

Расчет составной конструкции с распределенными нагрузками

Найти реакции опор плоской составной рамы, находящейся под действием линейно распределенной нагрузки с максимальной интенсивностью q_1 и нагрузки с интенсивностью q_2 , равномерно распределенной по дуге окружности. Участок CD представляет собой четверть окружности радиуса R с центром в O .

Кирсанов М.Н. Решебник. Теоретическая механика с. 61.

Вариант 1
С9.

$q_1 = 6 \text{ кН/м,}$	$R = 8 \text{ м,}$
$q_2 = 12 \text{ кН/м,}$	$AB = 6 \text{ м,}$
$BC = 9 \text{ м,}$	$DE = 6 \text{ м.}$

Вариант 2
С9.

$q_1 = 7 \text{ кН/м,}$	$R = 7 \text{ м,}$
$q_2 = 7 \text{ кН/м,}$	$AB = 7 \text{ м,}$
$BC = 10 \text{ м,}$	$DK = \pi R/3 \text{ м,}$
$DE = 5 \text{ м.}$	

Вариант 3
С9.

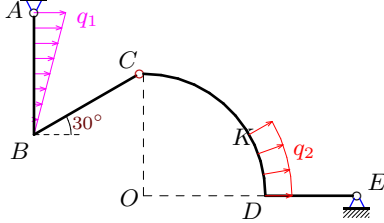
$q_1 = 4 \text{ кН/м,}$	$R = 6 \text{ м,}$
$q_2 = 12 \text{ кН/м,}$	$AB = 6 \text{ м,}$
$BC = 9 \text{ м,}$	$DE = 5 \text{ м.}$

Вариант 4
С9.

$q_1 = 10 \text{ кН/м,}$	$R = 7 \text{ м,}$
$q_2 = 4 \text{ кН/м,}$	$AB = 8 \text{ м,}$
$BC = 8 \text{ м,}$	$DK = \pi R/6 \text{ м,}$
$DE = 5 \text{ м.}$	

Вариант 5

C9.



$$q_1 = 12 \text{ кН/м}, \quad R = 8 \text{ м},$$

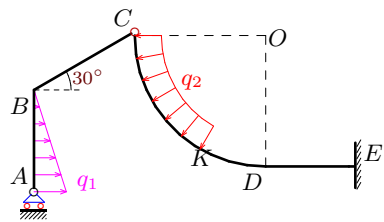
$$q_2 = 3 \text{ кН/м}, \quad AB = 8 \text{ м},$$

$$BC = 8 \text{ м}, \quad DK = \pi R/6 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 6

C9.



$$q_1 = 8 \text{ кН/м}, \quad R = 9 \text{ м},$$

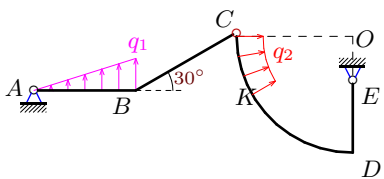
$$q_2 = 8 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad CK = \pi R/3 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 7

C9.



$$q_1 = 12 \text{ кН/м}, \quad R = 8 \text{ м},$$

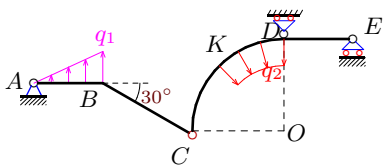
$$q_2 = 3 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad CK = \pi R/6 \text{ м},$$

$$DE = 5 \text{ м}.$$

Вариант 8

C9.



$$q_1 = 11 \text{ кН/м}, \quad R = 8 \text{ м},$$

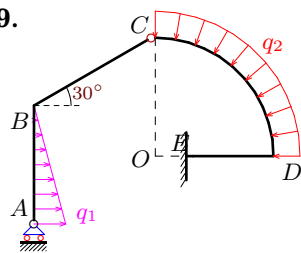
$$q_2 = 7 \text{ кН/м}, \quad AB = 6 \text{ м},$$

$$BC = 9 \text{ м}, \quad DK = \pi R/4 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 9

C9.



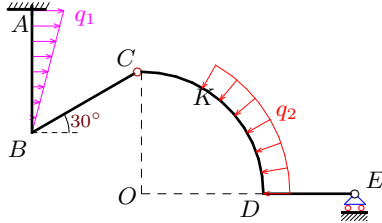
$$q_1 = 4 \text{ кН/м}, \quad R = 7 \text{ м},$$

$$q_2 = 10 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad DE = 5 \text{ м}.$$

Вариант 10

С9.



