

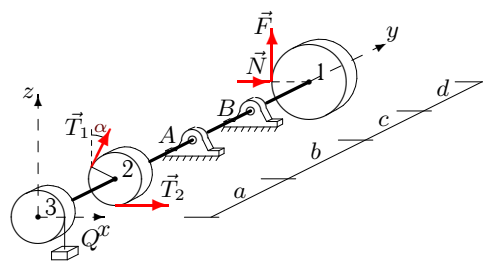
Равновесие вала

Горизонтальный вал весом G может вращаться в цилиндрических шарнирах A и B . К шкиву 1 приложено нормальное давление N и касательная сила сопротивления F , пропорциональная N . На шкив 2 действуют силы натяжения ремней T_1 и T_2 . Груз Q висит на нити, навитой на шкив 3. Определить силу давления N и реакции шарниров в условии равновесия вала (в Н). Учесть веса шкивов P_1, P_2, P_3 . Все нагрузки действуют в вертикальной плоскости. Силы даны в Н, размеры — в см.

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Вариант 1

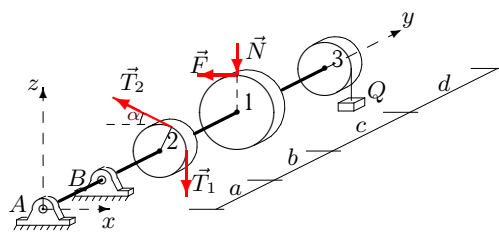
C19.



$$F = 0.1N, T_1 = 70, \\ T_2 = 136, P_1 = 20, \\ P_2 = 10, P_3 = 14, \\ Q = 22, G = 35, \\ \alpha = 30^\circ, R_1 = 22, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 26, \\ c = 27, d = 25.$$

Вариант 2

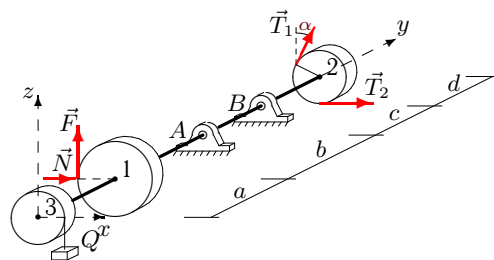
C19.



$$F = 0.3N, T_1 = 30, \\ T_2 = 18, P_1 = 30, \\ P_2 = 20, P_3 = 28, \\ Q = 10, G = 15, \\ \alpha = 45^\circ, R_1 = 16, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 25, \\ c = 27, d = 25.$$

Вариант 3

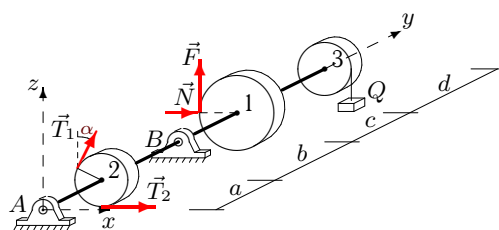
C19.



$$F = 0.2N, T_1 = 70, \\ T_2 = 136, P_1 = 22, \\ P_2 = 10, P_3 = 14, \\ Q = 22, G = 35, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 26, \\ c = 27, d = 26.$$

Вариант 4

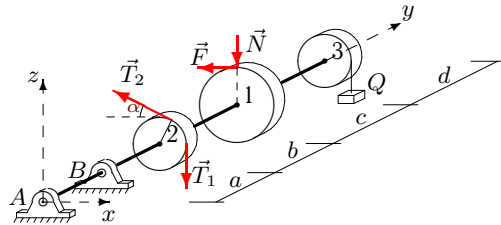
C19.



$$F = 0.2N, T_1 = 30, \\ T_2 = 56, P_1 = 20, \\ P_2 = 10, P_3 = 14, \\ Q = 22, G = 15, \\ \alpha = 30^\circ, R_1 = 22, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 26, \\ c = 27, d = 25.$$

Вариант 5

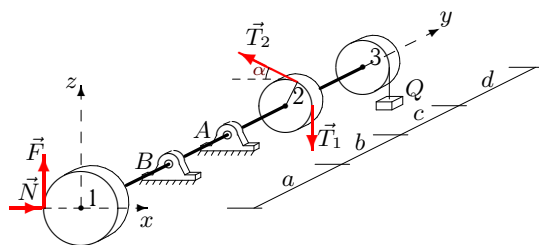
C19.



$F = 0.2N$, $T_1 = 30$,
 $T_2 = 17$, $P_1 = 18$,
 $P_2 = 10$, $P_3 = 14$,
 $Q = 26$, $G = 15$,
 $\alpha = 30^\circ$, $R_1 = 18$,
 $R_2 = 8$, $R_3 = 9$,
 $a = 22$, $b = 27$,
 $c = 28$, $d = 24$.

