

17. (2 points)

The following information is available for a property and casualty insurance company as at December 31, 2018.

Risk cost of capital	10%
Risk-free interest rate	2%
Required margin (as a percentage of claims liabilities)	15%
Target capital to required capital ratio	3.0
Undiscounted value of liabilities to be commuted	\$5,000,000

Calendar year liability payment pattern:

2019	50%
2020	30%
2021	20%

All claim payments are made mid-year.

Calculate the commuted value of claims as at December 31, 2018.

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QUESTION 17**TOTAL POINT VALUE: 2****LEARNING OBJECTIVE(S): C1****SAMPLE ANSWERS**Sample 1

Future cost by year:

2019	2020	2021
2,500,000	1,500,000	1,000,000

Duration: 0.5

1.5

2.5

$$PV = \frac{2.5M}{1.02^{0.5}} + \frac{1.5M}{1.02^{1.5}} + \frac{1M}{1.02^{2.5}} = 4,883,167$$

$$1.02^{0.5} \quad 1.02^{1.5} \quad 1.02^{2.5}$$

Remainder of undiscounted:

	2019	2020	2021
	5,000,000	2,500,000	1,000,000
Duration	1	2	3
Cost of Capital	10%		
Margin	15%		
Target	3		
	225,000	112,500	45,000

$$PV = \frac{225,000}{1.02^{0.5}} + \frac{112,500}{1.02^{1.5}} + \frac{45,000}{1.02^{2.5}} = 371,124.23$$

1.02 1.02² 1.02³

Total value of commuted claims: $4,883,167 + 371,124 = 5,254,291$

Sample 2

	1	2	3
5,000,000	2,500,000	1,500,000	1,000,000

PV = 4,883,167

5,000,000	2,500,000	1,000,000
x 0.1 x 3 x .15		
= 225,000	= 112,500	= 45,000

PV = 371,124

Total commuted value = 5,254,291

Sample 3

Commuted value of capital =

$$5,000,000 \left(\frac{0.5}{1.02^{0.5}} + \frac{0.3}{1.02^{1.5}} + \frac{0.2}{1.02^{2.5}} \right) + 5,000,000 * 10\% * 15\% * 3 * \left(\frac{1}{1.02^1} + \frac{0.5}{1.02^2} + \frac{0.2}{1.02^3} \right)$$

$$= 4,883,167.09 + 371,124.23 = 5,254,291.32$$

EXAMINER'S REPORT

Candidates were expected to use the information given to calculate the commuted value of claims.

Common errors included:

- Calculation errors
- Using the wrong discount rate to calculate the present value
- Not calculating the payment patterns correctly
- Using the wrong capital duration for the calculation of the risk margin