Reading: Odomirok.19-RBC (RBC - 2015.Fall Q17) a-Question
Model: 2015.Fall #17
Problem Type: Calculate RBC charge R_1.

Given

#	Unaffiliated Bonds NAIC Class 02	Unaffiliated Common Stock	Assets subject to Asset Concentration
1	5,000	2,000	7,000
2	4,500		4,500
3	4,000	250	4,250
4	4,000		4,000
5		2,000	2,000
6		1,500	1,500
7	1,000	300	1,300
8		1,250	1,250
9	500	700	1,200
10		900	900
11	550	200	750
12	600		600
	20,150	**9,100**	**29,250**

Notation	
basic	basic R_1 charge
BSC	Bond **Size** Charge
BSF	*Bond **Size** Factor*
ACC	Asset Contentration Charge
R_1 =	basic + BSC + ACC

* Issuers are **sorted** from largest to smallest.

Bond Size Adjustment Factor WEIGHTS

bond count	# issuers	weights
1-50	8	2.5
51-100	0	1.3
101-400	0	1.0
> 400	0	0.9

* BSF = sumproduct(issuers, weights) / sum(issuers) - 1
(shout-out to AT!)

RBC Factors by Asset Category

Asset Category	RBC Factor
Unaffiliated Bonds Class 02	0.01
Unaffiliated Common Stock	0.15

Find Calculate the RBC charge R_1.

R1	=	basic	+	BSC	+	ACC
	=	202	+	302	+	190
	=	694	**<== final answer**			

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basic = **SUM over n:** [(total fixed income assets of category i) x (RBC factor for category i)]

= (total bonds of class 02) x (RBC factor for class 02)

= 20,150 x 0.01

= 202

BSC = BSF x basic

= 1.5 x 201.5

= 302

ACC = (total bonds from TOP 10 issuers) x (RBC factor)

= 19,000 x 0.01

= 190

Notes on the BSF term (Bond Size Factor)

==> Since we have at most 12 issuers in this problem, BSF always equals 1.5
==> In general BSF = sumproduct(# issuers, weights) / sum(# issuers) - 1
==> if (bond count) > 1300 then the portfolio will receive a discount to their RBC charge for bonds
(shout-out to AT!)
==> BSF decreases as *bond count* increases