

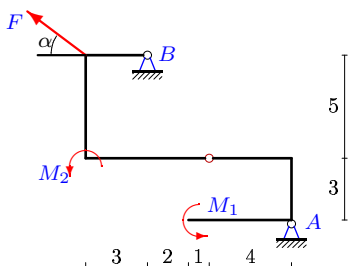
## Тяжелая составная рама из двух частей

Плоская рама, состоящая из двух шарнирно соединенных частей, расположена в вертикальной плоскости. Задан погонный вес  $\rho$  стержней рамы. Определить реакции опор рамы (в кН).

Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.— М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.54.)

### Задача 36.101.

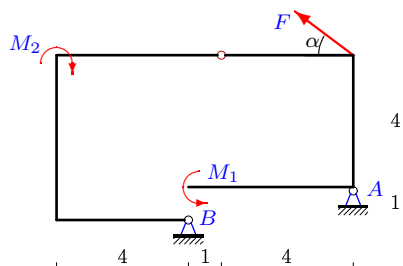
100



$$F = 15 \text{ кН}, M_1 = 33 \text{ кНм}, M_2 = 71 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

### Задача 36.102.

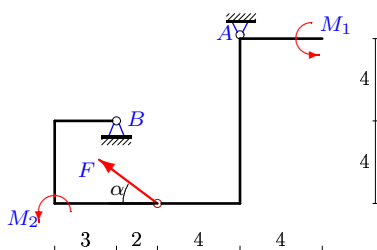
100



$$F = 5 \text{ кН}, M_1 = 99 \text{ кНм}, M_2 = 92 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

### Задача 36.103.

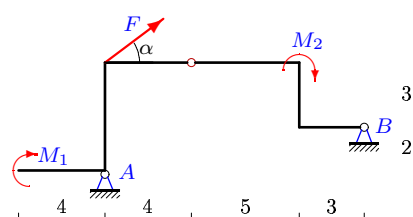
100



$$F = 5 \text{ кН}, M_1 = 0 \text{ кНм}, M_2 = 55 \text{ кНм}, \\ \rho = 1 \text{ кН/м}, \cos \alpha = 0,8.$$

### Задача 36.104.

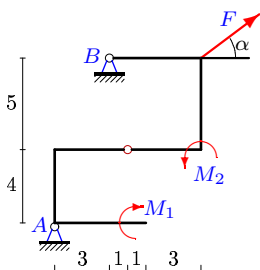
100



$$F = 15 \text{ кН}, M_1 = 172 \text{ кНм}, M_2 = 130 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

### Задача 36.105.

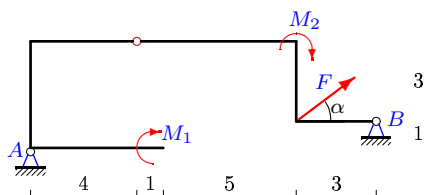
100



$$F = 10 \text{ кН}, M_1 = 39 \text{ кНм}, M_2 = 95 \text{ кНм}, \\ \rho = 2 \text{ кН/м}, \cos \alpha = 0,8.$$

### Задача 36.106.

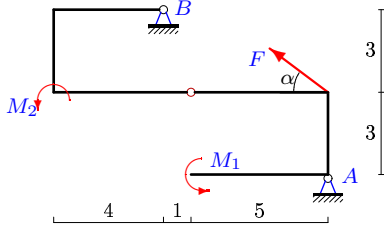
100



$$F = 10 \text{ кН}, M_1 = 127,5 \text{ кНм}, M_2 = 100,5 \text{ кНм}, \\ \rho = 1 \text{ кН/м}, \cos \alpha = 0,8.$$

**Задача 36.107.**

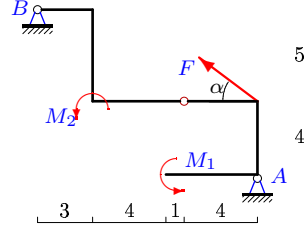
100



$F = 15 \text{ кН}$ ,  $M_1 = 11 \text{ кНм}$ ,  $M_2 = 10 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.108.**

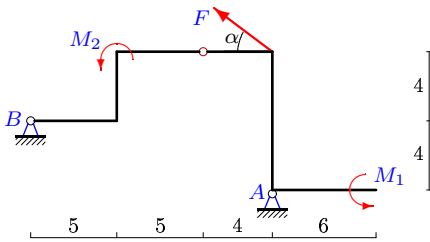
100



$F = 10 \text{ кН}$ ,  $M_1 = 31,5 \text{ кНм}$ ,  $M_2 = 131 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.109.**

