

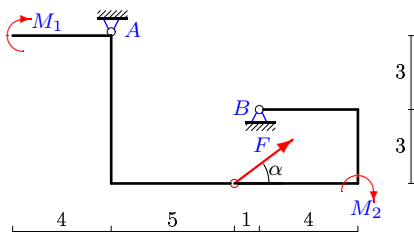
Тяжелая составная рама из двух частей

Плоская рама, состоящая из двух шарнирно соединенных частей, расположена в вертикальной плоскости. Задан погонный вес ρ 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 S-36.1.

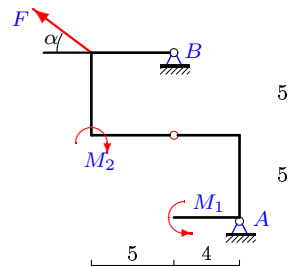
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$F = 15$ кН, $M_1 = 28.5$ кНМ, $M_2 = 35.5$ кНМ,
 $\rho = 1$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.2.

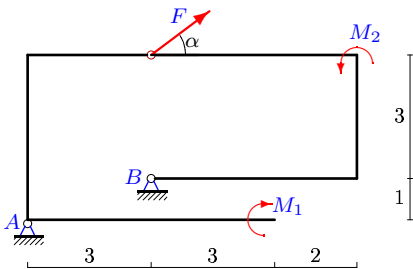
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$F = 15$ кН, $M_1 = 32$ кНМ, $M_2 = 35$ кНМ,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.3.

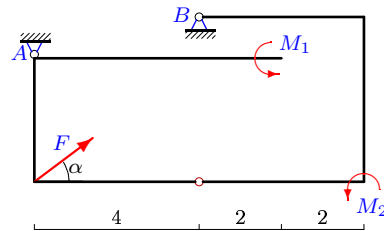
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$F = 15$ кН, $M_1 = 67.5$ кНМ, $M_2 = 165$ кНМ,
 $\rho = 3$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.4.

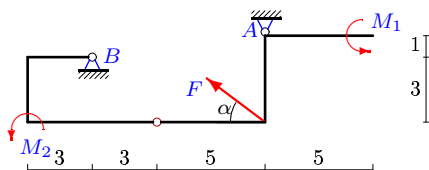
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$F = 15$ кН, $M_1 = 0$ кНМ, $M_2 = 16$ кНМ,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.5.

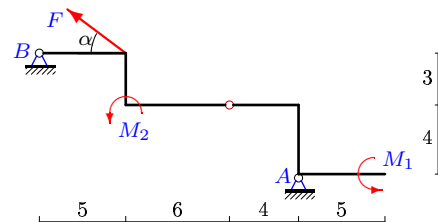
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$F = 15$ кН, $M_1 = 41$ кНМ, $M_2 = 93$ кНМ,
 $\rho = 2$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.6.

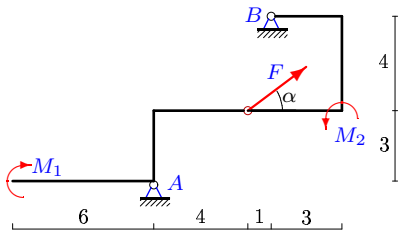
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$F = 15$ кН, $M_1 = 233.5$ кНМ, $M_2 = 578.5$ кНМ,
 $\rho = 3$ кН/м, $\cos \alpha = 0,8$.

Задача S-36.7.

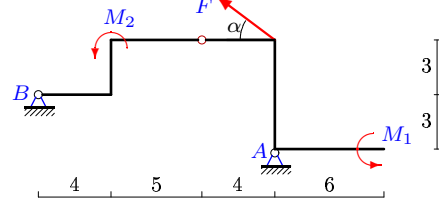
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$F = 5 \text{ кН}$, $M_1 = 111 \text{ кНМ}$, $M_2 = 2 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.8.

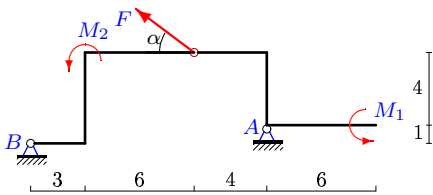
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$F = 5 \text{ кН}$, $M_1 = 202 \text{ кНМ}$, $M_2 = 354 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.9.

