

Reading: Friedland 05 (Triangles)
Model: Supplementary Problems based on Video
Problem Type: Information in Triangles

F-05 (010) Triangle Info (Problem 1)

Find	(a) cumulative paid loss for AY	2020	@	12	months
	(b) incremental paid loss for AY	2023	@	12	months
	(c) cumulative reported loss for AY	2023	@	36	months
	(d) incremental reported loss for AY	2023	@	12	months
	(e) cumulative reported count for AY	2025	@	12	months
	(f) total paid loss for CY	2022			
	(g) total rptd loss for CY	2020			

Given

<u>Amounts</u>	<u>Paid Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	720	1,800	2,880	3,600	3,960	4,320
2021	720	1,800	2,880	3,600	3,960	
2022	720	1,800	2,880	3,600		
2023	720	1,800	2,880			
2024	720	1,800				
2025	720					

<u>Amounts</u>	<u>O/S Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	1,440	1,080	720	360	360	0
2021	1,440	1,080	720	360	360	
2022	1,440	1,080	720	360		
2023	1,440	1,080	720			
2024	1,440	1,080				
2025	1,440					

<== same as Case O/S

<u>Amounts</u>	<u>Paid Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	2	5	8	10	11	12
2021	2	5	8	10	11	
2022	2	5	8	10		
2023	2	5	8			
2024	2	5				
2025	2					

<u>Amounts</u>	<u>O/S Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	4	3	2	1	1	0
2021	4	3	2	1	1	
2022	4	3	2	1		
2023	4	3	2			
2024	4	3				
2025	4					

- (a) 720 <== directly from paid loss triangle
- (b) 720 = 720 - 0
- (c) 3,600 = 2,880 + 720
- (d) 2,160 = 720 + 1,440 - 0 - 0
- (e) 6 = 2 + 4
- (f) 2,880 <== directly from alternate format of paid loss triangle below
- (g) 2,160 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	720	1,800	2,880	3,600	3,960	4,320
2021		720	1,800	2,880	3,600	3,960
2022			720	1,800	2,880	3,600
2023				720	1,800	2,880
2024					720	1,800
2025						720
	720	2,520	5,400	9,000	12,960	17,280
CY paid	720	1,800	2,880	3,600	3,960	4,320
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	2,160	2,880	3,600	3,960	4,320	4,320
2021		2,160	2,880	3,600	3,960	4,320
2022			2,160	2,880	3,600	3,960
2023				2,160	2,880	3,600
2024					2,160	2,880
2025						2,160
	2,160	5,040	8,640	12,600	16,920	21,240
CY rptd	2,160	2,880	3,600	3,960	4,320	4,320
CY	2020	2021	2022	2023	2024	2025

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F-05 (010) Triangle Info (Problem 2)

Find	(a) cumulative paid loss for AY	2022	@	12	months
	(b) incremental paid loss for AY	2024	@	12	months
	(c) cumulative reported loss for AY	2025	@	12	months
	(d) incremental reported loss for AY	2023	@	36	months
	(e) cumulative reported count for AY	2022	@	36	months
	(f) total paid loss for CY	2025			
	(g) total rptd loss for CY	2020			

Given

<u>Amounts</u>	Paid Loss		Development Age			
AY	12	24	36	48	60	72
2020	360	720	1,440	1,800	1,800	2,160
2021	372	1,116	1,860	2,232	2,604	
2022	768	1,536	2,304	3,072		
2023	792	1,980	3,168			
2024	816	2,040				
2025	840					

<u>Amounts</u>	O/S Loss		Development Age			
AY	12	24	36	48	60	72
2020	720	720	360	360	360	0
2021	1,116	1,116	744	372	372	
2022	1,152	1,152	768	384		
2023	1,584	1,188	792			
2024	1,632	1,224				
2025	1,680					

<== same as Case O/S

<u>Amounts</u>	Paid Count		Development Age			
AY	12	24	36	48	60	72
2020	1	2	4	5	5	6
2021	1	3	5	6	7	
2022	2	4	6	8		
2023	2	5	8			
2024	2	5				
2025	2					

