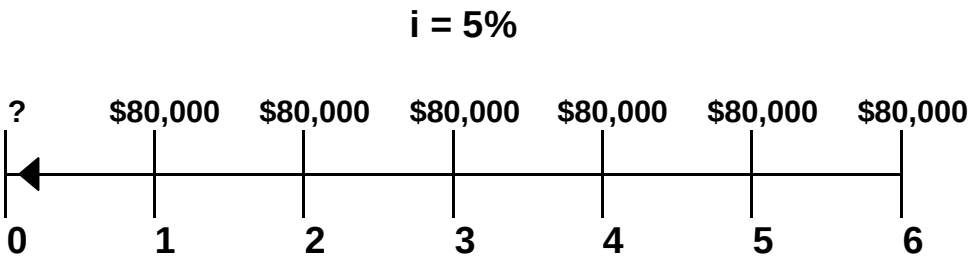
Discount rate from Table 3 is .62741 (8 periods at 6%). Present value of $450,000 to be received in 8 years discounted at 6% is therefore $282,334.50 ($450,000 X .62741). Lloyd Company should invest $282,334.50 to have $450,000 in eight years.

BRIEF EXERCISE E-11



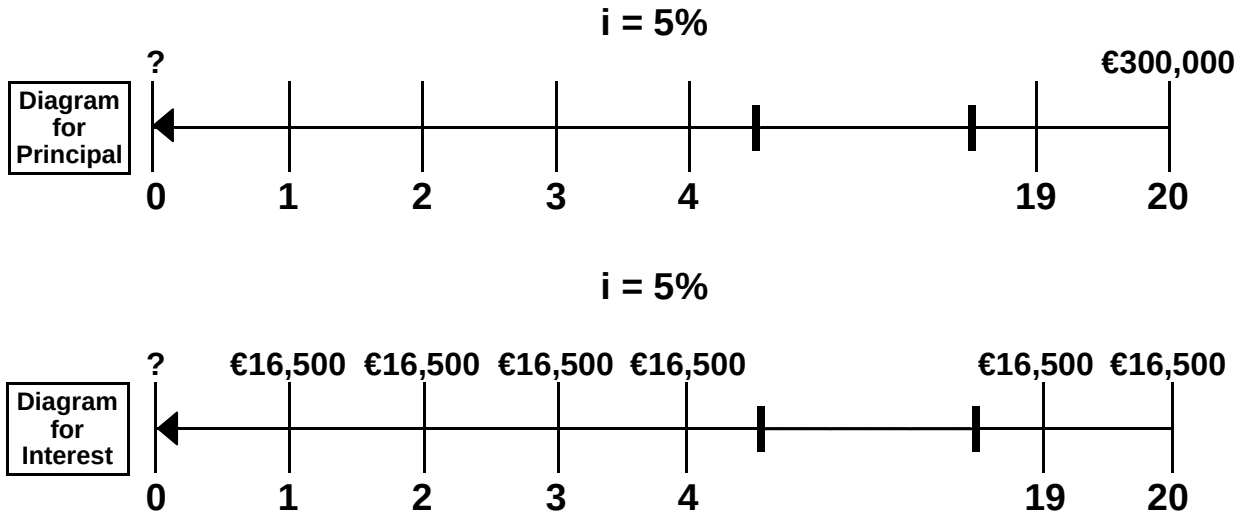
Discount rate from Table 4 is 7.94269. Present value of 12 payments of £46,000 each discounted at 7% is therefore £365,363.74 (£46,000 X 7.94269). Arthur Plc should pay £365,363.74 for this annuity contract.

BRIEF EXERCISE E-12



Discount rate from Table 4 is 5.07569. Present value of 6 payments of $80,000 each discounted at 5% is therefore $406,055.20 ($80,000 X 5.07569). Kaehler Enterprises invested $406,055.20 to earn $80,000 per year for six years.

