Paper:
Problem:
Problem Type:

| CapAvail (GROSS): | 69,500 |
| :---: | ---: |
| deduc(UnregRe): | 0 |
| deduc(BC Limit): | 1,625 |

Practice
Calculate the diversification credit and the final MCT ratio

## Given:

1,625

| CapReq(InsRsk): | 35,584 |
| :--- | ---: |
| CapReq(MktRsk): | 9,000 |
| CapReq(CrdRsk): | 4,550 |
| CapReq(OpnRsk): | 10,597 |
| diversification correlation: | 0.5 |

Concept:

| MCT ratio | $=$ CapAvail $/ \min$ CapReq |
| ---: | :--- |
|  |  |
| min CapReq | $=\operatorname{CapReq(total)~} / 1.5$ |
| CapReq(tot) | $=\operatorname{SUM}(I M C O)-($ diversification credit) |

diversification credit $=$ Sum 1 $\quad$ SQRT(Sum 2)

Let:
A $\quad=\quad$ CapReq(AssRsk)
$=$
CapReq(MktRsk) + CapReq(CrdRsk
I
$=\quad$ CapReq(InsRsk)

Then:

| Sum 1 | $=$ | $A$ | + | 1 |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Sum 2 | $=$ | $A^{2}$ | + | $1^{2}$ | + | $2 R \times A \times I$ |


| template: | CapAvail |  | = | 67,875 | = | CapAvail(GROSS) - deduc. 1 - deduc. 2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | DC |  | = | 5,180 | = | $A+I-\operatorname{sqrt}\left(A^{2}+I^{2}+2 R A I\right)$ |
|  | CapReq |  | = | 54,552 | = | SUM(IMCO) - DC |
|  | minCapReq |  | = | 36,368 | = | CapReq / 1.5 |
|  | MCT ratio |  | = | 187\% | = | CapAvail / minCapReq |
| MCT ratio | $=$ | 187\% |  |  |  |  |
| minCapReq | = | 36,368 |  |  |  |  |
| CapReq(tot) | $=$ | 54,552 |  |  |  |  |
| diversifica | ation credit | $=$ | 5,180 |  |  |  |
|  | (Sum 1) | = | 49,134 |  |  |  |
|  | QRT(Sum 2) | = | 43,954 |  |  |  |

Problem:
Problem Type:

Practice
A/R Ref:
Notation:
Concept:

## Note:

This problem is trivial because all you do is sum the given quantities. But before going to the next problem, you should MEMORIZE the names of these 8 items, AND be able to list the 4 that can potentially be modified.

## Problem:

Problem Type:

Practice
Calculate the deduction from MCT capital available for unregistered reinsurance recoverables

| A/R Ref: | page: | 70.60 (Cdn Insurers) |
| :--- | :--- | :--- |
|  | page: | 70.61 (Foreign Insurers) |



Answer: $\quad$ deduction $=\max (0, \mathrm{D}) * D$ must be $>0$ to effect a deduction in CapAvail

Note: If completing page 70.60 or 70.61 , we would then just drop the $\operatorname{ABS}(\mathrm{D})$ into either col (42) or (44)

Paper:
Problem:
Problem Type:

Notation:

## Concept:

Answer:

| Concept: | Here, the CapAvail is AFTER the deduction for unregistered reinsurance. |  |
| :--- | :--- | ---: |
| Given: | CapAvail (GROSS): | 69,500 |
|  | deduc for unreg re: | 0 |
|  | AOCI: | 7,000 |
|  | qualifying category B instruments: | 16,500 |
|  | qualifying category C instruments: | 6,000 |


|  |  | actual <br> minus <br> limit |  |  |  |
| :---: | ---: | ---: | ---: | ---: | ---: |
| BC | $=$ | 62,500 | $x$ | $40 \%$ | $=$ |
| limit | 25,000 | 0 |  |  |  |
|  | 62,500 | $x$ | $7 \%$ | $=$ | 4,375 |

* do you subtract the unreg reins deduc BEFORE applying the $40 \%$ and $7 \%$ ?
--> YES! (according to the answer key for 15.S)
--> NO! (according to the actual MCT paper, but since there are no exs in the paper, its hard to verify)
- the paper isn't sufficiently precise regarding the term 'capital available', whether it means GROSS or after deductions