$$q_1 = 8 \text{ кН/м}, \quad R = 8 \text{ м},$$

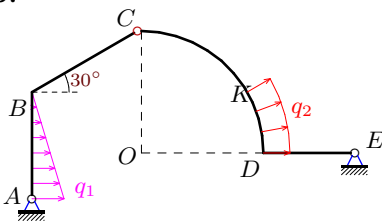
$$q_2 = 7 \text{ кН/м}, \quad AB = 8 \text{ м},$$

$$BC = 8 \text{ м}, \quad DK = \pi R/3 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 11

С9.



$$q_1 = 12 \text{ кН/м}, \quad R = 8 \text{ м},$$

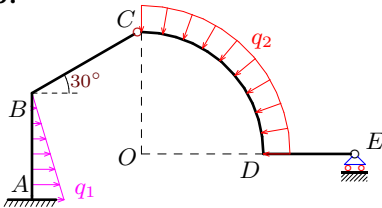
$$q_2 = 3 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad DK = \pi R/6 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 12

С9.



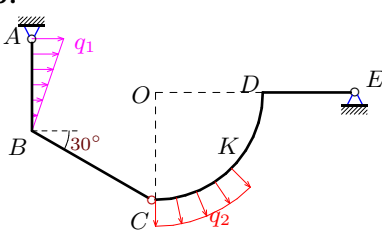
$$q_1 = 6 \text{ кН/м}, \quad R = 8 \text{ м},$$

$$q_2 = 9 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad DE = 6 \text{ м}.$$

Вариант 13

С9.



$$q_1 = 9 \text{ кН/м}, \quad R = 7 \text{ м},$$

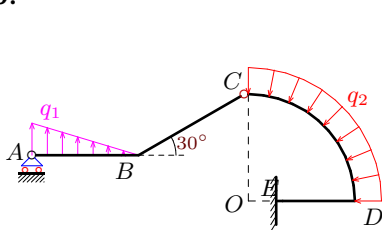
$$q_2 = 8 \text{ кН/м}, \quad AB = 6 \text{ м},$$

$$BC = 9 \text{ м}, \quad CK = \pi R/4 \text{ м},$$

$$DE = 6 \text{ м}.$$

Вариант 14

С9.



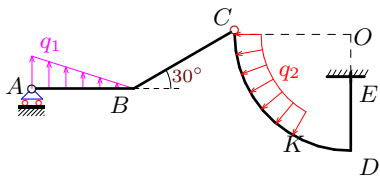
$$q_1 = 4 \text{ кН/м}, \quad R = 7 \text{ м},$$

$$q_2 = 10 \text{ кН/м}, \quad AB = 7 \text{ м},$$

$$BC = 8 \text{ м}, \quad DE = 5 \text{ м}.$$

Вариант 15

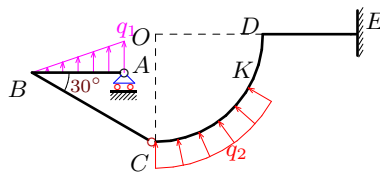
C9.



$$\begin{aligned} q_1 &= 7 \text{ кН/м}, & R &= 8 \text{ м}, \\ q_2 &= 8 \text{ кН/м}, & AB &= 7 \text{ м}, \\ BC &= 8 \text{ м}, & CK &= \pi R/3 \text{ м}, \\ DE &= 5 \text{ м}. \end{aligned}$$

Вариант 16

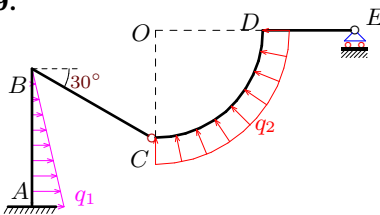
C9.



$$\begin{aligned} q_1 &= 7 \text{ кН/м}, & R &= 7 \text{ м}, \\ q_2 &= 10 \text{ кН/м}, & AB &= 6 \text{ м}, \\ BC &= 9 \text{ м}, & CK &= \pi R/3 \text{ м}, \\ DE &= 6 \text{ м}. \end{aligned}$$

Вариант 17

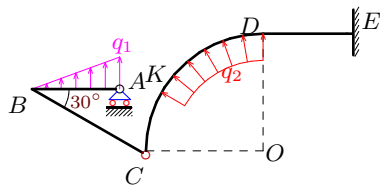
C9.



$$\begin{aligned} q_1 &= 6 \text{ кН/м}, & R &= 7 \text{ м}, \\ q_2 &= 11 \text{ кН/м}, & AB &= 9 \text{ м}, \\ BC &= 9 \text{ м}, & DE &= 6 \text{ м}. \end{aligned}$$

Вариант 18

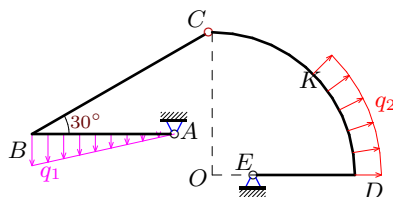
C9.



