

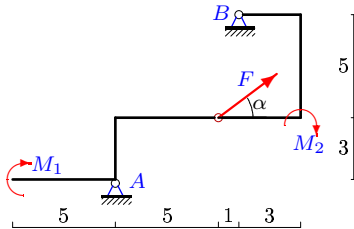
Тяжелая составная рама из двух частей

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.

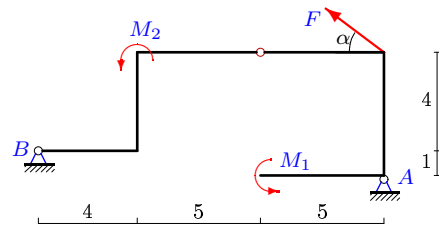
20



$F = 5 \text{ кН}$, $M_1 = 43 \text{ кНм}$, $M_2 = 6.5 \text{ кНм}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.2.

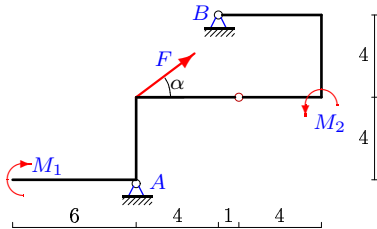
20



$F = 10 \text{ кН}$, $M_1 = 185 \text{ кНм}$, $M_2 = 488.5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.3.

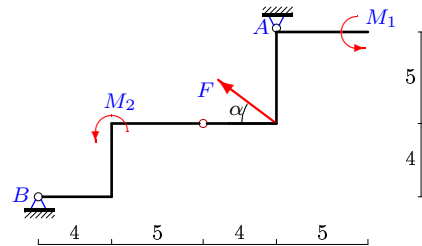
20



$F = 10 \text{ кН}$, $M_1 = 107 \text{ кНм}$, $M_2 = 81 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.4.

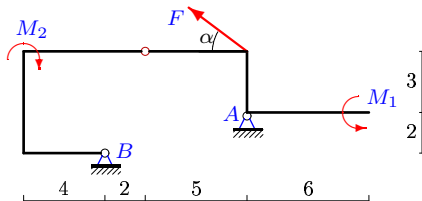
20



$F = 5 \text{ кН}$, $M_1 = 111.5 \text{ кНм}$, $M_2 = 533.5 \text{ кНм}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.5.

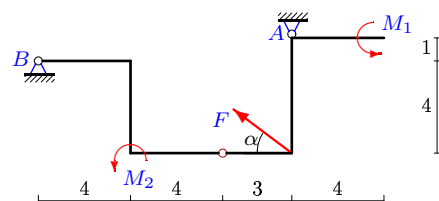
20



$F = 10 \text{ кН}$, $M_1 = 183 \text{ кНм}$, $M_2 = 95 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.6.

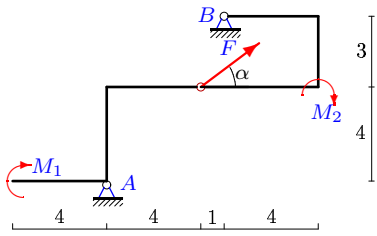
20



$F = 10 \text{ кН}$, $M_1 = 9 \text{ кНм}$, $M_2 = 272 \text{ кНм}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.7.

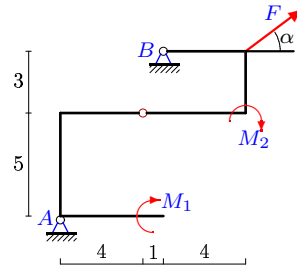
20



$F = 15 \text{ кН}$, $M_1 = 80 \text{ кНМ}$, $M_2 = 4 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.8.

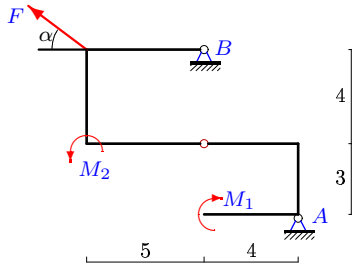
20



$F = 15 \text{ кН}$, $M_1 = 64 \text{ кНМ}$, $M_2 = 9 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.9.

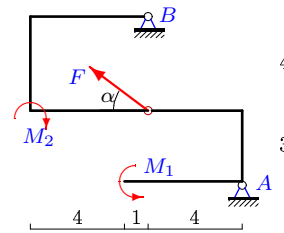
20



$F = 10 \text{ кН}$, $M_1 = 4 \text{ кНМ}$, $M_2 = 1 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.10.