<u>Amounts</u>	O/S Count		Development Age			
AY	12	24	36	48	60	72
2020	2	2	1	1	1	0
2021	3	3	2	1	1	
2022	3	3	2	1		
2023	4	3	2			
2024	4	3				
2025	4					

- (a) 768 <== directly from paid loss triangle
- (b) 816 = 816 - 0
- (c) 2,520 = 840 + 1,680
- (d) 792 = 3,168 + 792 - 1,980 - 1,188
- (e) 8 = 6 + 2
- (f) 4,752 <== directly from alternate format of paid loss triangle below
- (g) 1,080 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	360	720	1,440	1,800	1,800	2,160
2021		372	1,116	1,860	2,232	2,604
2022			768	1,536	2,304	3,072
2023				792	1,980	3,168
2024					816	2,040
2025						840
	360	1,092	3,324	5,988	9,132	13,884
CY paid	360	732	2,232	2,664	3,144	4,752
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	1,080	1,440	1,800	2,160	2,160	2,160
2021		1,488	2,232	2,604	2,604	2,976
2022			1,920	2,688	3,072	3,456
2023				2,376	3,168	3,960
2024					2,448	3,264
2025						2,520
	1,080	2,928	5,952	9,828	13,452	18,336
CY rptd	1,080	1,848	3,024	3,876	3,624	4,884
CY	2020	2021	2022	2023	2024	2025

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F-05 (010) Triangle Info (Problem 3)

Find	(a) cumulative paid loss for AY	2023	@	12	months
	(b) incremental paid loss for AY	2021	@	36	months
	(c) cumulative reported loss for AY	2023	@	24	months
	(d) incremental reported loss for AY	2023	@	12	months
	(e) cumulative reported count for AY	2025	@	12	months
	(f) total paid loss for CY	2023			
	(g) total rptd loss for CY	2024			

Given

<u>Amounts</u>	<u>Paid Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	2,160	5,040	7,200	9,360	10,080	11,520
2021	1,217	3,650	6,084	7,301	7,909	
2022	1,080	2,700	4,320	5,400		
2023	469	1,406	2,343			
2024	399	1,197				
2025	950					

<u>Amounts</u>	<u>O/S Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	3,600	2,880	2,160	1,440	1,440	0
2021	3,650	3,042	1,825	1,217	1,217	
2022	2,160	1,620	1,080	540		
2023	1,406	1,406	937			
2024	1,197	1,197				
2025	950					

<== same as Case O/S

<u>Amounts</u>	<u>Paid Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	3	7	10	13	14	16
2021	2	6	10	12	13	
2022	2	5	8	10		
2023	1	3	5			
2024	1	3				
2025	2					

<u>Amounts</u>	<u>O/S Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	5	4	3	2	2	0
2021	6	5	3	2	2	
2022	4	3	2	1		
2023	3	3	2			
2024	3	3				
2025	2					

- (a) 469 <== directly from paid loss triangle
- (b) 2,434 = 6,084 - 3,650
- (c) 2,812 = 1,406 + 1,406
- (d) 1,874 = 469 + 1,406 - 0 - 0
- (e) 4 = 2 + 2
- (f) 6,682 <== directly from alternate format of paid loss triangle below
- (g) 4,942 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	2,160	5,040	7,200	9,360	10,080	11,520
2021		1,217	3,650	6,084	7,301	7,909
2022			1,080	2,700	4,320	5,400
2023				469	1,406	2,343
2024					399	1,197
2025						950
	2,160	6,257	11,930	18,613	23,506	29,320
CY paid	2,160	4,097	5,674	6,682	4,893	5,814
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	5,760	7,920	9,360	10,800	11,520	11,520
2021		4,867	6,692	7,909	8,518	9,126
2022			3,240	4,320	5,400	5,940
2023				1,874	2,812	3,280
2024					1,596	2,394
2025						1,901
	5,760	12,787	19,292	24,904	29,845	34,161
CY rptd	5,760	7,027	6,505	5,611	4,942	4,316
CY	2020	2021	2022	2023	2024	2025

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F-05 (010) Triangle Info (Problem 4)

