Paper: CCIR.ARinstr (Alphabet City (Model 18.F Q16)) 01 a-Question

**Problem:** calculate (A,B,C,D,E,F,G,H,J,K) - there is no "I"

Problem Type: 2018.Fall #16

Balance Sheet

Page 20.10 Asset	2017	2016
recoverable from reinsurers:		
UEP	n/a	1,850
UCAE	А	2,250
total investments including cash	42,400	27,000

<== ceded values
<== ceded values

Page 20.20 Liabilities & Equity	2017	2016
UEP	J	3,700
UCAE	В	4,500

<== gross values <== gross values

### Income Statement

Page 20.30 Statement of Income	2017	2016
NWP	19,000	20,100
NEP	16,900	n/a
GROSS claims & adjustment expenses	С	n/a
REINSURER'S SHARE of claims & adj exps	D	n/a
NET claims & adjustment expenses	E	n/a
NET investment income	2,200	n/a

#### Runoff

	Page 60.4	1 Net Clms & Adj Exps Runoff			AY 2017
CY	Discounte	d	AY 2016	AY 2017	& prior
2016	UCAE	end of year	1,400		
	IBNR	end of year	1,500		
2017	Paid	during year	F	n/a	n/a
	UCAE	UCAE end of year		n/a	2,000
	IBNR end of year		1,600	n/a	K
	investment income from UCAE & IBNR		G		
	Amount: excess/deficiency		n/a		
	Ratio:	excess/deficiency	Н		

### Bond Portfolio

rating	class	book val.	mkt. val.	duration	yield
govt	HTM	10,000	11,300	1.5	1.1%
AAA	HTM	15,000	15,600	8.0	2.4%
Α	HTM	14,000	13,160	5.0	6.0%

# Triangle Data

GROSS paid loss (cumulative)						
AY 12 :						
2016	1,100	4,000				
2017	1,000					

#### GROSS unpaid loss (undiscounted)

AY	12	24
2016	n/a	2,900
2017	4,500	

# Payment Pattern (incremental)

year 1	20%
year 2	20%
year 3	60%

MfADs

MfAD (claims):	9.00%
MfAD (re):	8.00%
MfAD (inv):	0.75%

<sup>\*</sup> reinsurance quota-share RETENTION ==>

**Step 1:** calculate the discount rate as a weighted average of the yields in the bond portfolio

weight *	yield	* weight = (book value) x duration
15,200	1.1%	
120,000	2.4%	
70,000	6.0%	
	3.53%	<== discount rate

Step 2a:	calculate the gross PV for AY 2017 and AY 2016 (gross of quota-share reinsurance) at 3.53%									
	AY 2017:	unpaid	=	4,500	(at 12 mont	hs)				
		PV <sub>17</sub>	= + = =	20% 60% 1,106 <b>4,310</b>	/ / +	80% 80% 3,204	x x	4,500 4,500	/	1.0353 ^ 0.5 1.0353 ^ 1.5
	AY 2016:	unpaid PV <sub>16</sub>	=	2,900 60%	(at 24 mont	hs) 60%	x	2,900	/	1.0353 ^ 0.5
		. • 16	=	<u>2,850</u>	,	00%	^	2,300	,	1.0000
	==>	gross	PV for both A	AYs at:	3.53%	is	7,160			
Step 2b:	calculate the	gross PV fo	or AY 2017 an	nd AY 2016	( <u>gross</u> of quo	ta-share rei	nsurance) at		<u>2.78%</u>	
	==>	gross	PV for both A	AYs at:	2.78%	is	7,209	(similar ca	lculation to	Step 1)
Step 3a:	gross APV	=	7,209	+	9.00%	х	7,160	=	7,854	
Step 3b:	net APV	=	7,209	x	50%					
		+	7,160	x	50%	x	9.00%			
		+	7,160	х	50%	X	8.00%			
		=	4,213							
Step 3c:	ceded APV	=	7,854	-	4,213	=	3,640			

