20. (6 points)

The following information is provided for a stand-alone U.S. property and casualty insurance company that writes only two lines of business, medical malpractice (MM) and workers' compensation (WC), on a direct basis (all figures are in thousands of dollars).

Line of Business	Direct & Assumed Written Premium				Ceded Written Premium			
	2008	2009	2010	2011	2008	2009	2010	2011
MM	1,000	1,250	1,500	1,800	50	62.5	75	80
WC	500	625	750	900	0	0	0	0
Total	1,500	1,875	2,250	2,700	50	62.5	75	80

- 75% of MM net written premium is written on a claims-made basis.
- 50% of WC net written premium meets the NAIC definition of loss-sensitive contracts.

Risk Based Capital (RBC) input items and values:

	WC	MM
Company 10- year Average Loss and LAE Ratio	87%	72%
Industry 10- year Average Loss and LAE Ratio	80%	74%
Industry Worst Case Loss and LAE Ratio	104%	93%
Adjustment for Investment Income	0.89	0.81

	Total
Company Expense Ratio (All Lines Combined)	27%
2011 Policyholder Surplus (in thousands)	1,000

a. (4.25 points)

Determine the written premium RBC charge (in dollars) after application of the loss-sensitive discount, claims-made discount and premium concentration factor.

b. (0.75 point)

Calculate IRIS Ratio 3 (change in net written premium) and determine whether the result is in the range of usual values.

c. (1 point)

With respect to the treatment of premium, briefly describe two differences between IRIS Ratio 3 and the RBC growth charge.

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20) Sample Answer

Part A

Answer 1

Basic charge WC = $avg\left(1.04, 1.04\left(.\frac{87}{.80}\right)\right)(.89) + .27 - 1 = .2361$

Basic charge MM = $avg\left(.93, .93\left(.\frac{72}{.74}\right)\right)(.81) + .21 - 1 = .0131$

Initial charge = $(.2361)(900\text{K}) + (.0131)(1800\text{K} - 80\text{K}) = 235022$

Loss sensitive discount = $(.30)(.50)(.2361)(900K) = 31874$

CM Discount = $(.2)(.75)(.0131)(1800K - 80K) = 3380$

PCF = $.70 + .30\left(\frac{1800-80}{2700-80}\right) = .8969$

$$R_5 = (235022 - 31874 - 3380)(.8969) = 179172$$

Answer 2

	medical malpractice	workers compensation
1) Industry woste case	93%	104%
2) Company difference	$\frac{.72}{.74} = 0.973$	$\frac{.87}{.80} = 1.0855$
3) Company won't case	$\frac{0.93+0.973(0.93)}{2} = 0.917$	$\frac{1.04+1.0815(1.04)}{2} = 1.0855$
4) Inv. Inc. adjustment	0.81(0.917)=0.743	0.89(1.0855)=0.966
5) Company expenses	0.27	0.27
6) Combined ratio	1.013	1.236
7) Basic charge	(1800-80)(1.013-1)=22.36	900(1.236-1)=212.4
8) Loss sensitive	0	0.3(0.5)(20.4)=31.86
9) Claims made	(0.75)(0.2)(22.36)=3.354	0
10) Total	19.006	180.54

-> total = 199.546

Premium correction factor=$0.7 + 0.3\frac{1720}{2620} = 0.897$

Total = $178,982

Answer 3

WC = $\left[\frac{1}{2}(\frac{.87}{.80} + 1)x1.04x0.89 + 0.27 - 1\right]x(0.5 + 0.5x0.7)x(900)$

= 0.2x900

=180

MM = $\left[\frac{1}{2}\left(\frac{.72}{.74} + 1\right)x0.93x0.81 + 0.27 - 1\right]x(0.25 + 0.75x0.8)x(1800 - 80)$

= 0.011 x 1720 = 19

Total = (180+19)x(0.7+0.3x1720/1720+900)

= 178

Answer 4

	WC	MM	total
1) Co Avg L & LAE	.87	.72	
2) Industry Avg	80%	74%	
3) Industry worst	104%	93%	

4) {(1)/(2)x(3)+(3)}x0.5   1.0855   .91743
5) Investment Income   .89   .81
6) {(4) x(5)}+(Co U/W Exp .27)   1.236095   1.0131207
7) NWP   900   1720   2680
8) Initial Charge {(6) – 1} x (7)   212.485522.56686
9) % CM   0.75
10) CM Discount {(9)x0.2}*(8)   0   3.385
11) % Loss   50%   0
12) {(11) x 0.3}x(9)   31.872825   0
13) (8)-(10)-(12)   180.01207   19.1818   199.7945
14) PremConc (1720/2620)   .65640
15) 0.7 + {0.3 x (14)}   .8969465
16) Charge {(13) x (15)}   179.205

Part B
Answer 1

- $\frac{(2700-80)-(2250-75)}{2250-75} = 20.5\% < 33\%$
  Moves in the usual range.