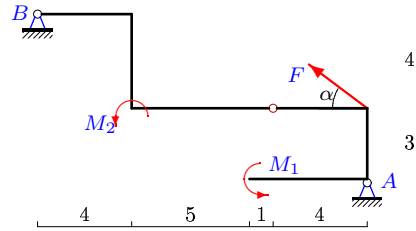
100



$F = 5 \text{ кН}$ ,  $M_1 = 426 \text{ кНм}$ ,  $M_2 = 608 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.110.**

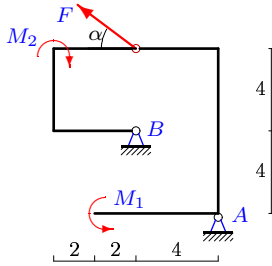
100



$F = 15 \text{ кН}$ ,  $M_1 = 19,5 \text{ кНм}$ ,  $M_2 = 130 \text{ кНм}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.111.**

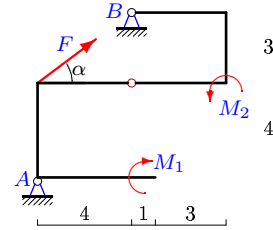
100



$F = 10 \text{ кН}$ ,  $M_1 = 108 \text{ кНм}$ ,  $M_2 = 96 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.112.**

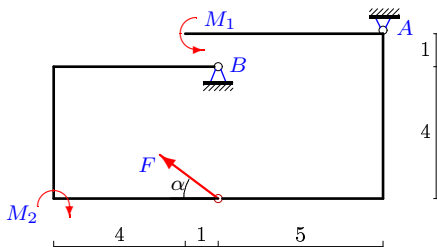
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$F = 10 \text{ кН}$ ,  $M_1 = 27 \text{ кНм}$ ,  $M_2 = 32 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.113.**

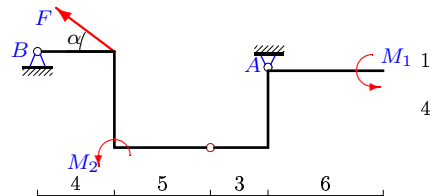
100



$F = 5 \text{ кН}$ ,  $M_1 = 128,5 \text{ кНм}$ ,  $M_2 = 119 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.114.**

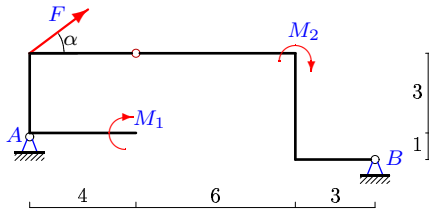
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$F = 10 \text{ кН}$ ,  $M_1 = 3 \text{ кНм}$ ,  $M_2 = 382 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.115.

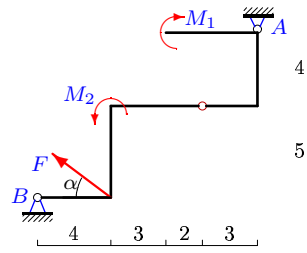
100



$F = 5 \text{ кН}$ ,  $M_1 = 102 \text{ кНМ}$ ,  $M_2 = 65.5 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.116.

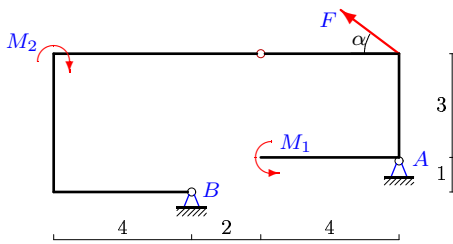
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$F = 5 \text{ кН}$ ,  $M_1 = 23 \text{ кНМ}$ ,  $M_2 = 177.5 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.117.

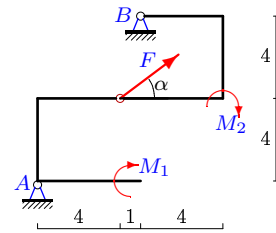
100



$F = 15 \text{ кН}$ ,  $M_1 = 36 \text{ кНМ}$ ,  $M_2 = 96 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.118.

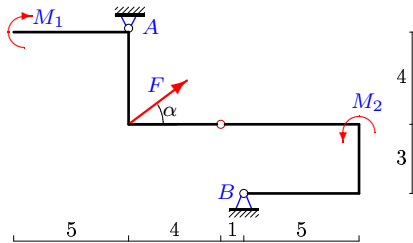
100



$F = 15 \text{ кН}$ ,  $M_1 = 7.5 \text{ кНМ}$ ,  $M_2 = 32.5 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.119.