### A & B are very easy: ( $\underline{B}$ is the net claims **liability**, $\underline{A}$ is the reinsurance recoverable **asset**)

A = 3,640 UCAE recoverable from reinsurer (Step 3c)
B = 7,854 gross UCAE liability (Step 3a)

#### C, D & E are more confusing:

C = the GROSS "income" due to GROSS claims in 2017 (think of it as **negative** income)

= (2017 gross UCAE) - (2016 gross UCAE) + (gross paid in 2017) \*

= B - given info + from paid triangle

= 7,854 - 4,500 + 3,900

= 7,254

\* (gross paid in 2017)

= 2016 @ 24 - 2016 @ 12 + 2017 @ 12

= 4,000 - 1,100 + 1,000

= 3,900

D = the CEDED "income" due to CEDED claims in 2017 (this is a recoverable)
= (2017 ceded UCAE) - (2016 ceded UCAE) + (ceded paid in 2017) \*\*
= A - given info + see below
= 3,640 - 2,250 + 1,950
= 3,340

E = net "income" due to claims in 2017 (this is also negative income)

= C - D

= 7,254 - 3,340

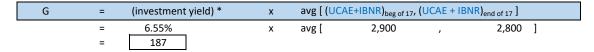
= 3,913

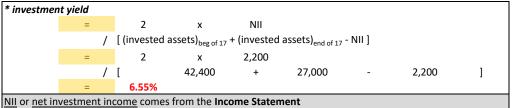
Use the paid loss triangle and the quota-share percentage

F	=	qs%	Х	(	AY 201	)		
	=	50%	Х	(	4,000 - 1,100		1,100	)
	=	1,450						

G & H are related: H is the excess (deficiency) ratio and G is the investment income in the excess (deficiency) formula

You might like to review the practice template for the excess (defiency) ratio before proceding! In any case, we first need to calculate G. Note that UCAE + IBNR are directly from the **Runoff exhibit** in the given info.





invested assets come from the Balance Sheet

Now:

(UCAE + IBNR) <sub>AY16 @ 12</sub>	=	1,400	+	1,500	=	2,900
(UCAE + IBNR) <sub>AY16 @ 24</sub>	=	1,200	+	1,600	=	2,800
(net Pd) <sub>12-24</sub>	=	F			=	1,450

Therefore:

Recall the standard formula for EP in terms of WP and UEP:

Apply this to our situation to obtain:

$$NEP_{17}$$
 =  $NWP_{17}$  - [(net UEP)<sub>17</sub> - (net UEP)<sub>16</sub>]  
16,900 = 19,000 - [(net UEP)<sub>17</sub> - ((gross UEP)<sub>16</sub> - (ceded UEP)<sub>16</sub>)]

Ok, this is getting messy so I'm going to let you do the algebra. Substitute these values above:

$$(gross UEP)_{16}$$
 = 3,700 <== from Page 20.20 Balance Sheet  
(ceded UEP)<sub>16</sub> = 1,850 <== from Page 20.10 Balance Sheet

The result is:

$$(net UEP)_{17} = 3,950$$

And finally, using the **quota-share percentage** to GROSS UP this net value, we obtain:

$$(gross UEP)_{17} = (net UEP)_{17} / 50\%$$
 $J = 3,950 / 50\%$ 
 $J = 7,900$ 

K (finally): K is (net IBNR)<sub>17 & prior</sub> and the standard formula is IBNR = (Total Liabilities) - Case

Α	=	3,640
В	=	7,854
С	=	7,254
D	=	3,340
E	=	3,913

F	=	1,450
G	=	187
Н	=	-40.1%
J	=	7,900
K	=	2,213

Paper: CCIR.ARinstr (Alphabet City (Model 18.F Q16)) 02 a-Question

**Problem:** calculate (A,B,C,D,E,F,G,H,J,K) - there is no "I"

Problem Type: 2018.Fall #16

Balance Sheet

Page 20.10 Asset	2017	2016
recoverable from reinsurers:		
UEP	n/a	2,340
UCAE	Α	4,740
total investments including cash	79,300	86,700

