Model: 2017.Spring #19
Problem Type: Calculating the RBC charges (not the ratio)

Given

item	RBC charge
Investment income due and accrued	1,400
Federal income tax recoverable	2,200
Recoverable from parent, subsidiaries, or affiliates	4,200
Reinsurance recoverable	4,300
Reserve	29,500
Written premium	52,000
Cash and cash equivalents	9,500
Unaffiliated bond	26,100
Unaffiliated stocks	13,600
Real estate	6,000
Asset concentration	15,500
Other non-insurance subsidiaries	16,000
Investments in insurance affiliates	400

Non-Tabular Discount	9,900
Tabular Discount in Reserves	7,900

Find

     (a)   RBC total risk charge
     (b)   range of surplus corresponding to RAL *(Regulatory Action Level)*

Note   This question was ambiguous and many different solutions were accepted. My
answer corresponds to **Sample Answer 2** because that seemed the simplest. *(It might be
helpful also to spend a moment looking over the answers in the examiner's report.)*

Concept   You just have to figure out which risk category each RBC charge goes into. Then apply
the basic formula for the RBC charge.

Concept   It's straightforward except for 3 items:

           i   Reinsurance recoverable is split 50/50 between R_3 and R_4.

           ii   Asset concentration factor can be split in any proportion between R_1 and R_2.
                     (I chose 100% for R_2.)

           iii   Other non-insurance subsidiaries can go into either R_1 or R_2, depending on
                     whether it is considered a fixed-income or equity investment.

RBC Ratio   You cannot calculate the RBC Ratio because they don't provide TAC (Total Adjusted Capital)

Note   *This exam problem is outdated because it uses an earlier version of the RBC formula that
didn't include catastrophe or operational risk. For the purposes of this problem, make the
following assumptions:*

Rcat	=	0

operational risk	=	0

item	RBC charge	S R_0	F R_1	E R_2	C R_3	reserve R_4	NWP R_5
Investment income due and accrued	1,400				1.0		
Federal income tax recoverable	2,200				1.0		
Recoverable from parent, subsidiaries, or affiliates	4,200				1.0		
Reinsurance recoverable	4,300				0.5	0.5	
Reserve	29,500					1.0	
Written premium	52,000						1.0
Cash and cash equivalents	9,500		1.0				
Unaffiliated bond	26,100		1.0				
Unaffiliated stocks	13,600			1.0			
Real estate	6,000			1.0			
Asset concentration	15,500			1.0			
Other non-insurance subsidiaries	16,000		1.0				
Investments in insurance affiliates	400	1.0					
reasoning from Sample 2 from examiner's report ==>		400	51,600	35,100	9,950	31,650	52,000

sum check:	**180,700**
sum check:	180,700
difference:	0

RBC charge $= R_0 + [\, R_1{}^2 + R_2{}^2 + R_3{}^2 + R_4{}^2 + R_5{}^2 \,]^{0.5}$ =   **88,146** **<== final answer (part a)**

(sample answer #7 in examiner's report)

(part b)

Let NTD	= Non-Tabular DIscount	=	**9,900**	*(given)*
Let TD	= Tabular Dicsount	=	**7,900**	*(given)*

Required Facts:

* RAL corresponds to a range of 100-150% for the RBC ratio
* RBC Ratio = TAC / ACL   =   TAC / 44073   *(ACL = 50% of the RBC charge from part a)*
* TAC = PHS - NTD - TD   =   PHS - 17800

Then

100%	=	(PHS - 17800) / 44073	==>	PHS	=	61,873	**<== low end of range**
150%	=	(PHS - 17800) / 44073	==>	PHS	=	83,909	**<== high end of range**

Reading: Odomirok.19-RBC   (RBC (practice 02))   Practice 02 a-Question
Model: 2017.Spring #19
Problem Type: Calculating the RBC charges (not the ratio)

Given

item	RBC charge
Investment income due and accrued	2,700
Federal income tax recoverable	5,400
Recoverable from parent, subsidiaries, or affiliates	7,200
Reinsurance recoverable	8,900
Reserve	44,200
Written premium	16,300
Cash and cash equivalents	7,900
Unaffiliated bond	17,700
Unaffiliated stocks	9,400
Real estate	2,400
Asset concentration	5,800
Other non-insurance subsidiaries	13,800
Investments in insurance affiliates	800

Non-Tabular Discount	16,200
Tabular Discount in Reserves	5,800

Find   (a) RBC total risk charge
(b) range of surplus corresponding to RAL *(Regulatory Action Level)*

Note   This question was ambiguous and many different solutions were accepted. My
answer corresponds to **Sample Answer 2** because that seemed the simplest. *(It might be
helpful also to spend a moment looking over the answers in the examiner's report.)*

Concept   You just have to figure out which risk category each RBC charge goes into. Then apply
the basic formula for the RBC charge.

Concept   It's straightforward except for 3 items:

　　i   Reinsurance recoverable is split 50/50 between R_3 and R_4.

　　ii   Asset concentration factor can be split in any proportion between R_1 and R_2.
　　 (I chose 100% for R_2.)

　　iii   Other non-insurance subsidiaries can go into either R_1 or R_2, depending on
　　 whether it is considered a fixed-income or equity investment.

RBC Ratio   You cannot calculate the RBC Ratio because they don't provide TAC (Total Adjusted Capital)

Note   *This exam problem is outdated because it uses an earlier version of the RBC formula that
didn't include catastrophe or operational risk. For the purposes of this problem, make the
following assumptions:*

R_{cat}	=	0		operational risk	=	0

item	RBC charge	S R$_0$	F R$_1$	E R$_2$	C R$_3$	reserve R$_4$	NWP R$_5$
Investment income due and accrued	2,700				1.0		
Federal income tax recoverable	5,400				1.0		
Recoverable from parent, subsidiaries, or affiliates	7,200				1.0		
Reinsurance recoverable	8,900				0.5	0.5	
Reserve	44,200					1.0	
Written premium	16,300						1.0
Cash and cash equivalents	7,900		1.0				
Unaffiliated bond	17,700		1.0				
Unaffiliated stocks	9,400			1.0			
Real estate	2,400			1.0			
Asset concentration	5,800			1.0			
Other non-insurance subsidiaries	13,800		1.0				
Investments in insurance affiliates	800	1.0					
reasoning from Sample 2 from examiner's report ==>		800	39,400	17,600	19,750	48,650	16,300

sum check:	**142,500**
sum check:	142,500
difference:	0

RBC charge = $R_0 + [R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2]^{0.5}$ =   70,691   **<== final answer (part a)**

(sample answer #7 in examiner's report)

(part b)

Let NTD	= Non-Tabular DIscount	=	**16,200**	*(given)*
Let TD	= Tabular Dicsount	=	**5,800**	*(given)*

Required Facts:

* RAL corresponds to a range of 100-150% for the RBC ratio
* RBC Ratio = TAC / ACL   =   TAC / 35345 *(ACL = 50% of the RBC charge from part a)*
* TAC = PHS - NTD - TD   =   PHS - 22000

Then

100%	=	(PHS - 22000) / 35345	==>	PHS	=	57,345	**<== low end of range**
150%	=	(PHS - 22000) / 35345	==>	PHS	=	75,018	**<== high end of range**