Paper: Odo.FinReg
Problem: Practice
Problem Type: Calculate PV(commuted claims), WITH risk margin

Notation: TMF = Total Margin Factor

Concept: TMF = (req'd margin) x (target cap to req'd *ratio*) x (risk cost of capital)

Given: All information is as at yr-end: 2015

undiscounted liabilities to be commuted:	3,000,000
risk-free rate:	1.0%
required margin:	15%
target capital to required ratio:	200%
risk cost of capital:	6%

calendar yr pmt patterns:

2016	20%
2017	30%
2018	75%
2019	100%

Assume: All pmts are made in the middle of the year

PV(**with** margin) = 3,079,215

PV(w/o margin):

that's why the exponents for the margin are integers

	% paid in year (1)	3,000,000 x (1) = (2)	# yrs to discount (3)	discount @ 1% (4)
2016	20%	600,000	0.5	597,022
2017	10%	300,000	1.5	295,556
2018	45%	1,350,000	2.5	1,316,832
2019	25%	750,000	3.5	724,330
				2,933,740

margin:

TMF = 1.80%

pmt rem @ beg yr (5)	TMF x (5) = (6)	# yrs to discount (7)	discount @ 1% (8)
3,000,000	54,000	1	53,465
2,400,000	43,200	2	42,349
2,100,000	37,800	3	36,688
750,000	13,500	4	12,973
			145,476

Note 1: The (# of yrs to discount) is DIFFERENT for calc'ing the PV(w/o margin) and the corresponding margin. Refer to columns (3) and (7).

Note 2: Think of (6) as the "cost of capital". The intermediate steps are:

req'd margin	=	(5) x req'd margin
target capital	=	(5) x req'd margin x (target capital to req'd RATIO)
cost of capital	=	(5) x req'd margin x (target capital to req'd RATIO) x risk cost of capital

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Given: All information is as at yr-end: 2014

undiscounted liabilities to be commuted:	3,000,000
risk-free rate:	2.0%
required margin:	10%
target capital to required ratio:	220%
risk cost of capital:	7%

calendar yr pmt patterns:

2015	10%
2016	20%
2017	70%
2018	100%

Assume: All pmts are made in the middle of the year

PV(**with** margin) = 2,988,439

PV(w/o margin):

that's why the exponents for the margin are integers

	% paid in year (1)	3,000,000 x (1) = (2)	# yrs to discount (3)	discount @ 2% (4)
2015	10%	300,000	0.5	297,044
2016	10%	300,000	1.5	291,220
2017	50%	1,500,000	2.5	1,427,548
2018	30%	900,000	3.5	839,734
				2,855,547

margin:

TMF = 1.54%

pmt rem @ beg yr (5)	TMF x (5) = (6)	# yrs to discount (7)	discount @ 2% (8)
3,000,000	46,200	1	45,294
2,700,000	41,580	2	39,965
2,400,000	36,960	3	34,828
900,000	13,860	4	12,804
			132,892

Note 1: The (# of yrs to discount) is DIFFERENT for calc'ing the PV(w/o margin) and the corresponding margin. Refer to columns (3) and (7).

Note 2: Think of (6) as the "cost of capital". The intermediate steps are:

req'd margin	=	(5) x req'd margin
target capital	=	(5) x req'd margin x (target capital to req'd RATIO)
cost of capital	=	(5) x req'd margin x (target capital to req'd RATIO) x risk cost of capital

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Concept: TMF = (req'd margin) x (target cap to req'd *ratio*) x (risk cost of capital)

Given: All information is as at yr-end: 2014

undiscounted liabilities to be commuted:	2,000,000
risk-free rate:	1.5%
required margin:	15%
target capital to required ratio:	210%
risk cost of capital:	9%

calendar yr payments:

2015	400,000
2016	300,000
2017	900,000
2018	400,000

Assume: All pmts are made in the middle of the year

PV(**with** margin) = 2,083,035

PV(w/o margin):

that's why the exponents for the margin are integers

margin:

TMF = 2.84%

	% paid in year (1)	CY pmts (2)	# yrs to discount (3)	discount @ 1.5% (4)	pmt rem @ beg yr (5)	TMF x (5) = (6)	# yrs to discount (7)	discount @ 1.5% (8)
2015	n/a	400,000	0.5	397,033	2,000,000	56,700	1	55,862
2016	n/a	300,000	1.5	293,374	1,600,000	45,360	2	44,029
2017	n/a	900,000	2.5	867,116	1,300,000	36,855	3	35,245
2018	n/a	400,000	3.5	379,690	400,000	11,340	4	10,684
				1,937,214				145,821

Note 1: The (# of yrs to discount) is DIFFERENT for calc'ing the PV(w/o margin) and the corresponding margin. Refer to columns (3) and (7).

Note 2: Think of (6) as the "cost of capital". The intermediate steps are:

req'd margin	=	(5) x req'd margin
target capital	=	(5) x req'd margin x (target capital to req'd RATIO)
cost of capital	=	(5) x req'd margin x (target capital to req'd RATIO) x risk cost of capital

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Concept: TMF = (req'd margin) x (target cap to req'd *ratio*) x (risk cost of capital)

Given: All information is as at yr-end: 2015

undiscounted liabilities to be commuted:	2,000,000
risk-free rate:	2.0%
required margin:	15%
target capital to required ratio:	170%
risk cost of capital:	12%

calendar yr payments:

2016	100,000
2017	600,000
2018	700,000
2019	600,000

Assume: All pmts are made in the middle of the year

PV(w/o margin):

that's why the exponents for the margin are integers

	% paid in year (1)	CY pmts (2)	# yrs to discount (3)	discount @ 2% (4)
2016	n/a	100,000	0.5	99,015
2017	n/a	600,000	1.5	582,440
2018	n/a	700,000	2.5	666,189
2019	n/a	600,000	3.5	559,823
				1,907,467

margin:

TMF = 3.06%

pmt rem @ beg yr (5)	TMF x (5) = (6)	# yrs to discount (7)	discount @ 2% (8)
2,000,000	61,200	1	60,000
1,900,000	58,140	2	55,882
1,300,000	39,780	3	37,486
600,000	18,360	4	16,962
			170,330

Note 1: The (# of yrs to discount) is DIFFERENT for calc'ing the PV(w/o margin) and the corresponding margin. Refer to columns (3) and (7).

Note 2: Think of (6) as the "cost of capital". The intermediate steps are:

req'd margin	=	(5) x req'd margin
target capital	=	(5) x req'd margin x (target capital to req'd RATIO)
cost of capital	=	(5) x req'd margin x (target capital to req'd RATIO) x risk cost of capital