<== ceded values
<== ceded values

Page 20.20 Liabilities & Equity	2017	2016
UEP	J	7,800
UCAE	В	15,800

<== gross values <== gross values

### Income Statement

Page 20.30 Statement of Income	2017	2016
NWP	47,000	41,000
NEP	45,000	n/a
GROSS claims & adjustment expenses	С	n/a
REINSURER'S SHARE of claims & adj exps	D	n/a
NET claims & adjustment expenses	Е	n/a
NET investment income	4,900	n/a

#### Runoff

	Page 60.4	1 Net Clms & Adj Exps Runoff			AY 2017
CY	Discounted		AY 2016	AY 2017	& prior
2016	UCAE	end of year	3,300		
	IBNR	end of year	3,800		
2017	Paid	during year	F	n/a	n/a
	UCAE	end of year	2,300	n/a	6,200
	IBNR	end of year	3,400	n/a	K
	investmer	t income from UCAE & IBNR	G		
	Amount:	excess/deficiency	n/a		
	Ratio:	excess/deficiency	Н		

### Bond Portfolio

rating	class	book val.	mkt. val.	duration	yield
govt	HTM	8,000	6,480	2.0	1.5%
AAA	HTM	13,000	14,560	9.0	2.5%
Α	HTM	7,000	7,280	4.0	7.0%

# Triangle Data

GROSS paid loss (cumulative)			
AY	12	24	
2016	3,300	8,500	
2017	3,400		

#### GROSS unpaid loss (undiscounted)

AY	12	24
2016	n/a	9,300
2017	11,500	

# Payment Pattern (incremental)

year 1	20%
year 2	20%
year 3	60%

MfADs

MfAD (claims):	11.00%
MfAD (re):	9.00%
MfAD (inv):	1.25%

<sup>\*</sup> reinsurance quota-share RETENTION ==>

**Step 1:** calculate the discount rate as a weighted average of the yields in the bond portfolio

	weight *	yield	* weight = (book value) x duration
_	15,840	1.5%	
	117,000	2.5%	
	28,000	7.0%	
		3.18%	<== discount rate

Step 2a:	calculate the	gross PV fo	or AY 2017 an	d AY 2016	( gross of quo	ta-share rei	<i>nsurance)</i> at		3.18%	
	AY 2017:	unpaid	=	11,500	(at 12 mont	hs)				
		PV <sub>17</sub>	= + = =	20% 60% 2,830 <b>11,060</b>	/ / +	80% 80% 8,229	x x	11,500 11,500	/	1.0318 ^ 0.5 1.0318 ^ 1.5
	AY 2016:	unpaid	=	9,300	(at 24 mont	hs)				
		PV <sub>16</sub>	= =	60% <u><b>9,156</b></u>	/	60%	x	9,300	/	1.0318 ^ 0.5
	==>	gross	PV for both A	AYs at:	3.18%	is	20,215			
Step 2b:	calculate the	gross PV fo	or AY 2017 an	d AY 2016	( <u>gross</u> of quo	ta-share rei	nsurance) at		1.93%	
	==>	gross	PV for both A	AYs at:	1.93%	is	20,440	(similar ca	lculation to	Step 1)
Step 3a:	gross APV	=	20,440	+	11.00%	х	20,215	=	22,664	]
Step 3b:	net APV	=	20,440	х	30%		44.000/			
		+	<b>20,215</b> 20,215	X X	30% 70%	x x	11.00% 9.00%			
		=	8,073							
Step 3c:	ceded APV	=	22,664	-	8,073	=	14,591			