$$\begin{aligned} q_1 &= 8 \text{ кН/м}, & R &= 8 \text{ м}, \\ q_2 &= 10 \text{ кН/м}, & AB &= 6 \text{ м}, \\ BC &= 9 \text{ м}, & DK &= \pi R/3 \text{ м}, \\ DE &= 6 \text{ м}. \end{aligned}$$

Вариант 19

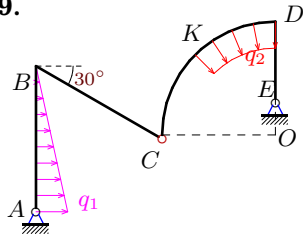
C9.



$$\begin{aligned} q_1 &= 8 \text{ кН/м}, & R &= 7 \text{ м}, \\ q_2 &= 6 \text{ кН/м}, & AB &= 7 \text{ м}, \\ BC &= 10 \text{ м}, & DK &= \pi R/4 \text{ м}, \\ DE &= 5 \text{ м}. \end{aligned}$$

Вариант 20

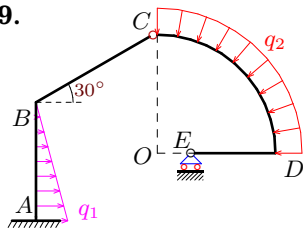
C9.



$$\begin{aligned}
 q_1 &= 9 \text{ кН/м}, & R &= 7 \text{ м}, \\
 q_2 &= 8 \text{ кН/м}, & AB &= 9 \text{ м}, \\
 BC &= 9 \text{ м}, & DK &= \pi R/4 \text{ м}, \\
 DE &= 5 \text{ м}.
 \end{aligned}$$

Вариант 21

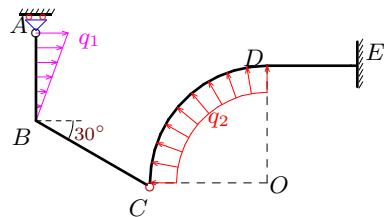
C9.



$$\begin{aligned}
 q_1 &= 5 \text{ кН/м}, & R &= 7 \text{ м}, \\
 q_2 &= 9 \text{ кН/м}, & AB &= 7 \text{ м}, \\
 BC &= 8 \text{ м}, & DE &= 5 \text{ м}.
 \end{aligned}$$

Вариант 22

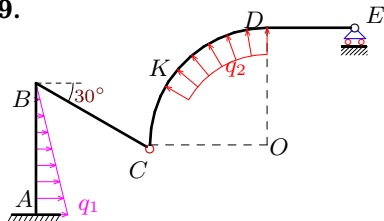
C9.



$$\begin{aligned}
 q_1 &= 6 \text{ кН/м}, & R &= 8 \text{ м}, \\
 q_2 &= 12 \text{ кН/м}, & AB &= 6 \text{ м}, \\
 BC &= 9 \text{ м}, & DE &= 6 \text{ м}.
 \end{aligned}$$

Вариант 23

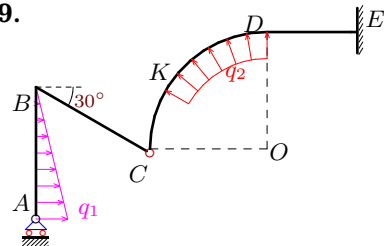
C9.



$$\begin{aligned}
 q_1 &= 9 \text{ кН/м}, & R &= 8 \text{ м}, \\
 q_2 &= 9 \text{ кН/м}, & AB &= 9 \text{ м}, \\
 BC &= 9 \text{ м}, & DK &= \pi R/3 \text{ м}, \\
 DE &= 6 \text{ м}.
 \end{aligned}$$

Вариант 24

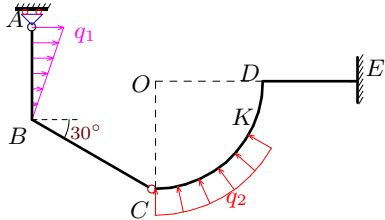
C9.



$$\begin{aligned}
 q_1 &= 8 \text{ кН/м}, & R &= 8 \text{ м}, \\
 q_2 &= 10 \text{ кН/м}, & AB &= 9 \text{ м}, \\
 BC &= 9 \text{ м}, & DK &= \pi R/3 \text{ м}, \\
 DE &= 6 \text{ м}.
 \end{aligned}$$

Вариант 25

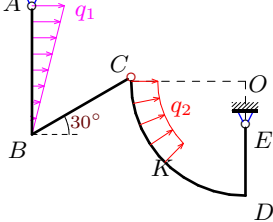
C9.



