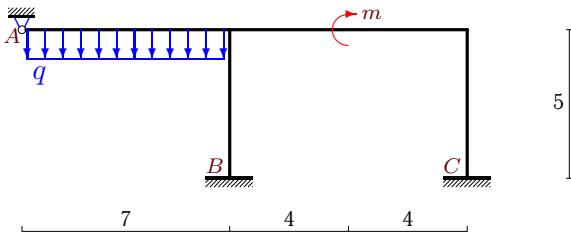


Статически неопределимая рама (метод перемещений, 1)

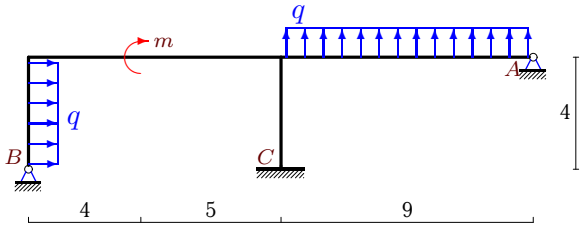
Найти реакции опор рамы.

Задача 32.1.



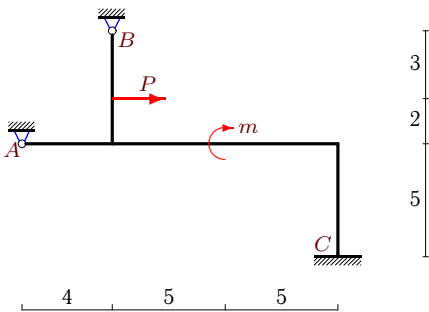
$q = 5 \text{ кН/м}, m = 4 \text{ кНм.}$

Задача 32.2.



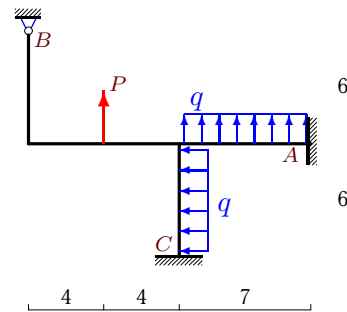
$q = 5 \text{ кН/м}, m = 5 \text{ кНм.}$

Задача 32.3.



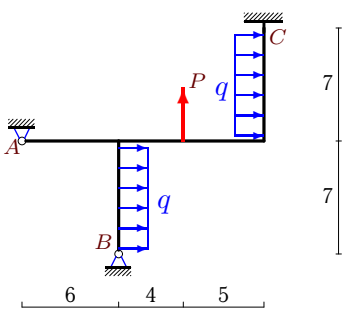
$P = 5 \text{ кН}, m = 7 \text{ кНм.}$

Задача 32.4.



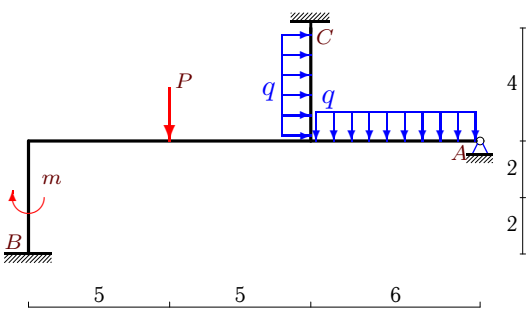
$q = 7 \text{ кН/м}, P = 6 \text{ кН},$

Задача 32.5.



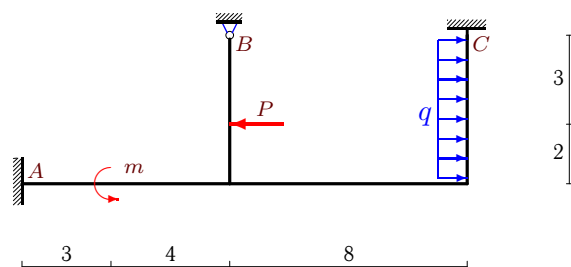
$q = 8 \text{ кН/м}, P = 7 \text{ кН},$

Задача 32.6.