### A & B are very easy: ( $\underline{B}$ is the net claims **liability**, $\underline{A}$ is the reinsurance recoverable **asset**)

A = 14,591 UCAE recoverable from reinsurer (Step 3c)
B = 22,664 gross UCAE liability (Step 3a)

#### C, D & E are more confusing:

C = the GROSS "income" due to GROSS claims in 2017 (think of it as negative income)

= (2017 gross UCAE) - (2016 gross UCAE) + (gross paid in 2017) \*

= B - given info + from paid triangle

= 22,664 - 15,800 + 8,600

= 15,464

\* (gross paid in 2017)

= 2016 @ 24 - 2016 @ 12 + 2017 @ 12

= 8,500 - 3,300 + 3,400

= 8,600

D = the CEDED "income" due to CEDED claims in 2017 (this is a recoverable)

= (2017 ceded UCAE) - (2016 ceded UCAE) + (ceded paid in 2017) \*\*

= A - given info + see below

= 14,591 - 4,740 + 6,020

= 15,871

E = net "income" due to claims in 2017 (this is also negative income)

= C - D

= 15,464 - 15,871

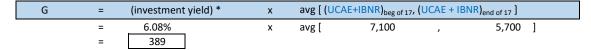
= -407

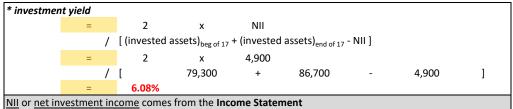
Use the paid loss triangle and the quota-share percentage

F	=	qs%	Х	(	AY 201	6 paid in 0	CY 2017	)
	=	30%	Х	(	8,500	-	3,300	)
	=	1,560						

G & H are related: H is the excess (deficiency) ratio and G is the investment income in the excess (deficiency) formula

You might like to review the practice template for the excess (defiency) ratio before proceding! In any case, we first need to calculate G. Note that UCAE + IBNR are directly from the **Runoff exhibit** in the given info.





invested assets come from the Balance Sheet

Now:

(UCAE + IBNR) <sub>AY16 @ 12</sub>	=	3,300	+	3,800	=	7,100
(UCAE + IBNR) <sub>AY16 @ 24</sub>	=	2,300	+	3,400	=	5,700
(net Pd) <sub>12-24</sub>	=	F			=	1,560

Therefore:

Recall the standard formula for EP in terms of WP and UEP:

Apply this to our situation to obtain:

$$NEP_{17}$$
 =  $NWP_{17}$  - [(net UEP)<sub>17</sub> - (net UEP)<sub>16</sub>]  
45,000 = 47,000 - [(net UEP)<sub>17</sub> - ((gross UEP)<sub>16</sub> - (ceded UEP)<sub>16</sub>)]

Ok, this is getting messy so I'm going to let you do the algebra. Substitute these values above:

$$(gross UEP)_{16}$$
 = 7,800 <== from Page 20.20 Balance Sheet  
(ceded UEP)<sub>16</sub> = 2,340 <== from Page 20.10 Balance Sheet

The result is:

$$(net UEP)_{17} = 7,460$$

And finally, using the **quota-share percentage** to GROSS UP this net value, we obtain:

$$(gross UEP)_{17} = (net UEP)_{17} / 30\%$$
 $J = 7,460 / 30\%$ 
 $J = 24,867$ 

K (finally): K is (net IBNR)<sub>17 & prior</sub> and the standard formula is IBNR = (Total Liabilities) - Case

Α	=	14,591
В	=	22,664
С	=	15,464
D	=	15,871
E	=	-407

F	=	1,560
G	=	389
Н	=	3.2%
J	=	24,867
K	=	1,873

Paper: CCIR.ARinstr (Alphabet City (Model 18.F Q16)) 03 a-Question

**Problem:** calculate (A,B,C,D,E,F,G,H,J,K) - there is no "I"

Problem Type: 2018.Fall #16

Balance Sheet

Page 20.10 Asset	2017	2016
recoverable from reinsurers:		
UEP	n/a	1,750
UCAE	Α	2,590
total investments including cash	34,500	21,000