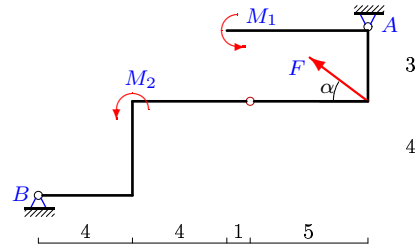
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$F = 15 \text{ кН}$, $M_1 = 310 \text{ кНМ}$, $M_2 = 347,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.10.

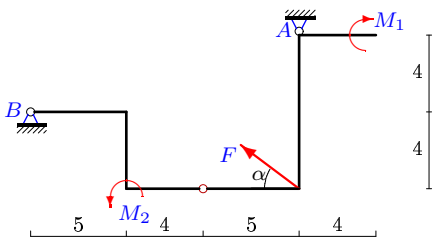
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$F = 10 \text{ кН}$, $M_1 = 42 \text{ кНМ}$, $M_2 = 279 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.11.

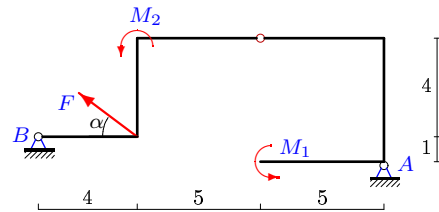
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$F = 10 \text{ кН}$, $M_1 = 41,5 \text{ кНМ}$, $M_2 = 191,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.12.

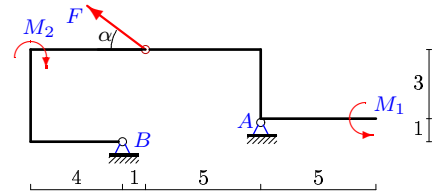
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$F = 15 \text{ кН}$, $M_1 = 215 \text{ кНМ}$, $M_2 = 538,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.13.

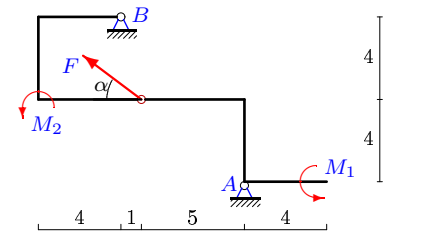
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$F = 5 \text{ кН}$, $M_1 = 88 \text{ кНМ}$, $M_2 = 37,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.14.

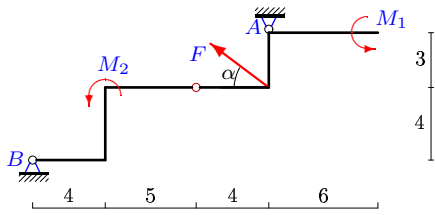
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$F = 10 \text{ кН}$, $M_1 = 28,5 \text{ кНМ}$, $M_2 = 23,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.15.

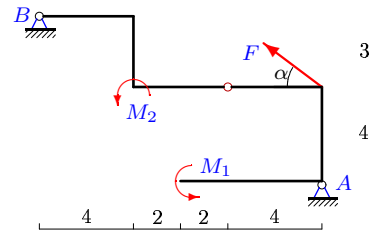
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$F = 5 \text{ кН}$, $M_1 = 101 \text{ кНМ}$, $M_2 = 304 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

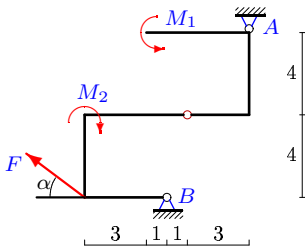
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$F = 5 \text{ кН}$, $M_1 = 68 \text{ кНМ}$, $M_2 = 300 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

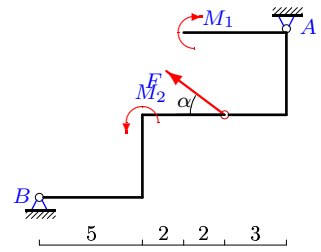
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$F = 15 \text{ кН}$, $M_1 = 65 \text{ кНМ}$, $M_2 = 22,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

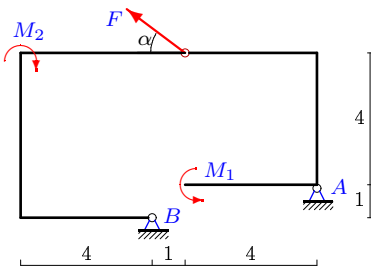
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$F = 15 \text{ кН}$, $M_1 = 5 \text{ кНМ}$, $M_2 = 39,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