Find	(a) cumulative paid loss for AY	2025	@	12	months
	(b) incremental paid loss for AY	2025	@	12	months
	(c) cumulative reported loss for AY	2022	@	12	months
	(d) incremental reported loss for AY	2020	@	24	months
	(e) cumulative reported count for AY	2025	@	12	months
	(f) total paid loss for CY	2024			
	(g) total rptd loss for CY	2024			

Given

<u>Amounts</u>	<u>Paid Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	720	1,800	2,880	3,600	3,960	4,320
2021	720	1,800	2,880	3,600	3,960	
2022	720	1,800	2,880	3,600		
2023	720	1,800	2,880			
2024	720	1,800				
2025	720					

<u>Amounts</u>	<u>O/S Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	1,440	1,080	720	360	360	0
2021	1,440	1,080	720	360	360	
2022	1,440	1,080	720	360		
2023	1,440	1,080	720			
2024	1,440	1,080				
2025	1,440					

<== same as Case O/S

<u>Amounts</u>	<u>Paid Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	2	5	8	10	11	12
2021	2	5	8	10	11	
2022	2	5	8	10		
2023	2	5	8			
2024	2	5				
2025	2					

<u>Amounts</u>	<u>O/S Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	4	3	2	1	1	0
2021	4	3	2	1	1	
2022	4	3	2	1		
2023	4	3	2			
2024	4	3				
2025	4					

- (a) 720 <== directly from paid loss triangle
- (b) 720 = 720 - 0
- (c) 2,160 = 720 + 1,440
- (d) 720 = 1,800 + 1,080 - 720 - 1,440
- (e) 6 = 2 + 4
- (f) 3,960 <== directly from alternate format of paid loss triangle below
- (g) 4,320 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	720	1,800	2,880	3,600	3,960	4,320
2021		720	1,800	2,880	3,600	3,960
2022			720	1,800	2,880	3,600
2023				720	1,800	2,880
2024					720	1,800
2025						720
	720	2,520	5,400	9,000	12,960	17,280
CY paid	720	1,800	2,880	3,600	3,960	4,320
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	2,160	2,880	3,600	3,960	4,320	4,320
2021		2,160	2,880	3,600	3,960	4,320
2022			2,160	2,880	3,600	3,960
2023				2,160	2,880	3,600
2024					2,160	2,880
2025						2,160
	2,160	5,040	8,640	12,600	16,920	21,240
CY rptd	2,160	2,880	3,600	3,960	4,320	4,320
CY	2020	2021	2022	2023	2024	2025

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F-05 (010) Triangle Info (Problem 5)

Find	(a) cumulative paid loss for AY	2023	@	24	months
	(b) incremental paid loss for AY	2021	@	12	months
	(c) cumulative reported loss for AY	2024	@	24	months
	(d) incremental reported loss for AY	2024	@	12	months
	(e) cumulative reported count for AY	2023	@	36	months
	(f) total paid loss for CY	2023			
	(g) total rptd loss for CY	2023			

Given

<u>Amounts</u>	Paid Loss		Development Age			
AY	12	24	36	48	60	72
2020	360	720	1,440	1,800	1,800	2,160
2021	372	1,116	1,860	2,232	2,604	
2022	768	1,536	2,304	3,072		
2023	792	1,980	3,168			
2024	816	2,040				
2025	840					

<u>Amounts</u>	O/S Loss		Development Age			
AY	12	24	36	48	60	72
2020	720	720	360	360	360	0
2021	1,116	1,116	744	372	372	
2022	1,152	1,152	768	384		
2023	1,584	1,188	792			
2024	1,632	1,224				
2025	1,680					

<== same as Case O/S

<u>Amounts</u>	Paid Count		Development Age			
AY	12	24	36	48	60	72
2020	1	2	4	5	5	6
2021	1	3	5	6	7	
2022	2	4	6	8		
2023	2	5	8			
2024	2	5				
2025	2					

<u>Amounts</u>	O/S Count		Development Age			
AY	12	24	36	48	60	72
2020	2	2	1	1	1	0
2021	3	3	2	1	1	
2022	3	3	2	1		
2023	4	3	2			
2024	4	3				
2025	4					