BRIEF EXERCISE E-13



Present value of principal to be received at maturity:
€300,000 X 0.37689 (PV of 1 due in 20 periods at 5% from Table 3)..... €113,067
Present value of interest to be received periodically over the term of the bonds: €16,500* X 12.46221 (PV of 1 due each period for 20 periods at 5% from Table 4)..... 205,626**
Present value of bonds..... €318,693**

***€300,000 X .055**
****Rounded.**

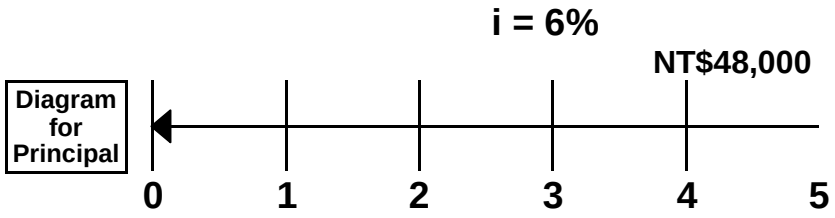
BRIEF EXERCISE E-14

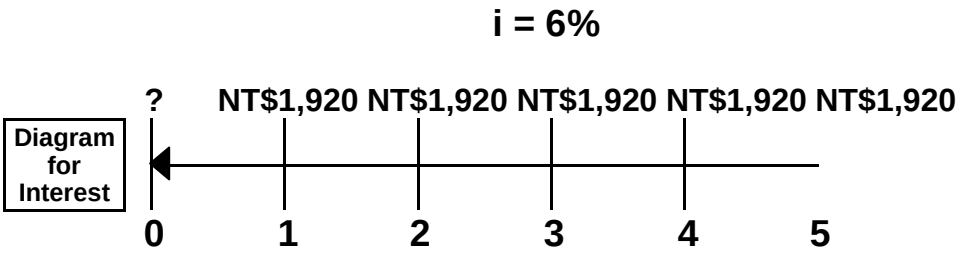
The bonds will sell at a discount (for less than $300,000). This may be proven as follows:

Present value of principal to be received at maturity:
$300,000 X .31180 (PV of 1 due in 20 periods at 6% from Table 3)..... $ 93,540
Present value of interest to be received periodically over the term of the bonds: $16,500 X 11.46992 (PV of 1 due each period for 20 periods at 6% from Table 4)..... 189,254*
Present value of bonds..... $282,794*