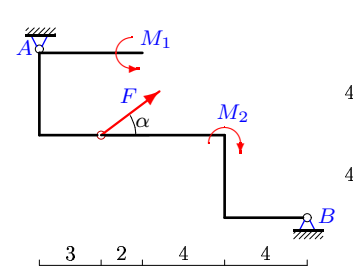
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$F = 10 \text{ кН}$, $M_1 = 88 \text{ кНМ}$, $M_2 = 93 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

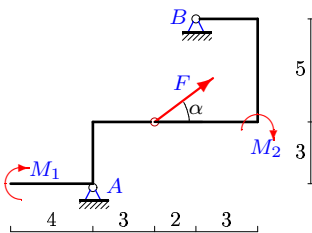
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$F = 15 \text{ кН}$, $M_1 = 18 \text{ кНМ}$, $M_2 = 262 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

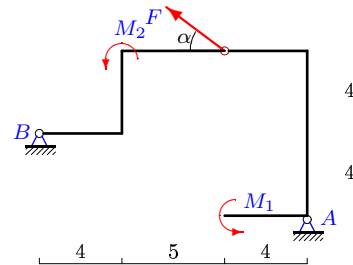
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$F = 5 \text{ кН}$, $M_1 = 15,5 \text{ кНМ}$, $M_2 = 21 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

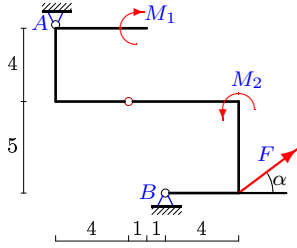
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$F = 5 \text{ кН}$, $M_1 = 184 \text{ кНМ}$, $M_2 = 358 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

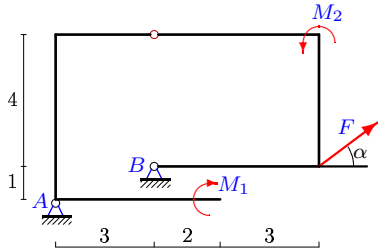
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$F = 10 \text{ кН}$, $M_1 = 118.5 \text{ кНМ}$, $M_2 = 12 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

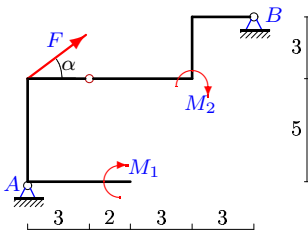
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$F = 15 \text{ кН}$, $M_1 = 78 \text{ кНМ}$, $M_2 = 90 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

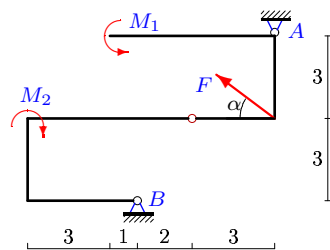
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$F = 15 \text{ кН}$, $M_1 = 79 \text{ кНМ}$, $M_2 = 223 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

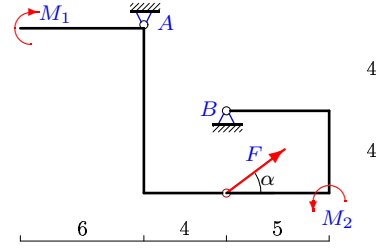
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$F = 10 \text{ кН}$, $M_1 = 15 \text{ кНМ}$, $M_2 = 43 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

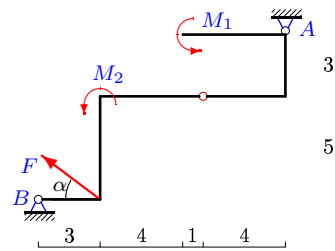
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$F = 10 \text{ кН}$, $M_1 = 230 \text{ кНМ}$, $M_2 = 103 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

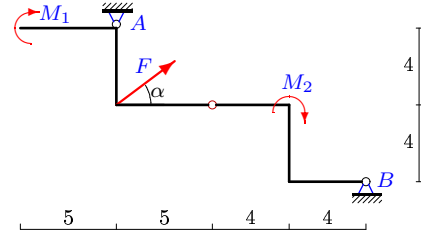
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$F = 10 \text{ кН}$, $M_1 = 23.5 \text{ кНМ}$, $M_2 = 125 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

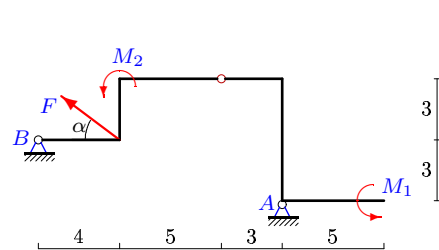
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$F = 10 \text{ кН}$, $M_1 = 98 \text{ кНМ}$, $M_2 = 240 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