<== ceded values
<== ceded values

Page 20.20 Liabilities & Equity	2017	2016
UEP	J	2,500
UCAE	В	3,700

<== gross values <== gross values

### Income Statement

Page 20.30 Statement of Income	2017	2016
NWP	16,000	14,700
NEP	14,900	n/a
GROSS claims & adjustment expenses	С	n/a
REINSURER'S SHARE of claims & adj exps	D	n/a
NET claims & adjustment expenses	Е	n/a
NET investment income	1,600	n/a

#### Runoff

	Page 60.4	1 Net Clms & Adj Exps Runoff			AY 2017
CY	Discounte	d	AY 2016	AY 2017	& prior
2016	UCAE	end of year	1,300		
	IBNR	end of year	1,500		
2017	Paid	during year	F	n/a	n/a
	UCAE	end of year	900	n/a	2,000
	IBNR	end of year	1,000	n/a	K
	investmer	it income from UCAE & IBNR	G		
	Amount:	excess/deficiency	n/a		
	Ratio:	excess/deficiency	Н		

### Bond Portfolio

rating	class	book val.	mkt. val.	duration	yield
govt	HTM	8,000	8,880	1.7	1.0%
AAA	HTM	9,000	8,100	15.0	3.9%
Α	HTM	8,000	7,920	1.0	5.0%

# Triangle Data

GROSS paid loss (cumulative)						
AY	12	24				
2016	1,000	3,500				
2017	900					

#### GROSS unpaid loss (undiscounted)

	ı	
AY	12	24
2016	n/a	2,900
2017	4,600	

# Payment Pattern (incremental)

40%
10%
50%

MfADs

MfAD (claims):	12.00%
MfAD (re):	10.00%
MfAD (inv):	0.75%

<sup>\*</sup> reinsurance quota-share RETENTION ==>

**Step 1:** calculate the discount rate as a weighted average of the yields in the bond portfolio

weight *	yield	* weight = (book value) x duration
13,360	1.0%	
135,000	3.9%	
8,000	5.0%	
	3.71%	<== discount rate

Step 2a:	calculate the	gross PV fo	or AY 2017 an	d AY 2016	( gross of quo	ta-share rei	nsurance) at		<u>3.71%</u>	
	AY 2017:	unpaid	=	4,600	(at 12 monti	hs)				
		PV <sub>17</sub>	= + = =	10% 50% 753 <b>4,382</b>	/ / +	60% 60% 3,629	x x	4,600 4,600	/ /	1.0371 ^ 0.5 1.0371 ^ 1.5
	AY 2016:	unpaid PV <sub>16</sub>	= = =	2,900 50% <u>2,848</u>	(at 24 monti	hs) 50%	x	2,900	/	1.0371 ^ 0.5
	==>	gross	PV for both A	AYs at:	3.71%	is	7,230			
Step 2b:	calculate the	gross PV fo	or AY 2017 an	d AY 2016	( gross of quo	ta-share rei	nsurance) at		2.96%	
	==>	gross	PV for both A	AYs at:	2.96%	is	7,283	(similar ca	lculation to .	Step 1)
Step 3a:	gross APV	=	7,283	+	12.00%	x	7,230	=	8,150	]
Step 3b:	net APV	=	7,283	x	70%					
		+	7,230	X	70%	Х	12.00%			
		=	7,230 <b>5,922</b>	Х	30%	Х	10.00%			
Step 3c:	ceded APV	=	8,150	-	5,922	=	2,228			

A & B are very easy: ( $\underline{B}$  is the net claims **liability**,  $\underline{A}$  is the reinsurance recoverable **asset**)

A = 2,228 UCAE recoverable from reinsurer (Step 3c)
B = 8,150 gross UCAE liability (Step 3a)