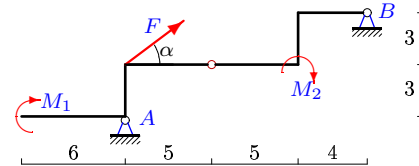
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$F = 15 \text{ кН}$ ,  $M_1 = 93 \text{ кНМ}$ ,  $M_2 = 106 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.120.

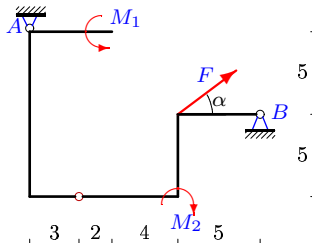
100



$F = 5 \text{ кН}$ ,  $M_1 = 160 \text{ кНМ}$ ,  $M_2 = 330 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.121.

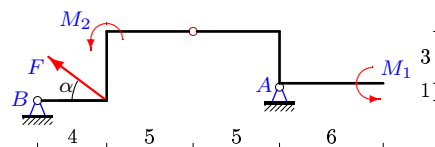
100



$F = 5 \text{ кН}$ ,  $M_1 = 176 \text{ кНМ}$ ,  $M_2 = 677 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

Задача 36.122.

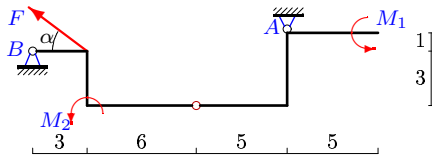
100



$F = 10 \text{ кН}$ ,  $M_1 = 245 \text{ кНМ}$ ,  $M_2 = 294 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.123.**

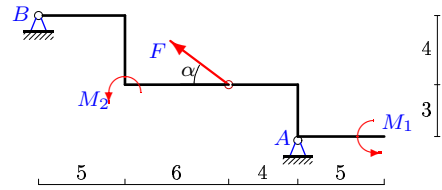
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$F = 15 \text{ кН}$ ,  $M_1 = 108 \text{ кНм}$ ,  $M_2 = 550.5 \text{ кНм}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.124.**

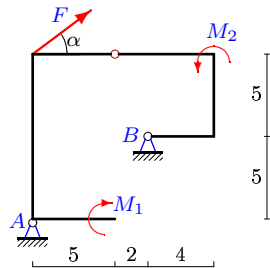
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$F = 5 \text{ кН}$ ,  $M_1 = 139 \text{ кНм}$ ,  $M_2 = 391 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.125.**

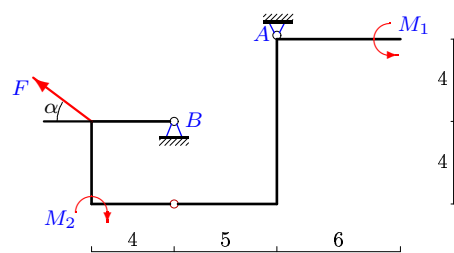
100



$F = 5 \text{ кН}$ ,  $M_1 = 225 \text{ кНм}$ ,  $M_2 = 59 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.126.**

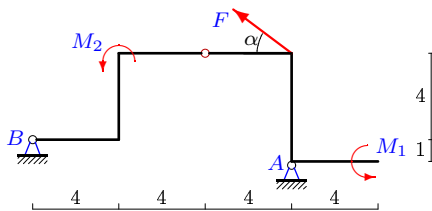
100



$F = 10 \text{ кН}$ ,  $M_1 = 181 \text{ кНм}$ ,  $M_2 = 40 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.127.**

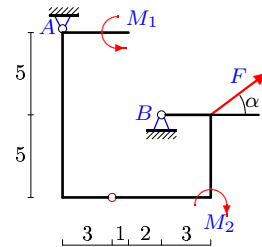
100



$F = 10 \text{ кН}$ ,  $M_1 = 136 \text{ кНм}$ ,  $M_2 = 224 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.128.**

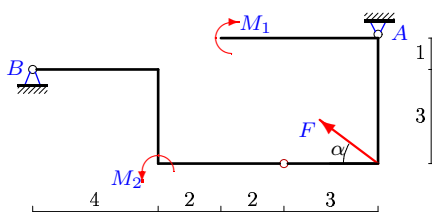
100



$F = 15 \text{ кН}$ ,  $M_1 = 13 \text{ кНм}$ ,  $M_2 = 135 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.129.**