17



$F = 5 \text{ кН}$, $M_1 = 113 \text{ кНМ}$, $M_2 = 166.5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

S-36

Ответы.
Тяжелая составная рама из двух частей

13.02.2015

№	X_A	Y_A	X_B	Y_B	$\sum M_C = 0$	$\sum M_B = 0$
1	7	0	-19	18	$-6X_A - 5Y_A + 42 = 0,$	$-3X_A - 6Y_A + 21 = 0$
2	-4	15	16	32	$5X_A + 4Y_A - 40 = 0,$	$10X_A + 4Y_A - 20 = 0$
3	3	-2	-15	71	$4X_A - 3Y_A - 18 = 0,$	$X_A - 3Y_A - 9 = 0$
4	0	4	-12	37	$-3X_A - 4Y_A + 16 = 0,$	$X_A - 4Y_A + 16 = 0$
5	-11	2	23	41	$-4X_A + 5Y_A - 54 = 0,$	$X_A + 8Y_A - 27 = 0$
6	-26	10	38	62	$4X_A + 4Y_A + 64 = 0,$	$7X_A + 15Y_A + 32 = 0$
7	1	4	-5	41	$3X_A - 4Y_A + 13 = 0,$	$7X_A - 5Y_A + 13 = 0$
8	-9	-3	13	56	$6X_A + 4Y_A + 66 = 0,$	$3X_A + 13Y_A + 66 = 0$
9	-22	-6	34	81	$4X_A + 4Y_A + 112 = 0,$	$X_A + 13Y_A + 56 = 0$
10	-9	-4	17	52	$-3X_A + 5Y_A - 7 = 0,$	$-7X_A + 14Y_A - 7 = 0$
11	-9	4	17	20	$-8X_A + 5Y_A - 92 = 0,$	$-4X_A + 14Y_A - 92 = 0$
12	-9	-4	21	79	$5X_A + 5Y_A + 65 = 0,$	$X_A + 14Y_A + 65 = 0$
13	-1	-4	5	27	$3X_A + 5Y_A + 23 = 0,$	$X_A + 6Y_A + 23 = 0$
14	-7	12	15	8	$4X_A + 5Y_A - 32 = 0,$	$8X_A + 6Y_A - 16 = 0$
15	-9	-4	13	53	$-3X_A + 4Y_A - 11 = 0,$	$-7X_A + 13Y_A - 11 = 0$
16	-8	3	12	44	$4X_A + 4Y_A + 20 = 0,$	$7X_A + 12Y_A + 20 = 0$
17	-1	-4	13	70	$-4X_A + 3Y_A + 8 = 0,$	$-8X_A + 4Y_A + 8 = 0$
18	-9	-4	21	20	$-4X_A + 3Y_A - 24 = 0,$	$-8X_A + 12Y_A - 24 = 0$
19	-1	-5	9	51	$4X_A + 4Y_A + 24 = 0,$	$X_A + 5Y_A + 24 = 0$
20	23	-12	-35	55	$-4X_A - 3Y_A + 56 = 0,$	$-8X_A - 13Y_A + 28 = 0$
21	7	13	-11	7	$3X_A - 3Y_A + 18 = 0,$	$8X_A - 5Y_A + 9 = 0$
22	-9	-4	13	59	$8X_A + 4Y_A + 88 = 0,$	$4X_A + 13Y_A + 88 = 0$
23	8	-14	-16	92	$-4X_A - 4Y_A - 24 = 0,$	$-9X_A - 6Y_A - 12 = 0$
24	0	4	-8	86	$-8X_A - 4Y_A + 16 = 0,$	$-4X_A - 4Y_A + 16 = 0$
25	0	-4	-12	76	$5X_A - 3Y_A - 12 = 0,$	$X_A - 3Y_A - 12 = 0$
26	-8	-5	16	24	$-3X_A + 4Y_A - 4 = 0,$	$-8X_A + 12Y_A - 4 = 0$
27	19	11	-31	28	$5X_A - 3Y_A - 62 = 0,$	$8X_A - 11Y_A - 31 = 0$
28	8	-4	-16	50	$-4X_A - 5Y_A + 12 = 0,$	$-8X_A - 13Y_A + 12 = 0$
29	-7	-9	15	53	$-3X_A + 3Y_A + 6 = 0,$	$-6X_A + 5Y_A + 3 = 0$
30	-9	-3	13	26	$6X_A + 3Y_A + 63 = 0,$	$3X_A + 12Y_A + 63 = 0$