Answer 2

- ratio = $\frac{(2700-80)-(2250-75)}{2250-75} = .2046$
  Yes; range of usual values: -33% to 33%

Part C (each difference listed was worth 0.5 point and only one difference from each category was accepted)

Premium

- "R3 uses net premium; RBC growth charge uses gross premium"
- "RBC growth use direct & assumed prem. IRIS uses net."

Company

- "R3 based on total premium of a company; RBC charge based on total premium of entire group"
- "RBC growth uses premium from pool. IRIS uses individual company."

Years Used

- "IRIS 3: only one year-over-year. RBC: avg of last three year-over-year"
- "IRIS Ratio 3 only looks at 2 years of data, while RBC uses up to 4 (if available)"

Discounts

- "The 90% in the growth charge is a discount factor. No discount for IRIS."

Ranges

- "RBC growth charge applies to premium growth >10% vs 33% for IRIS #3."
- IRIS concerned about negative growth more than -33% where RBC only cares about excess positive growth.

Capping

- "The growth charge is capped at 30% for RBC. There is no cap for IRIS." (Also excepted - RBC is capped at 40% premium growth, but no capping for IRIS.)

Purposes

- "RBC wants to make sure there is enough capital for growing business. Ratio is testing to see spike in WP before a possible insolvency."
- "IRIS #3 is concerned about change in NWP. Company could be trying to increase CF to meet PH obligations. RBC concerned about risk that newly written business will not be profitable."
- "The RBC growth charge assesses a "penalty" for growth exceeding 10% per annum, whereas the IRIS ratio 3 only alerts the company and regulator if the change is about 33% (increase) or below -33% (decrease)."

Examiner's Report

Question 20 Common Mistakes

Part A

- Input Issues
  - Calculated base RBC out of order
    - Applied expense adjustment before investment income discount
    - Applied Loss Sensitive discount or Claims Made Discount before expense or investment income adjustment
  - Flipped Inputs (used Med Mal for Work Comp or vice versa)
- Premium Issues
  - Calculated using gross written premium instead of net written premium
  - Flipping the premium (used Med Mal for Work Comp or Vice Versa)
- Discount Issues
  - Used wrong percentage discount for Claims Made
  - Used wrong percentage discount for Loss Sensitive
  - Used wrong formula for Claims Made
  - Used wrong formula for Loss Sensitive
- Premium Concentration Factor applied incorrectly
  - Calculated using gross written premium instead of net written premium
  - Calculated separately by line, using each line's premium instead of the largest line's premium
- Growth Charge
  - The question specifically did not ask for the growth charge, but some candidates included it. No points were added for including the growth charge and no points were taken away for not adding the growth charge or if the growth charge was done incorrectly.

Part B

- Divided by Policyholder surplus instead of last year's net premium
- Calculated the ratio by line instead of for the total company
- Did not state usual range or incorrectly stated usual range in assessment

Part C

- Just listing the formula (this is not briefly describing a difference)
- Listing difference compared to general RBC formula not specifically growth charge
  - Stating RBC is by line of business and IRIS is not (growth charge is aggregated)
  - Stating RBC applies loss sensitive discounts, claims made discounts or premium concentration and IRIS does not (growth charge does not apply these adjustments)
- Mismatching the comparison of years used in calculation
  - Stating IRIS uses one year and RBC uses four years
  - Stating IRIS uses two years and RBC uses three years
- Stating a fact about one without a comparison to the other
  - RBC used gross written premium (what about IRIS…how is this a difference?)
- Statements that were too vague or not specific
- Forgetting to state which difference belonged to which calculation
  - One is gross other is net (which is which?)
- Making both comparisons related to the normal range of the calculations (only counted as one difference)
  - IRIS cares if ratio is over 33% versus RBC caring over 10%
  - IRIS concerned about negative growth over 33% where RBC is only concerned with positive growth
- Stating RBC uses direct premium (only counted if it said direct AND assumed)