$q_1 = 7 \text{ кН/м}, \quad R = 7 \text{ м},$
 $q_2 = 10 \text{ кН/м}, \quad AB = 6 \text{ м},$
 $BC = 9 \text{ м}, \quad CK = \pi R/3 \text{ м},$
 $DE = 6 \text{ м}.$

Вариант 26

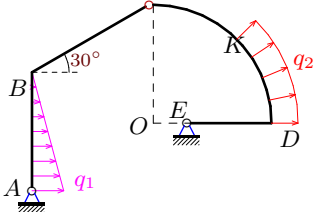
C9.



$q_1 = 9 \text{ кН/м}, \quad R = 8 \text{ м},$
 $q_2 = 6 \text{ кН/м}, \quad AB = 9 \text{ м},$
 $BC = 8 \text{ м}, \quad CK = \pi R/4 \text{ м},$
 $DE = 5 \text{ м}.$

Вариант 27

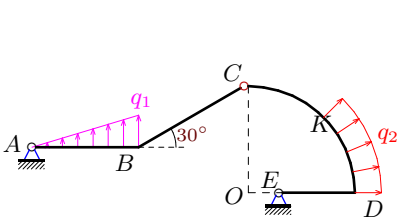
C9.



$q_1 = 8 \text{ кН/м}, \quad R = 7 \text{ м},$
 $q_2 = 6 \text{ кН/м}, \quad AB = 7 \text{ м},$
 $BC = 8 \text{ м}, \quad DK = \pi R/4 \text{ м},$
 $DE = 5 \text{ м}.$

Вариант 28

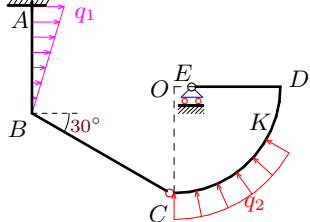
C9.



$q_1 = 9 \text{ кН/м}, \quad R = 7 \text{ м},$
 $q_2 = 5 \text{ кН/м}, \quad AB = 7 \text{ м},$
 $BC = 8 \text{ м}, \quad DK = \pi R/4 \text{ м},$
 $DE = 5 \text{ м}.$

Вариант 29

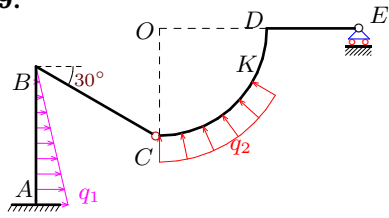
C9.



$q_1 = 7 \text{ кН/м}, \quad R = 6 \text{ м},$
 $q_2 = 9 \text{ кН/м}, \quad AB = 6 \text{ м},$
 $BC = 9 \text{ м}, \quad CK = \pi R/3 \text{ м},$
 $DE = 5 \text{ м}.$

Вариант 30

С9.



$q_1 = 8 \text{ кН/м}, \quad R = 7 \text{ м},$
 $q_2 = 9 \text{ кН/м}, \quad AB = 9 \text{ м},$
 $BC = 9 \text{ м}, \quad CK = \pi R/3 \text{ м},$
 $DE = 6 \text{ м}.$

Ответы

	X_A	Y_A	Y_D	X_E	Y_E	M_A
1	–	–38.064	–	96.000	–75.936	–
2	42.435	–99.523	–	–	148.523	–475.253
3	–	–10.260	–	72.000	–73.740	–
4	–46.551	19.178	–	–7.449	–22.930	–
5	3614.902	–2096.30	–	–3674.90	2093.087	–
6	–	35.026	–	34.354	0.974	–
7	–28.047	–35.982	–	16.047	–9.233	–
8	–16.402	–18.080	4.785	–	19.893	–
9	–	17.513	–	56.000	52.487	–
10	16.497	0.287	–	–	27.713	110.646
11	–36.938	–6.108	–	–17.062	2.893	–
12	51.000	30.857	–	–	41.143	–529.215
13	–44.326	30.269	–	0.924	9.329	–
14	–	–11.655	–	70.000	67.655	–
15	–	–20.396	–	55.426	27.896	–
16	–	–44.408	–	35.000	–37.213	–
17	50.000	–35.538	–	–	–41.462	–542.495
18	–	–50.752	–	40.000	–42.530	–
19	–13.976	64.614	–	–15.723	–48.915	–
20	29.021	24.549	–	–85.923	15.049	–
21	45.500	–157.500	–	–	220.500	–1743.35
22	–	–19.630	–	78.000	–76.370	–
23	–4.500	–26.723	–	–	–35.631	–248.786
24	–	6.928	–	4.000	–76.210	–
25	–	–22.902	–	14.000	–37.720	–
26	46.797	–45.464	–	–121.238	31.406	–
27	–28.564	–10.326	–	–29.134	–1.975	–
28	–5.494	–22.524	–	–19.255	–19.228	–
29	6.000	115.235	–	–	–162.000	1139.665
30	–4.500	–37.598	–	–	–16.962	–326.798