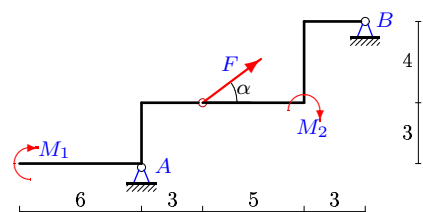
100



$F = 10 \text{ кН}$ ,  $M_1 = 21 \text{ кНм}$ ,  $M_2 = 256 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.130.**

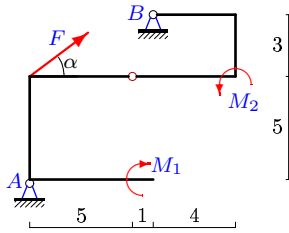
100



$F = 10 \text{ кН}$ ,  $M_1 = 123 \text{ кНм}$ ,  $M_2 = 252 \text{ кНм}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.131.**

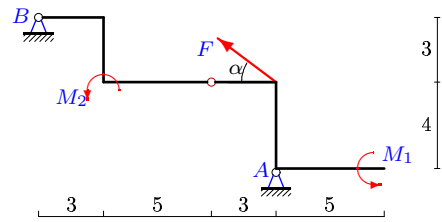
100



$F = 15 \text{ кН}$ ,  $M_1 = 93.5 \text{ кНМ}$ ,  $M_2 = 7.5 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.132.**

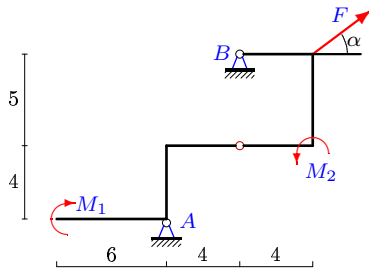
100



$F = 10 \text{ кН}$ ,  $M_1 = 137 \text{ кНМ}$ ,  $M_2 = 387 \text{ кНМ}$ ,  
 $\rho = 3 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.133.**

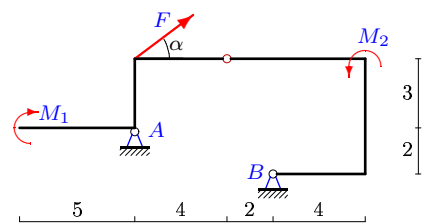
100



$F = 10 \text{ кН}$ ,  $M_1 = 112 \text{ кНМ}$ ,  $M_2 = 48 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.134.**

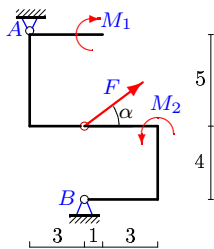
100



$F = 15 \text{ кН}$ ,  $M_1 = 68.5 \text{ кНМ}$ ,  $M_2 = 114 \text{ кНМ}$ ,  
 $\rho = 1 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.135.**

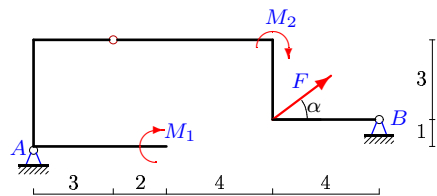
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$F = 5 \text{ кН}$ ,  $M_1 = 59 \text{ кНМ}$ ,  $M_2 = 80 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.136.**

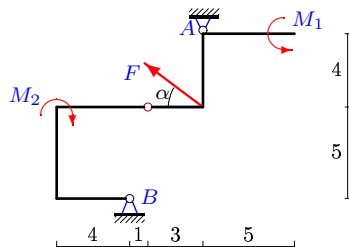
100



$F = 15 \text{ кН}$ ,  $M_1 = 136 \text{ кНМ}$ ,  $M_2 = 279 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

**Задача 36.137.**

100



$F = 5 \text{ кН}$ ,  $M_1 = 90 \text{ кНМ}$ ,  $M_2 = 70 \text{ кНМ}$ ,  
 $\rho = 2 \text{ кН/м}$ ,  $\cos \alpha = 0,8$ .