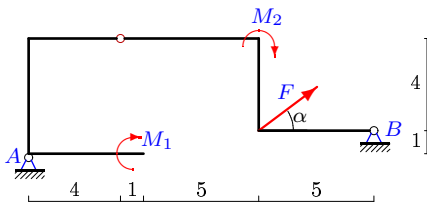
20



$F = 5 \text{ кН}$, $M_1 = 39 \text{ кНМ}$, $M_2 = 74 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.11.

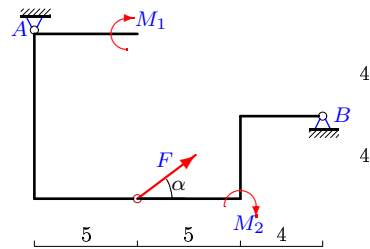
20



$F = 10 \text{ кН}$, $M_1 = 248,5 \text{ кНМ}$, $M_2 = 602,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.12.

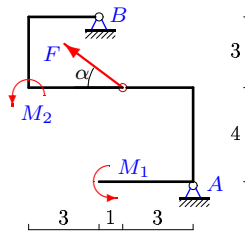
20



$F = 5 \text{ кН}$, $M_1 = 103 \text{ кНМ}$, $M_2 = 644,5 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.13.

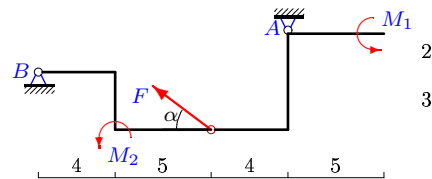
20



$F = 10 \text{ кН}$, $M_1 = 36 \text{ кНМ}$, $M_2 = 5 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.14.

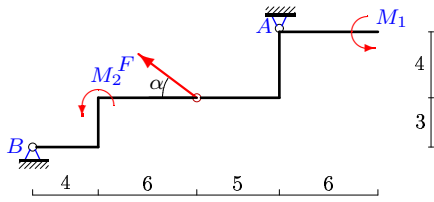
20



$F = 5 \text{ кН}$, $M_1 = 64 \text{ кНМ}$, $M_2 = 342 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.15.

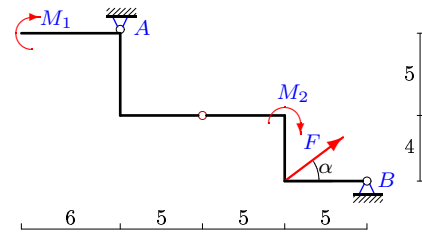
20



$F = 15 \text{ кН}$, $M_1 = 191.5 \text{ кНМ}$, $M_2 = 535 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.16.

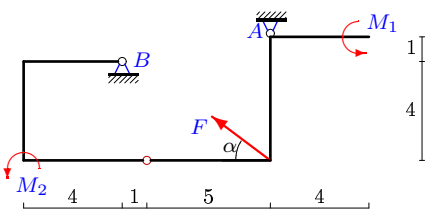
20



$F = 5 \text{ кН}$, $M_1 = 196.5 \text{ кНМ}$, $M_2 = 705 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.17.

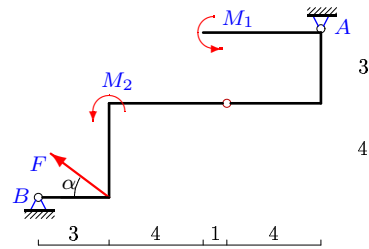
20



$F = 5 \text{ кН}$, $M_1 = 66 \text{ кНМ}$, $M_2 = 3 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.18.

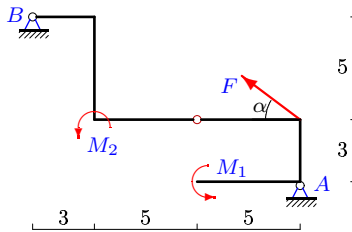
20



$F = 10 \text{ кН}$, $M_1 = 47 \text{ кНМ}$, $M_2 = 262 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.19.

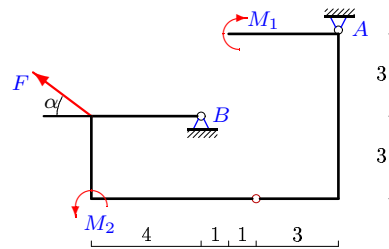
20



$F = 10 \text{ кН}$, $M_1 = 48 \text{ кНМ}$, $M_2 = 295 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.20.