***Rounded.**

BRIEF EXERCISE E-15

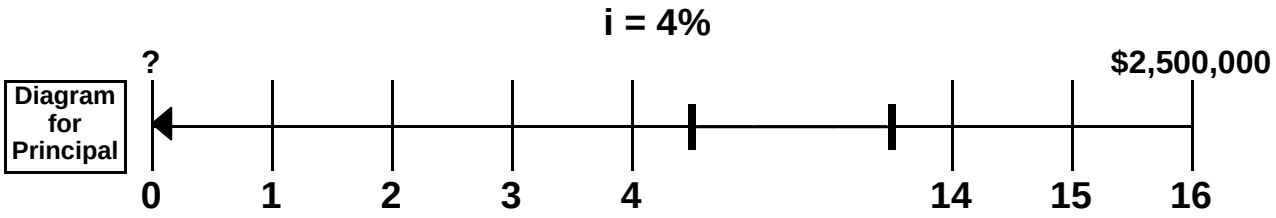


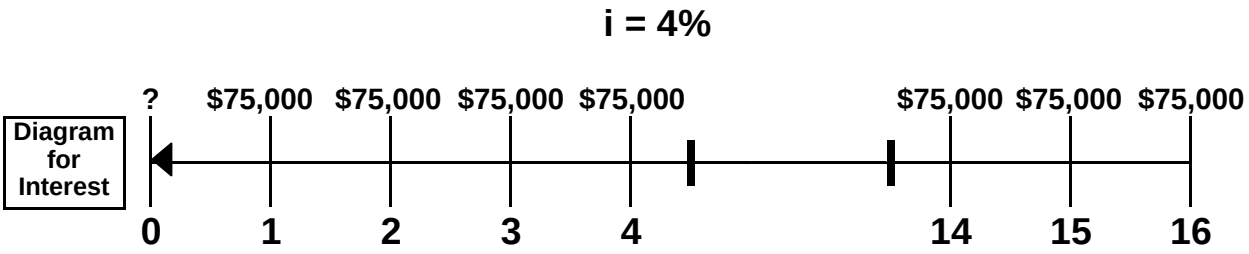


Present value of principal to be received at maturity:
NT$48,000 X .74726 (PV of 1 due in 5 periods at 6% from Table 3)..... NT$35,868.48
Present value of interest to be received annually over the term of the note: NT$1,920* X 4.21236 (PV of 1 due each period for 5 periods at 6% from Table 4)..... 8,087.73
Present value of note received..... NT$43,956.21

***NT$48,000 X .04**

BRIEF EXERCISE E-16

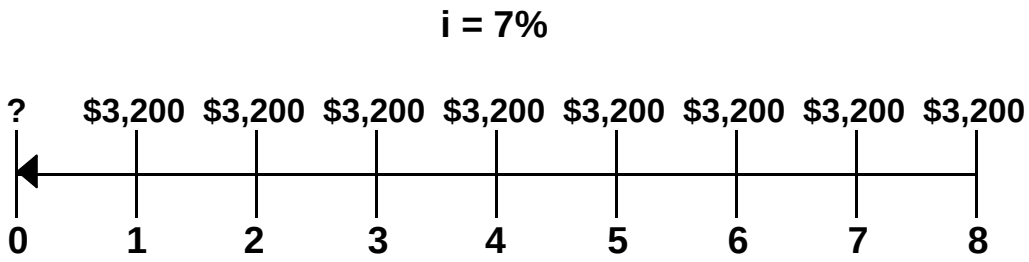




Present value of principal to be received at maturity:
$2,500,000 X 0.53391 (PV of 1 due in 16 periods at 4% from Table 3)..... $1,334,775
Present value of interest to be received periodically over the term of the bonds: $75,000* X 11.65230 (PV of 1 due each period for 16 periods at 4% from Table 4)..... 873,923**
Present value of bonds and cash proceeds..... $2,208,698**

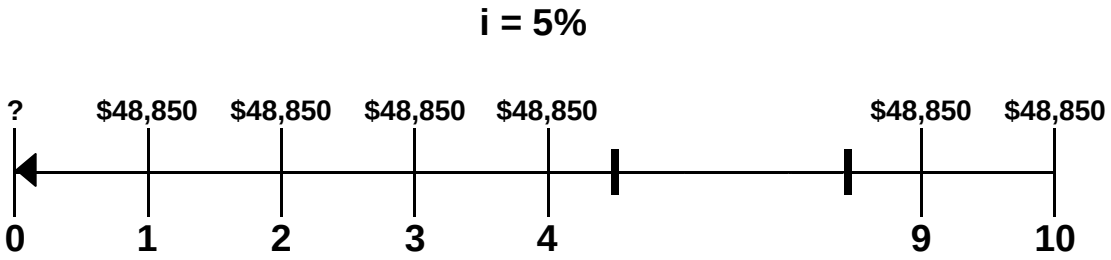
***($2,500,000 X .06 X 1/2)** ****Rounded**

BRIEF EXERCISE E-17



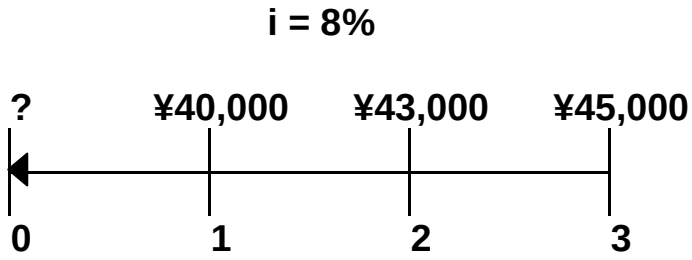
Discount rate from Table 4 is 5.97130. Present value of 8 payments of $3,200 each discounted at 7% is therefore $19,108.16 ($3,200 X 5.97130). Mark Barton should not purchase the tire retreading machine because the present value of the future cash flows is less than the $20,000 purchase price of the retreading machine.