[^0]Practice
Calculate the MCT capital required at target for insurance risk

## Problem:

Problem Type:

Given:

## Concept:

Question:

Answer:
summary of elements of insurance risk (amts required ABOVE \& BEYOND normal reserves)

|  | CapReq |
| :--- | :---: |
| unpaid clms | 14,070 |
| premium liabilities | 14,514 |
| unregistered reinsurers | 2,000 |
| self-insured retention | $\mathrm{n} / \mathrm{a}$ |
| catastrophes | 5,000 |
| accident \& sickness business | $\mathrm{n} / \mathrm{a}$ |

CapReq(InsRsk) = SUM(above items)
how is the MCT CapReq different from the APV of the PolLiabs

APV accounts for some of the InsRsk, MktRsk, \& CrdRsk that is within the MCT framework:

- Clms Devlpt (InsRsk)
- Relns rsk (InsRsk \& CrdRsk)
- IntRt rsk (MktRsk)

But the MCT margins account for much more than what's included in the MfADs

Also, the methodology underlying the MCT is rules-based, whereas the the CIA's MfAD paper is principles-based. (This is aside from a couple of specific rules in the MfAD paper for calculating IntRt margins using the weighted formula or explicit quantification methods.)

Paper:
Problem:
Problem Type:

Recall:
(from
MfAD.01a)

Given:

| line | NU | margin |
| :--- | ---: | ---: |
| property | 49,000 | $13 \%$ |
| auto-L | 77,000 | $10 \%$ |
|  | 126,000 |  |

Concept:
NU :
(\$) Net UCAE \& IBNR, discounted

CapReq(unpd) = SumProduct(NU x margin)

Calculate the unpaid clms component for MCT capital required at target for insurance risk
(x PfADs)

* discounted, excluding PfADs

Paper:
Problem:
Problem Type:

Notation: NPrLb: Net Premium Liabilities (discounted and excluding PfAD )
DWP: Direct Written Premium
AWP: Assumed WP
CWP: Ceded WP

|  |  |  | DWP | AWP | CWP |
| :--- | ---: | ---: | ---: | ---: | ---: |
| line | NPrLb | margin | pr 12 mth | pr 12 mth | pr 12 mth |
| property | 15,000 | $18 \%$ | 81,000 | 20,000 | 10,000 |
| auto-L | 60,000 | $16 \%$ | 104,000 | 23,000 | 28,000 |
|  | 75,000 |  | 185,000 | 43,000 | 38,000 |

Concept:

OSFI.MCT

## Practice

Calculate the premium liabilities component for MCT capital required at target for insurance risk

Given:

| SUM <br> over LOBs | Max (NWP x 30\%, NPrLb ) x margin |
| :---: | :---: |

where
NWP = DWP + AWP - CWP

|  | NWP | NWP <br> $\times 30 \%$ <br> $=(2)$ | NPrLb | Max of <br> $(2) \&(3)$ | margin | (3) |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| line | $(1)$ | $=(4)$ | $(5)$ | (4) $\times(5)$ <br> $=(6)$ |  |  |
| property | 91,000 | 27,300 | 15,000 | 27,300 | $18 \%$ | 4,914 |
| auto-L | 99,000 | 29,700 | 60,000 | 60,000 | $16 \%$ | 9,600 |
|  |  |  |  |  |  | 14,514 |

Paper:
Problem:
Problem Type:

Recall:
and
deduction from CapAvail for unregistered reinsurance $=\max (0, \mathrm{D})$

Given:

Note:
High values of (UEP, O/S) lead to a higher CapReq

| $D>0:$ | deduction from CapAvail: yes | reduction to CapReq: no | (MCT lower) |
| :--- | :--- | :--- | :--- |
| $D<0:$ | deduction from CapAvail: no | reduction to CapReq: yes | (MCT higher) |
| $D=0:$ | no effect on CapAvail or CapReq |  |  |



Paper:
Problem:
Problem Type:

