Reading: Odomirok.19-RBC (RBC (practice 01)) 01a-Question
Model: 2017.Spring #19
Problem Type: Calculating the RBC charges (not the ratio)

Given

item	RBC charge
Investment income due and accrued	1,000
Federal income tax recoverable	3,600
Recoverable from parent, subsidiaries, or affiliates	3,400
Reinsurance recoverable	7,400
Reserve	35,800
Written premium	41,400
Cash and cash equivalents	5,700
Unaffiliated bonds	28,500
Unaffiliated stocks	10,100
Real estate	4,600
Asset concentration	5,900
Other non-insurance subsidiaries	17,900
Investments in insurance affiliates	1,000

Non-Tabular Discount	5,900
Tabular Discount in Reserves	8,300

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)

		A	F	E	C	reserve	NWP
item	**RBC charge**	R_0	R_1	R_2	R_3	R_4	R_5
Investment income due and accrued	1,000				1.0		
Federal income tax recoverable	3,600				1.0		
Recoverable from parent, subsidiaries, or affiliates	3,400				1.0		
Reinsurance recoverable	7,400				0.5	0.5	
Reserve	35,800					1.0	
Written premium	41,400						1.0
Cash and cash equivalents	5,700		1.0				
Unaffiliated bond	28,500		1.0				
Unaffiliated stocks	10,100			1.0			
Real estate	4,600			1.0			
Asset concentration	5,900			1.0			
Other non-insurance subsidiaries	17,900		1.0				
Investments in insurance affiliates	1,000	1.0					
reasoning from Sample 2 from examiner's report ==>		1,000	52,100	20,600	11,700	39,500	41,400

sum check:	**166,300**
sum check:	166,300
difference:	0

RBC charge = $R_0 + [\ R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2\ ]^{0.5}$ = 81,931 **<== final answer (part a)**

(sample answer #7 in examiner's report)

(part b)

Let NTB = Non-Tabular DIscount = **5,900** *(given)*

Let TB = Tabular Dicsount = **8,300** *(given)*

Required Facts:

* RAL corresponds to a range of 100-150% for the RBC ratio
* RBC Ratio = TAC / ACL = TAC / 40966 *(ACL = 50% of the RBC charge from part a)*
* TAC = PHS - NTB - TB = PHS - 14200

Then

100%	=	(PHS - 14200) / 40966	==>	PHS	=	55,166	**<== low end of range**
150%	=	(PHS - 14200) / 40966	==>	PHS	=	75,648	**<== high end of range**

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

Given

item	RBC charge
Investment income due and accrued	1,600
Federal income tax recoverable	2,000
Recoverable from parent, subsidiaries, or affiliates	8,000
Reinsurance recoverable	11,400
Reserve	36,100
Written premium	53,400
Cash and cash equivalents	8,900
Unaffiliated bonds	14,700
Unaffiliated stocks	13,500
Real estate	4,500
Asset concentration	16,600
Other non-insurance subsidiaries	19,200
Investments in insurance affiliates	500

Non-Tabular Discount	13,800
Tabular Discount in Reserves	5,500

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.

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

		A	F	E	C	reserve	NWP
item	**RBC charge**	R_0	R_1	R_2	R_3	R_4	R_5
Investment income due and accrued	1,600				1.0		
Federal income tax recoverable	2,000				1.0		
Recoverable from parent, subsidiaries, or affiliates	8,000				1.0		
Reinsurance recoverable	11,400				0.5	0.5	
Reserve	36,100					1.0	
Written premium	53,400						1.0
Cash and cash equivalents	8,900		1.0				
Unaffiliated bond	14,700		1.0				
Unaffiliated stocks	13,500			1.0			
Real estate	4,500			1.0			
Asset concentration	16,600			1.0			
Other non-insurance subsidiaries	19,200		1.0				
Investments in insurance affiliates	500	1.0					
reasoning from Sample 2 from examiner's report ==>		500	42,800	34,600	17,300	41,800	53,400

sum check:	**190,400**
sum check:	190,400
difference:	0

RBC charge = $R_0 + [\ R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2\ ]^{0.5}$ = 89,534 **<== final answer (part a)**

(sample answer #7 in examiner's report)

(part b)

Let NTB = Non-Tabular DIscount = **13,800** *(given)*

Let TB = Tabular Dicsount = **5,500** *(given)*

Required Facts:

* RAL corresponds to a range of 100-150% for the RBC ratio
* RBC Ratio = TAC / ACL = TAC / 44767 *(ACL = 50% of the RBC charge from part a)*
* TAC = PHS - NTB - TB = PHS - 19300

Then

100%	=	(PHS - 19300) / 44767	==>	PHS	=	64,067	**<== low end of range**
150%	=	(PHS - 19300) / 44767	==>	PHS	=	86,451	**<== high end of range**