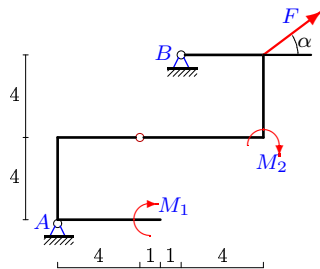
20



$F = 15 \text{ кН}$, $M_1 = 15.5 \text{ кНМ}$, $M_2 = 57 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.21.

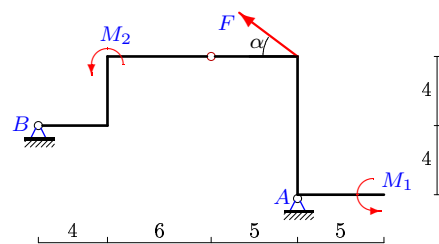
20



$F = 15 \text{ кН}$, $M_1 = 78.5 \text{ кНМ}$, $M_2 = 32 \text{ кНМ}$,
 $\rho = 3 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.22.

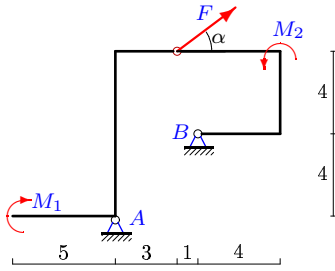
20



$F = 5 \text{ кН}$, $M_1 = 275 \text{ кНМ}$, $M_2 = 100 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.23.

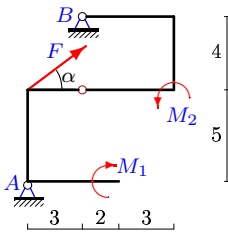
20



$F = 5 \text{ кН}$, $M_1 = 152 \text{ кНМ}$, $M_2 = 70 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.25.

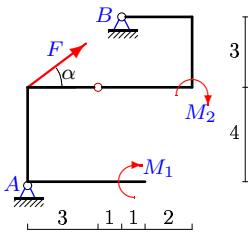
20



$F = 5 \text{ кН}$, $M_1 = 11 \text{ кНМ}$, $M_2 = 62 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.27.

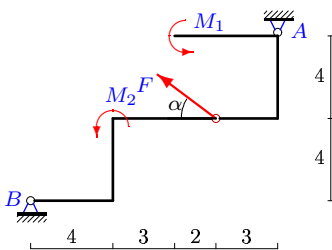
20



$F = 5 \text{ кН}$, $M_1 = 5 \text{ кНМ}$, $M_2 = 3,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.29.

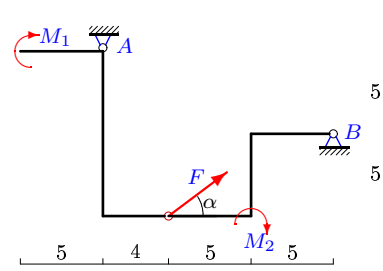
20



$F = 10 \text{ кН}$, $M_1 = 14 \text{ кНМ}$, $M_2 = 243 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.24.

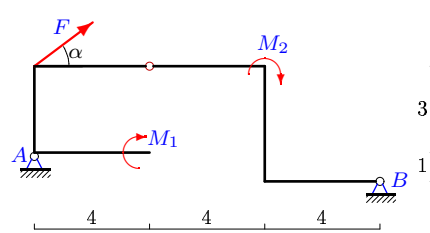
20



$F = 10 \text{ кН}$, $M_1 = 41 \text{ кНМ}$, $M_2 = 510 \text{ кНМ}$,
 $\rho = 2 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.26.

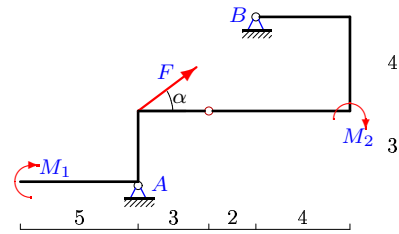
20



$F = 5 \text{ кН}$, $M_1 = 56 \text{ кНМ}$, $M_2 = 96 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.28.

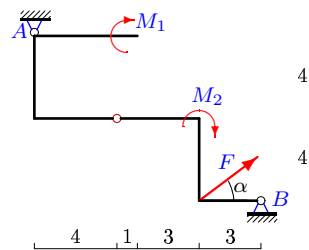
20



$F = 5 \text{ кН}$, $M_1 = 20 \text{ кНМ}$, $M_2 = 8 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

Задача S-36.30.