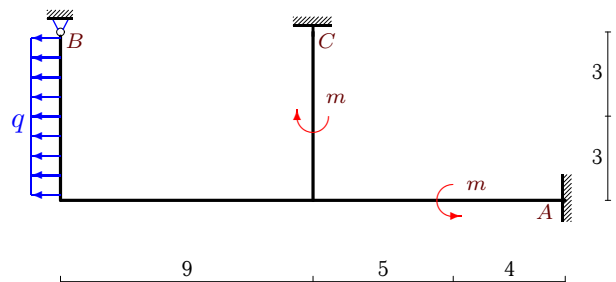
$q = 8 \text{ кН/м}, P = 8 \text{ кН}, m = 11 \text{ кНм.}$

Задача 32.7.



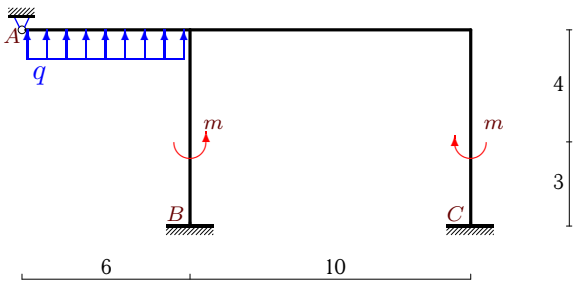
$q = 10 \text{ кН/м}, P = 9 \text{ кН}, m = 13 \text{ кНм.}$

Задача 32.8.



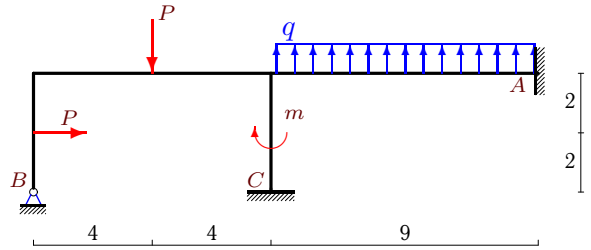
$q = 11 \text{ кН/м}, m = 16 \text{ кНм.}$

Задача 32.9.



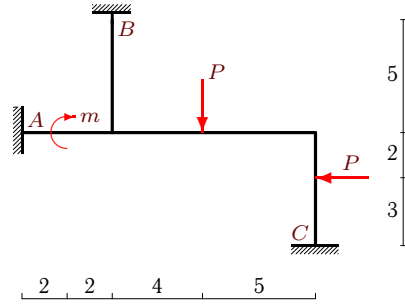
$q = 11 \text{ кН/м}, m = 18 \text{ кНм}.$

Задача 32.10.



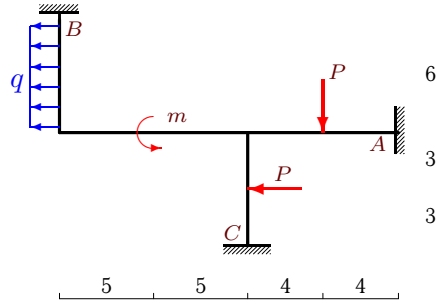
$q = 11 \text{ кН/м}, P = 12 \text{ кН}, m = 18 \text{ кНм}.$

Задача 32.11.



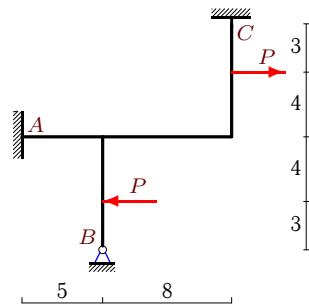
$P = 13 \text{ кН}, m = 20 \text{ кНм}.$

Задача 32.12.



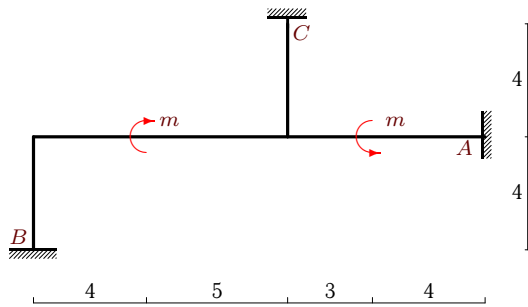
$q = 11 \text{ кН/м}, P = 14 \text{ кН}, m = 22 \text{ кНм}.$

Задача 32.13.



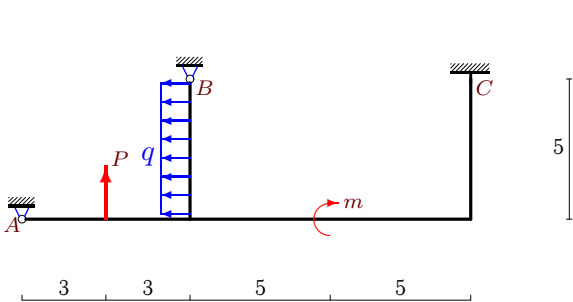
$P = 15 \text{ кН},$

Задача 32.14.