BRIEF EXERCISE E-18



Discount rate from Table 4 is 7.72173. Present value of 10 payments of $48,850 each discounted at 5% is therefore $377,206.51 ($48,850 X 7.72173). Frazier Company should receive $377,206.51 from the issuance of the note.

BRIEF EXERCISE E-19

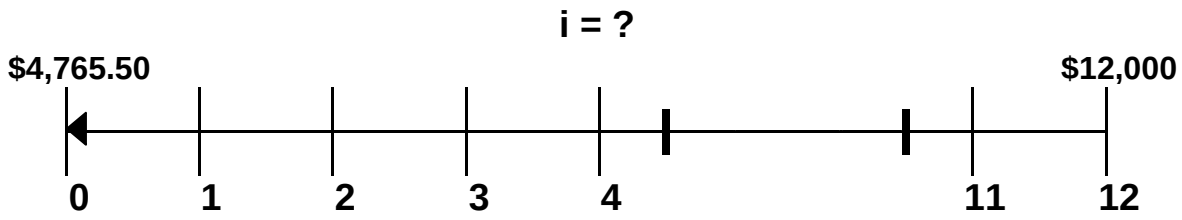


To determine the present value of the future cash inflows, discount the future cash flows at 8%, using Table 3.

Year 1 (¥40,000 X .92593) =	**¥ 37,037.20**
Year 2 (¥43,000 X .85734) =	**36,865.62**
Year 3 (¥45,000 X .79383) =	**35,722.35**
Present value of future cash inflows	**¥109,625.17**

To achieve a minimum rate of return of 8%, Wei Ltd. should pay no more than ¥109,625.17. If Wei pays less than ¥109,625.17, its rate of return will be greater than 8%.

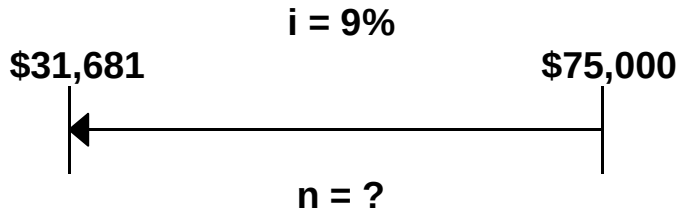
BRIEF EXERCISE E-20



Present value = Future value X Present value of 1 factor
$4,765.50 = $12,000 X Present value of 1 factor
Present value of 1 factor = $4,765.50 ÷ $12,000 = .39713

The .39713 for 12 periods approximates the value found in the 8% column (.39711). Colleen Mooney will receive an 8% return.

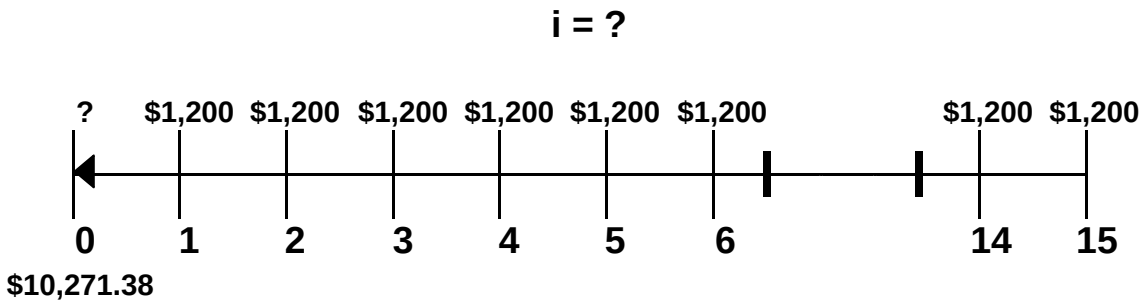
BRIEF EXERCISE E-21



Present value = Future value X Present value of 1 factor
$31,681 = $75,000 X Present value of 1 factor
Present value of 1 factor = $31,681 ÷ $75,000 = .4224