#### C, D & E are more confusing:

C = the GROSS "income" due to GROSS claims in 2017 (think of it as **negative** income)

= (2017 gross UCAE) - (2016 gross UCAE) + (gross paid in 2017) \*

= B - given info + from paid triangle

= 8,150 - 3,700 + 3,400

= 7,850

\* (gross paid in 2017)

= 2016 @ 24 - 2016 @ 12 + 2017 @ 12

= 3,500 - 1,000 + 900

= 3,400

D = the CEDED "income" due to CEDED claims in 2017 (this is a recoverable)

= (2017 ceded UCAE) - (2016 ceded UCAE) + (ceded paid in 2017) \*\*

= A - given info + see below

= 2,228 - 2,590 + 1,020

= 658

E = net "income" due to claims in 2017 (this is also negative income)

= C - D

= 7,850 - 658

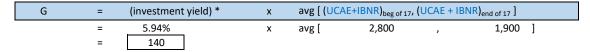
= 7,192

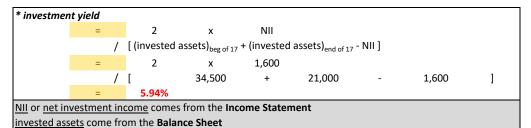
Use the paid loss triangle and the quota-share percentage

F	=	qs%	Х	(	AY 2016 paid in CY 2017		CY 2017	)
	=	70%	х	(	3,500	-	1,000	)
	=	1,750						

G & H are related: H is the excess (deficiency) ratio and G is the investment income in the excess (deficiency) formula

You might like to review the practice template for the excess (defiency) ratio before proceding! In any case, we first need to calculate G. Note that UCAE + IBNR are directly from the Runoff exhibit in the given info.





H = [(UCAE + IBNR)<sub>AY16 @ 12</sub> - (UCAE + IBNR)<sub>AY16 @ 24</sub> - (net Pd)<sub>12-24</sub> + G]/(UCAE + IBNR)AY16 @ 12

Now:

(UCAE + IBNR) <sub>AY16 @ 12</sub>	=	1,300	+	1,500	=	2,800
(UCAE + IBNR) <sub>AY16 @ 24</sub>	=	900	+	1,000	=	1,900
(net Pd) <sub>12-24</sub>	=	F			=	1,750

Therefore:

H = -25.4% <== Excess (Deficiency) Ratio

Recall the standard formula for EP in terms of WP and UEP:

Apply this to our situation to obtain:

$$NEP_{17}$$
 =  $NWP_{17}$  - [(net UEP)<sub>17</sub> - (net UEP)<sub>16</sub>]  
14,900 = 16,000 - [(net UEP)<sub>17</sub> - ((gross UEP)<sub>16</sub> - (ceded UEP)<sub>16</sub>)]

Ok, this is getting messy so I'm going to let you do the algebra. Substitute these values above:

$$(gross UEP)_{16}$$
 = 2,500 <== from Page 20.20 Balance Sheet  
(ceded UEP)<sub>16</sub> = 1,750 <== from Page 20.10 Balance Sheet

The result is:

$$(net UEP)_{17} = 1,850$$

And finally, using the **quota-share percentage** to GROSS UP this net value, we obtain:

$$(gross UEP)_{17} = (net UEP)_{17} / 70\%$$
 $J = 1,850 / 70\%$ 
 $J = 2,643$ 

K (finally): K is (net IBNR)<sub>17 & prior</sub> and the standard formula is IBNR = (Total Liabilities) - Case

Α	=	2,228
В	=	8,150
С	=	7,850
D	=	658
E	=	7,192

F	=	1,750
G	=	140
Н	=	-25.4%
J	=	2,643
K	=	3,922

Paper: CCIR.ARinstr (Alphabet City (Model 18.F Q16)) 04 a-Question

**Problem:** calculate (A,B,C,D,E,F,G,H,J,K) - there is no "I"

Problem Type: 2018.Fall #16

Balance Sheet

Page 20.10 Asset	2017	2016
recoverable from reinsurers:		
UEP	n/a	1,230
UCAE	А	1,590
total investments including cash	40,500	28,100