S-36

**Ответы.**  
**Тяжелая составная рама из двух частей**

20-May-23

№	$X_A$	$Y_A$	$X_B$	$Y_B$	$\sum M_C = 0$	$\sum M_B = 0$
101	-10	13	22	30	$3X_A + 4Y_A - 22 = 0,$	$8X_A + 7Y_A - 11 = 0$
102	-6	-6	10	57	$4X_A + 4Y_A + 48 = 0,$	$X_A + 5Y_A + 24 = 0$
103	-8	0	12	25	$-8X_A + 4Y_A - 64 = 0,$	$-4X_A + 6Y_A - 32 = 0$
104	20	-1	-32	40	$5X_A - 4Y_A - 104 = 0,$	$2X_A - 12Y_A - 52 = 0$
105	-1	5	-7	43	$4X_A - 4Y_A + 24 = 0,$	$9X_A - 3Y_A + 24 = 0$
106	22	-2	-30	21	$4X_A - 4Y_A - 96 = 0,$	$X_A - 13Y_A - 48 = 0$
107	-7	9	19	32	$3X_A + 5Y_A - 24 = 0,$	$6X_A + 6Y_A - 12 = 0$
108	-20	14	28	6	$4X_A + 4Y_A + 24 = 0,$	$9X_A + 12Y_A + 12 = 0$
109	-24	0	28	93	$8X_A + 4Y_A + 192 = 0,$	$4X_A + 14Y_A + 96 = 0$
110	-24	11	36	6	$3X_A + 4Y_A + 28 = 0,$	$7X_A + 14Y_A + 14 = 0$
111	0	-4	8	58	$8X_A + 4Y_A + 16 = 0,$	$4X_A + 4Y_A + 16 = 0$
112	0	3	-8	39	$4X_A - 4Y_A + 12 = 0,$	$7X_A - 4Y_A + 12 = 0$
113	0	4	4	83	$-5X_A + 5Y_A - 20 = 0,$	$X_A + 5Y_A - 20 = 0$
114	-21	6	29	42	$-4X_A + 3Y_A - 102 = 0,$	$X_A + 12Y_A - 51 = 0$
115	22	-5	-26	26	$3X_A - 4Y_A - 86 = 0,$	$X_A - 13Y_A - 43 = 0$
116	-21	-14	25	37	$-4X_A + 3Y_A - 42 = 0,$	$-9X_A + 12Y_A - 21 = 0$
117	-8	-5	20	21	$3X_A + 4Y_A + 44 = 0,$	$X_A + 6Y_A + 22 = 0$
118	6	12	-18	5	$4X_A - 4Y_A + 24 = 0,$	$8X_A - 5Y_A + 12 = 0$
119	6	-10	-18	55	$-4X_A - 4Y_A - 16 = 0,$	$-7X_A - 5Y_A - 8 = 0$
120	23	9	-27	40	$3X_A - 5Y_A - 24 = 0,$	$6X_A - 14Y_A - 12 = 0$
121	25	0	-29	65	$-10X_A - 3Y_A + 250 = 0,$	$-5X_A - 14Y_A + 125 = 0$
122	-23	-5	31	53	$3X_A + 5Y_A + 94 = 0,$	$X_A + 14Y_A + 47 = 0$
123	-23	2	35	67	$-4X_A + 5Y_A - 102 = 0,$	$X_A + 14Y_A - 51 = 0$
124	-26	11	30	40	$3X_A + 4Y_A + 34 = 0,$	$7X_A + 15Y_A + 17 = 0$
125	9	0	-13	67	$10X_A - 5Y_A - 90 = 0,$	$5X_A - 7Y_A - 45 = 0$
126	0	4	8	52	$-8X_A + 5Y_A - 20 = 0,$	$-4X_A + 5Y_A - 20 = 0$
127	-8	-4	16	48	$5X_A + 4Y_A + 56 = 0,$	$X_A + 12Y_A + 56 = 0$
128	9	0	-21	53	$-10X_A - 3Y_A + 90 = 0,$	$-5X_A - 6Y_A + 45 = 0$
129	-8	3	16	37	$-4X_A + 3Y_A - 41 = 0,$	$X_A + 11Y_A - 41 = 0$
130	19	11	-27	31	$3X_A - 3Y_A - 24 = 0,$	$7X_A - 11Y_A - 12 = 0$
131	1	3	-13	72	$5X_A - 5Y_A + 10 = 0,$	$8X_A - 6Y_A + 10 = 0$
132	-8	3	16	60	$4X_A + 3Y_A + 23 = 0,$	$7X_A + 11Y_A + 23 = 0$
133	0	5	-8	43	$4X_A - 4Y_A + 20 = 0,$	$9X_A - 4Y_A + 20 = 0$
134	8	-7	-20	25	$3X_A - 4Y_A - 52 = 0,$	$-2X_A - 6Y_A - 26 = 0$
135	0	-4	-4	49	$-5X_A - 3Y_A - 12 = 0,$	$-9X_A - 3Y_A - 12 = 0$
136	23	-2	-35	43	$4X_A - 3Y_A - 98 = 0,$	$X_A - 13Y_A - 49 = 0$
137	-1	-5	5	54	$-4X_A + 3Y_A + 11 = 0,$	$-9X_A + 4Y_A + 11 = 0$