- (a) 1,980 <== directly from paid loss triangle
- (b) 372 = 372 - 0
- (c) 3,264 = 2,040 + 1,224
- (d) 2,448 = 816 + 1,632 - 0 - 0
- (e) 10 = 8 + 2
- (f) 2,664 <== directly from alternate format of paid loss triangle below
- (g) 3,876 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	360	720	1,440	1,800	1,800	2,160
2021		372	1,116	1,860	2,232	2,604
2022			768	1,536	2,304	3,072
2023				792	1,980	3,168
2024					816	2,040
2025						840
	360	1,092	3,324	5,988	9,132	13,884
CY paid	360	732	2,232	2,664	3,144	4,752
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	1,080	1,440	1,800	2,160	2,160	2,160
2021		1,488	2,232	2,604	2,604	2,976
2022			1,920	2,688	3,072	3,456
2023				2,376	3,168	3,960
2024					2,448	3,264
2025						2,520
	1,080	2,928	5,952	9,828	13,452	18,336
CY rptd	1,080	1,848	3,024	3,876	3,624	4,884
CY	2020	2021	2022	2023	2024	2025

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F-05 (010) Triangle Info (Problem 6)

Find	(a) cumulative paid loss for AY	2025	@	12	months
	(b) incremental paid loss for AY	2023	@	12	months
	(c) cumulative reported loss for AY	2025	@	12	months
	(d) incremental reported loss for AY	2022	@	48	months
	(e) cumulative reported count for AY	2025	@	12	months
	(f) total paid loss for CY	2020			
	(g) total rptd loss for CY	2021			

Given

<u>Amounts</u>	<u>Paid Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	2,160	5,040	7,200	9,360	10,080	11,520
2021	1,217	3,650	6,084	7,301	7,909	
2022	1,080	2,700	4,320	5,400		
2023	469	1,406	2,343			
2024	399	1,197				
2025	950					

<u>Amounts</u>	<u>O/S Loss</u>	Development Age				
AY	12	24	36	48	60	72
2020	3,600	2,880	2,160	1,440	1,440	0
2021	3,650	3,042	1,825	1,217	1,217	
2022	2,160	1,620	1,080	540		
2023	1,406	1,406	937			
2024	1,197	1,197				
2025	950					

<== same as Case O/S

<u>Amounts</u>	<u>Paid Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	3	7	10	13	14	16
2021	2	6	10	12	13	
2022	2	5	8	10		
2023	1	3	5			
2024	1	3				
2025	2					

<u>Amounts</u>	<u>O/S Count</u>	Development Age				
AY	12	24	36	48	60	72
2020	5	4	3	2	2	0
2021	6	5	3	2	2	
2022	4	3	2	1		
2023	3	3	2			
2024	3	3				
2025	2					

- (a) 950 <== directly from paid loss triangle
- (b) 469 = 469 - 0
- (c) 1,901 = 950 + 950
- (d) 540 = 5,400 + 540 - 4,320 - 1,080
- (e) 4 = 2 + 2
- (f) 2,160 <== directly from alternate format of paid loss triangle below
- (g) 7,027 <== directly from alternate format of reported loss triangle below

side calc for CY loss: express triangles in alternate format

Amounts	Paid Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	2,160	5,040	7,200	9,360	10,080	11,520
2021		1,217	3,650	6,084	7,301	7,909
2022			1,080	2,700	4,320	5,400
2023				469	1,406	2,343
2024					399	1,197
2025						950
	2,160	6,257	11,930	18,613	23,506	29,320
CY paid	2,160	4,097	5,674	6,682	4,893	5,814
CY	2020	2021	2022	2023	2024	2025

Amounts	Rptd Loss		as of Calendar Year End			
AY	2020	2021	2022	2023	2024	2025
2020	5,760	7,920	9,360	10,800	11,520	11,520
2021		4,867	6,692	7,909	8,518	9,126
2022			3,240	4,320	5,400	5,940
2023				1,874	2,812	3,280
2024					1,596	2,394
2025						1,901
	5,760	12,787	19,292	24,904	29,845	34,161
CY rptd	5,760	7,027	6,505	5,611	4,942	4,316
CY	2020	2021	2022	2023	2024	2025