<== ceded values
<== ceded values

Page 20.20 Liabilities & Equity	2017	2016
UEP	J	4,100
UCAE	В	5,300

<== gross values <== gross values

Income Statement

Page 20.30 Statement of Income	2017	2016
NWP	20,000	16,100
NEP	19,200	n/a
GROSS claims & adjustment expenses	С	n/a
REINSURER'S SHARE of claims & adj exps	D	n/a
NET claims & adjustment expenses	E	n/a
NET investment income	1,900	n/a

Runoff

	Page 60.4	1 Net Clms & Adj Exps Runoff			AY 2017
CY	Discounte	d	AY 2016	AY 2017	& prior
2016	UCAE	end of year	1,700		
	IBNR	end of year	2,100		
2017	Paid	during year	F	n/a	n/a
	UCAE	end of year	1,300	n/a	2,100
	IBNR	end of year	1,600	n/a	K
	investment income from UCAE & IBNR		G		
	Amount:	excess/deficiency	n/a		
	Ratio:	excess/deficiency	Н		

Bond Portfolio

rating	class	book val.	mkt. val.	duration	yield
govt	HTM	6,000	6,240	1.0	1.4%
AAA	HTM	1,000	1,040	15.0	4.0%
Α	HTM	7,000	6,230	3.0	6.3%

MfADs

Triangle Data

GROSS paid	l loss (cumu	lative)
AY	12	24
2016	1,100	4,000
2017	1,200	

GROSS unpaid loss (undiscounted)

AY	12	24
2016	n/a	3,600
2017	4,200	

Payment Pattern (incremental)

year 1	40%
year 2	20%
year 3	40%

 MfAD (claims):
 16.00%

 MfAD (re):
 2.00%

 MfAD (inv):
 1.25%

<sup>\*</sup> reinsurance quota-share RETENTION ==>

**Step 1:** calculate the discount rate as a weighted average of the yields in the bond portfolio

_	weight *	yield	* weight = (book value) x duration
	6,000	1.4%	
	15,000	4.0%	
_	21,000	6.3%	
		4.78%	<== discount rate

Step 2a:	calculate the	gross PV fo	or AY 2017 ar	nd AY 2016	( <u>gross</u> of quo	ta-share rei	insurance) at		4.78%	
	AY 2017:	unpaid	=	4,200	(at 12 mont	hs)				
		PV <sub>17</sub>	=	20%	/	60%	х	4,200	/	1.0478 ^ 0.5
			+	40%	/	60%	X	4,200	/	1.0478 ^ 1.5
			=	1,368	+	2,611				
			=	<u>3,978</u>						
	AY 2016:	unpaid	=	3,600	(at 24 mont	hs)				
		$PV_{16}$	=	40%	/	40%	x	3,600	/	1.0478 ^ 0.5
		10	=	3,517	,			5,000	,	
				<u> </u>						
	==>	gross	PV for both A	AYs at:	4.78%	is	7,495			
Step 2b:	calculate the	gross PV fo	or AY 2017 ar	nd AY 2016	( <u>gross</u> of quo	ta-share rei	insurance) at		<u>3.53%</u>	
	==>	gross	PV for both A	AYs at:	3.53%	is	7,572	(similar ca	lculation to	Step 1)
					45.000/				0.774	1
Step 3a:	gross APV	=	7,572	+	16.00%	Х	7,495	=	8,771	
Step 3b:	net APV	=	7,572	х	30%					
		+	7,495	x	30%	х	16.00%			
		+	7,495	х	70%	х	2.00%			
		=	2,736							
Step 3c:	ceded APV	=	8,771	-	2,736	=	6,035			