20



$F = 10 \text{ кН}$, $M_1 = 19,5 \text{ кНМ}$, $M_2 = 109,5 \text{ кНМ}$,
 $\rho = 1 \text{ кН/м}$, $\cos \alpha = 0,8$.

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	1	5	-5	17	$3X_A - 5Y_A + 22 = 0,$	$8X_A - 6Y_A + 22 = 0$
2	-9	-4	17	82	$5X_A + 5Y_A + 65 = 0,$	$X_A + 14Y_A + 65 = 0$
3	-1	4	-7	46	$4X_A - 5Y_A + 24 = 0,$	$8X_A - 4Y_A + 24 = 0$
4	-22	-13	26	91	$-5X_A + 4Y_A - 58 = 0,$	$-9X_A + 13Y_A - 29 = 0$
5	-9	-7	17	59	$3X_A + 5Y_A + 62 = 0,$	$-2X_A + 7Y_A + 31 = 0$
6	-8	4	16	38	$-5X_A + 3Y_A - 52 = 0,$	$X_A + 11Y_A - 52 = 0$
7	6	10	-18	29	$4X_A - 4Y_A + 16 = 0,$	$7X_A - 5Y_A + 8 = 0$
8	1	3	-13	40	$5X_A - 4Y_A + 7 = 0,$	$8X_A - 5Y_A + 7 = 0$
9	-4	11	12	8	$3X_A + 4Y_A - 32 = 0,$	$7X_A + 4Y_A - 16 = 0$
10	0	4	4	45	$3X_A + 4Y_A - 16 = 0,$	$7X_A + 4Y_A - 16 = 0$
11	26	-3	-34	84	$5X_A - 4Y_A - 142 = 0,$	$X_A - 15Y_A - 71 = 0$
12	9	4	-13	86	$-8X_A - 5Y_A + 92 = 0,$	$-4X_A - 14Y_A + 92 = 0$
13	-1	3	9	33	$4X_A + 3Y_A - 5 = 0,$	$7X_A + 4Y_A - 5 = 0$
14	-9	3	13	46	$-5X_A + 4Y_A - 57 = 0,$	$-2X_A + 13Y_A - 57 = 0$
15	-25	-10	37	85	$-4X_A + 5Y_A - 50 = 0,$	$-7X_A + 15Y_A - 25 = 0$
16	25	-13	-29	100	$-5X_A - 5Y_A + 60 = 0,$	$-9X_A - 15Y_A + 30 = 0$
17	-7	3	11	48	$-5X_A + 5Y_A - 50 = 0,$	$X_A + 6Y_A - 25 = 0$
18	-8	-4	16	46	$-3X_A + 4Y_A - 8 = 0,$	$-7X_A + 12Y_A - 8 = 0$
19	-21	13	29	33	$3X_A + 5Y_A - 2 = 0,$	$8X_A + 13Y_A - = 0$
20	-7	0	19	17	$-6X_A + 3Y_A - 42 = 0,$	$-3X_A + 5Y_A - 21 = 0$
21	8	12	-20	60	$4X_A - 4Y_A + 16 = 0,$	$8X_A - 6Y_A + 8 = 0$
22	-25	0	29	29	$8X_A + 5Y_A + 200 = 0,$	$4X_A + 15Y_A + 100 = 0$
23	5	0	-9	55	$8X_A - 3Y_A - 40 = 0,$	$4X_A - 4Y_A - 20 = 0$
24	10	5	-18	57	$-10X_A - 4Y_A + 120 = 0,$	$-5X_A - 14Y_A + 120 = 0$
25	3	13	-7	38	$5X_A - 3Y_A + 24 = 0,$	$9X_A - 3Y_A + 12 = 0$
26	8	-4	-12	24	$3X_A - 4Y_A - 40 = 0,$	$X_A - 12Y_A - 40 = 0$
27	1	3	-5	16	$4X_A - 3Y_A + 5 = 0,$	$7X_A - 4Y_A + 5 = 0$
28	7	11	-11	11	$3X_A - 3Y_A + 12 = 0,$	$7X_A - 5Y_A + 6 = 0$
29	-9	-4	17	48	$-4X_A + 3Y_A - 24 = 0,$	$-8X_A + 12Y_A - 24 = 0$
30	7	-4	-15	22	$-4X_A - 4Y_A + 12 = 0,$	$-8X_A - 11Y_A + 12 = 0$

S-36 файл о36s20A