The .42241 at 9% is found in the 10 years row. Wayne Kurt therefore must wait 10 years to receive $75,000.

BRIEF EXERCISE E-22



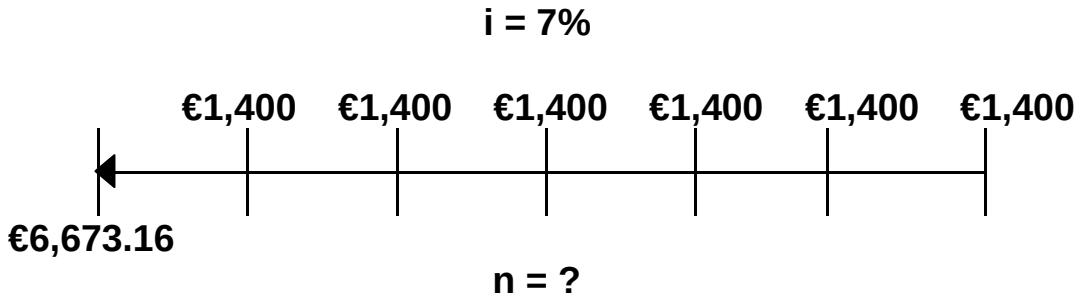
Present value = Future amount X Present value of an annuity factor

$10,271.38 = $1,200 X Present value of an annuity factor

Present value of an annuity factor = $10,271.38 ÷ $1,200 = 8.55948

The 8.55948 for 15 periods is found in the 8% column. Joanne Quick will therefore earn a rate of return of 8%.

BRIEF EXERCISE E-23



Present value = Future amount X Present value of an annuity factor

€6,673.16 = €1,400 X Present value of an annuity factor

Present value of an annuity factor = €6,673.16 ÷ €1,400 = 4.7665

The 4.76654 at an interest rate of 7% is shown in the 6-year row. Therefore, Patty will receive 6 payments.

BRIEF EXERCISE E-24

10*	?	–18,000	0	50,000
N	I/YR.	PV	PMT	FV
	10.76%			

*2027 – 2017

BRIEF EXERCISE E-25

8	?	66,000	–11,225	0
N	I/YR.	PV	PMT	FV
	7.40%			

BRIEF EXERCISE E-26

40	?	178,000*	–8,400	0
N	I/YR.	PV	PMT	FV
	3.55% (semiannual)			

*$198,000 – $20,000

BRIEF EXERCISE E-27

(a)

Inputs:	**7**	**5.4**	**?**	**–22,000**	**0**
	N	**I**	**PV**	**PMT**	**FV**
Answer:			**125,475.23**		

(b)

Inputs:	**10**	**8.65**	**?**	**14,000****	**200,000***
	N	**I**	**PV**	**PMT**	**FV**
Answer:			**–178,491.52**		

***200 X $1,000**

****$200,000 X .07**

BRIEF EXERCISE E-28

(a)

Note—set payments at 12 per year.

Inputs:	**96**	**7.8**	**42,000**	**?**	**0**
	N	**I**	**PV**	**PMT**	**FV**
Answer:				**–589.48**	

(b)

Note—set payments to 1 per year.

Inputs:	**5**	**7.25**	**8,000**	**?**	**0**
	N	**I**	**PV**	**PMT**	**FV**
Answer:				**–1,964.20**	