A & B are very easy: ( $\underline{B}$  is the net claims **liability**,  $\underline{A}$  is the reinsurance recoverable **asset**)

A = 6,035 UCAE recoverable from reinsurer (Step 3c)
B = 8,771 gross UCAE liability (Step 3a)

#### C, D & E are more confusing:

C = the GROSS "income" due to GROSS claims in 2017 (think of it as **negative** income)

= (2017 gross UCAE) - (2016 gross UCAE) + (gross paid in 2017) \*

= B - given info + from paid triangle

= 8,771 - 5,300 + 4,100

= 7,571

\* (gross paid in 2017)

= 2016 @ 24 - 2016 @ 12 + 2017 @ 12

= 4,000 - 1,100 + 1,200

= 4,100

D = the CEDED "income" due to CEDED claims in 2017 (this is a recoverable)

= (2017 ceded UCAE) - (2016 ceded UCAE) + (ceded paid in 2017) \*\*

= A - given info + see below

= 6,035 - 1,590 + 2,870

= 7,315

E = net "income" due to claims in 2017 (this is also negative income)

= C - D = 7,571 - 7,315

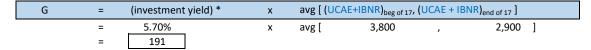
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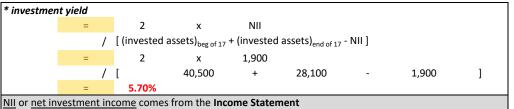
Use the paid loss triangle and the quota-share percentage

F	=	qs%	Х	(	AY 201	6 paid in 0	CY 2017	)
	=	30%	Х	(	4,000	-	1,100	)
	=	870						

G & H are related: H is the excess (deficiency) ratio and G is the investment income in the excess (deficiency) formula

You might like to review the practice template for the excess (defiency) ratio before proceding! In any case, we first need to calculate G. Note that UCAE + IBNR are directly from the **Runoff exhibit** in the given info.





invested assets come from the Balance Sheet

H = 
$$[(UCAE + IBNR)_{AY16 @ 12} - (UCAE + IBNR)_{AY16 @ 24} - (net Pd)_{12-24} + G] / (UCAE + IBNR)AY16 @ 12$$

Now:

(UCAE + IBNR) <sub>AY16 @ 12</sub>	=	1,700	+	2,100	=	3,800
(UCAE + IBNR) <sub>AY16 @ 24</sub>	=	1,300	+	1,600	=	2,900
(net Pd) <sub>12-24</sub>	=	F			=	870

Therefore:

Recall the standard formula for EP in terms of WP and UEP:

Apply this to our situation to obtain:

$$NEP_{17}$$
 =  $NWP_{17}$  - [(net UEP)<sub>17</sub> - (net UEP)<sub>16</sub>]  
19,200 = 20,000 - [(net UEP)<sub>17</sub> - ((gross UEP)<sub>16</sub> - (ceded UEP)<sub>16</sub>)]

Ok, this is getting messy so I'm going to let you do the algebra. Substitute these values above:

$$(gross UEP)_{16}$$
 = 4,100 <== from Page 20.20 Balance Sheet  
(ceded UEP)<sub>16</sub> = 1,230 <== from Page 20.10 Balance Sheet

The result is:

$$(net UEP)_{17} = 3,670$$

And finally, using the **quota-share percentage** to GROSS UP this net value, we obtain:

$$(gross UEP)_{17} = (net UEP)_{17} / 30\%$$
 $J = 3,670 / 30\%$ 
 $J = 12,233$ 

K (finally): K is (net IBNR)<sub>17 & prior</sub> and the standard formula is IBNR = (Total Liabilities) - Case

Α	=	6,035
В	=	8,771
С	=	7,571
D	=	7,315
E	=	256

F	=	870
G	=	191
Н	=	5.8%
J	=	12,233
K	=	636