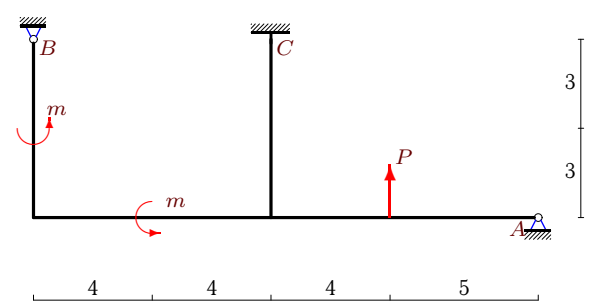
$m = 4 \text{ кНм}.$

Задача 32.15.



$q = 5 \text{ кН/м}, P = 4 \text{ кН}, m = 6 \text{ кНм}.$

Задача 32.16.



$P = 5 \text{ кН}, m = 7 \text{ кНм}.$

Статически неопределимая рама (метод перемещений, 1)

Коэффициенты системы уравнений и решение системы

№	r_{11}	r_{12}	r_{22}	R_{1p}	R_{2p}	Z_1	Z_2
1	1.729	0.250	1.300	31.625	1.000	-18.704	2.828
2	1.194	0.222	1.778	10.926	52.106	-3.782	-28.837
3	1.750	0.200	1.200	-3.050	1.750	1.947	-1.783
4	1.000	0.250	1.738	6.000	1.583	-5.988	-0.050
5	1.373	0.222	1.016	57.642	-39.580	-50.060	49.913
6	1.400	0.200	1.900	-7.250	-36.667	2.459	19.039
7	1.671	0.250	1.300	4.660	-20.833	-5.339	17.052
8	0.944	0.222	1.556	49.500	-0.741	-54.351	8.241
9	1.471	0.200	0.971	-55.010	5.510	39.255	-13.754
10	1.250	0.250	1.944	-3.000	90.750	12.044	-48.220
11	2.244	0.222	1.244	-11.049	3.480	5.293	-3.741
12	1.067	0.200	1.567	27.500	-30.000	-30.092	22.990
13	1.729	0.250	1.071	-18.367	-11.020	9.457	8.079
14	1.444	0.222	2.016	0.741	0.532	-0.480	-0.211
15	1.500	0.200	1.200	12.625	1.500	-8.438	0.156
16	1.000	0.250	1.500	-2.625	6.892	3.938	-5.251

Реакции опор.

№	M_A	X_A	Y_A	M_B	X_B	Y_B	M_C	X_C	Y_C
1	—	3.810	-20.730	7.482	-4.489	87.093	-1.131	0.679	-31.363
2	—	-0.977	36.028	—	-8.209	55.565	14.419	-10.814	-136.593
3	—	-3.299	-0.365	—	-1.274	-0.695	0.713	-0.428	1.060
4	28.598	20.509	37.564	—	0.499	51.877	-20.983	20.992	-144.441
5	—	-53.823	4.172	—	-24.065	-8.242	-46.927	-34.112	-2.930
6	—	-13.907	-40.655	-3.979	5.047	-33.435	-20.186	-23.140	130.090
7	3.648	-14.420	3.383	—	2.513	-4.481	-27.654	-29.093	1.098
8	1.132	42.094	-1.012	—	29.279	4.427	-6.747	-5.373	-3.416
9	—	-3.123	37.979	-8.277	1.028	-145.109	0.991	2.094	41.130
10	84.966	0.824	70.903	—	-1.492	148.863	19.610	-11.332	-306.766
11	-7.647	10.592	-9.485	-2.117	-1.270	16.949	-4.743	3.678	5.536
12	-19.748	31.153	-9.931	43.031	38.015	-11.543	-18.163	10.832	35.474
13	-3.783	3.559	-2.270	—	6.527	0.626	-17.002	-10.085	1.644
14	1.285	0.101	-0.379	0.240	-0.180	-0.229	0.106	0.079	0.607
15	—	14.650	3.453	—	10.387	-10.256	-0.063	-0.038	2.803
16	—	-1.860	3.935	—	0.984	7.501	1.750	0.875	-16.436