OSFI.MCT

Given:

| A/R p70.60 <br> name | UEP ceded (20) | O/S <br> recov <br> (22) | Reins Recv (24) | Reins Pay (26) | $\begin{gathered} \text { NOD } \\ (32)+(34) \end{gathered}$ | $\begin{aligned} & \text { LOC } \\ & (38) \\ & \hline \end{aligned}$ |  | Capital Factor |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ABC Re | 15,000 | 5,000 | 2,000 | 9,000 | 8,000 | 6,000 | NOD: | 0.25\% |
| DEF Re | 0 | 0 | 0 | 0 | 0 | 0 | LOC: | 0.50\% |
|  | 15,000 | 5,000 | 2,000 | 9,000 | 8,000 | 6,000 |  |  |

counter-party default risk for $\mathrm{B} / \mathrm{S}$ assets: counter-party default risk for off-B/S exposures: counter-party default risk for UnregReColl \& SIRs:
proportional allocation of xs collateral: 0.0\%

Concept: $\quad$ CapReq(CrdRsk) $=$ sum(CP Default Risks)

* the only item we don't have is the one for UnregRe \& SIRs

AHA! I finally see the point in calculating the reduction in CapReq for xs collateral.
You need the proportional allocation to calculate the 3rd component of CapReq(CrdRsk)

WITHOUT any reduction in CapReq for xs collateral, the CP DefRsk for UnregRe \& SIRs would be:
(NOD $\times$ CapFctr $)+($ LOC $\times$ CapFctr $)=50.0$
BUT, we must multiply this by (1-proportional allocation):
$50.0 \mathrm{x} \quad 100.0 \% \quad 50.0$

Paper:
Problem:
Problem Type:

OSFI.MCT

Given:

| A/R p70.60 | UEP <br> ceded <br> $(20)$ | O/S <br> recov <br> $(22)$ | Reins <br> Recv <br> $(24)$ | Reins <br> Pay <br> $(26)$ | NOD | (32) $+(34)$ | LOC |
| :--- | :---: | :---: | :---: | :---: | ---: | ---: | ---: |
| name | (38) |  |  |  |  |  |  |
| ABC Re | 15,000 | 5,000 | 2,000 | 9,000 | 8,000 | 6,000 |  |
| DEF Re | 0 | 0 | 0 | 0 | 0 | 0 |  |
|  | 15,000 | 5,000 | 2,000 | 9,000 | 8,000 | 6,000 |  |



Concept:
A: collateral required to reduce (margin required) to 0
$+\quad 115 \% \times($ UEP $+\mathrm{O} / \mathrm{S})$

+ receivables
- payables

B: total collateral
$+\quad$ NOD + LOC
$\mathrm{C}:$ excess collateral $=\quad \max (0, \mathrm{~B}-\mathrm{A})$

THEN proportional allocation of excess collateral $\quad=\quad$ excess $/$ total $=C / B$

Concept:

Concept:

| CapReq(collateral) | $=$ SumProduct (CapFctr, collateral) |
| :--- | :--- | :--- |
| CapReqReduc | $=\quad$ CapReq(collateral) $\times$ (proportional allocation) |




Paper:

## Problem:

Problem Type:

| Notation: | AWP(ig): | (\$) AWP (last 12 mths$)$ from intra-grp pooling |
| :--- | :--- | :--- |
|  | CWP(ig): | (\$) CWP (last 12 mths$)$ from intra-grp pooling |

Given:

DWP: 185,000
AWP:
CWP:
growth:

43,000
38,000 22.00\%
$\begin{array}{ll}\text { AWP(ig): } & 0 \\ \text { CWP(ig): } & 0\end{array}$
Concept: CR(0) = CapReq before (operational risk, diversification credit)
Concept: upper limit on CapReq(OpnRsk) $=30 \% \times \operatorname{CR}(0)$

Concept: Use WP and appropriate factors to determine if CapReq(OpnRsk) should be lower than the given upper limit of $30 \% \times \operatorname{CR}(0)$

Concept:

* purpose: dampens OpnRsk for cos. with (HighVol-LowComplexity) business
with (High Levels of ReIns)
$\operatorname{CR}(0) \quad=\quad 49,134 \frac{x 30 \%}{-->} \quad 14,740 \quad=\quad$ upper limit on CapReq(OpnRsk)


2nd string of components for alternative to ultimate cap - prems from INTRA-GRP POOLING

| $0.75 \%$ | $x$ | AWP(ig) | 0 |
| :--- | :--- | :--- | :--- |
| $0.75 \%$ | $x$ | CWP(ig) | 0 |


[^0]:    --> WAIT! Now I get it!!

    - you do ALL the 'extra deductions to get CapAvail THEN do the validation tests
    - i.e. use (NetCapAvail - AOCI) in validation test