Вариант 6

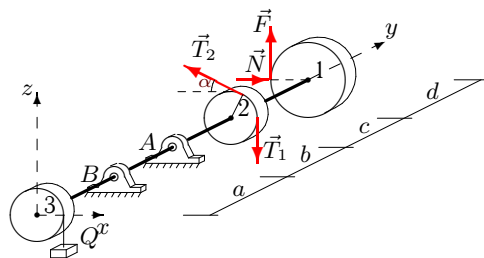
C19.



$F = 0.3N$, $T_1 = 60$,
 $T_2 = 116$, $P_1 = 22$,
 $P_2 = 10$, $P_3 = 18$,
 $Q = 22$, $G = 30$,
 $\alpha = 30^\circ$, $R_1 = 18$,
 $R_2 = 8$, $R_3 = 10$,
 $a = 24$, $b = 28$,
 $c = 29$, $d = 26$.

Вариант 7

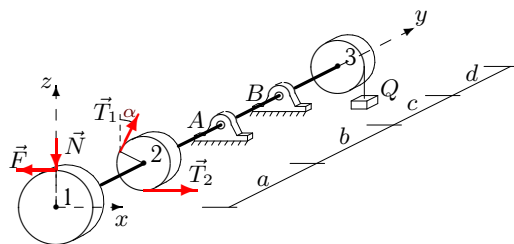
C19.



$F = 0.1N$, $T_1 = 70$,
 $T_2 = 137$, $P_1 = 18$,
 $P_2 = 10$, $P_3 = 14$,
 $Q = 18$, $G = 35$,
 $\alpha = 30^\circ$, $R_1 = 18$,
 $R_2 = 8$, $R_3 = 9$,
 $a = 22$, $b = 25$,
 $c = 26$, $d = 24$.

Вариант 8

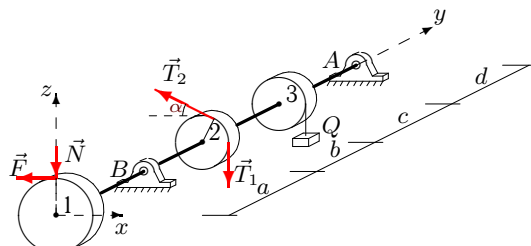
C19.



$F = 0.1N$, $T_1 = 60$,
 $T_2 = 31$, $P_1 = 20$,
 $P_2 = 10$, $P_3 = 14$,
 $Q = 26$, $G = 30$,
 $\alpha = 30^\circ$, $R_1 = 22$,
 $R_2 = 8$, $R_3 = 9$,
 $a = 22$, $b = 27$,
 $c = 28$, $d = 25$.

Вариант 9

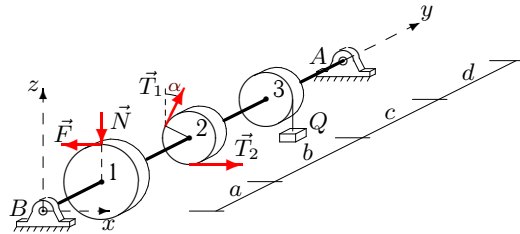
C19.



$F = 0.3N$, $T_1 = 60$,
 $T_2 = 33$, $P_1 = 32$,
 $P_2 = 20$, $P_3 = 28$,
 $Q = 10$, $G = 30$,
 $\alpha = 45^\circ$, $R_1 = 20$,
 $R_2 = 10$, $R_3 = 12$,
 $a = 24$, $b = 25$,
 $c = 27$, $d = 26$.

Вариант 10

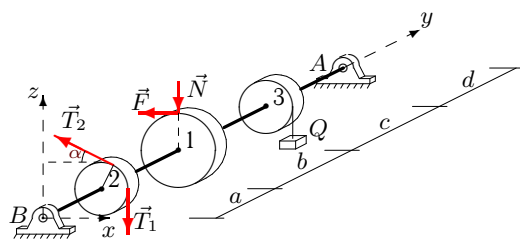
C19.



$$F = 0.3N, T_1 = 40, \\ T_2 = 23, P_1 = 46, \\ P_2 = 30, P_3 = 38, \\ Q = 26, G = 20, \\ \alpha = 60^\circ, R_1 = 30, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 29, \\ c = 32, d = 28.$$

Вариант 11

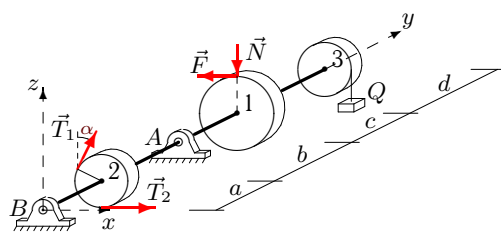
C19.



$$F = 0.3N, T_1 = 40, \\ T_2 = 23, P_1 = 32, \\ P_2 = 20, P_3 = 28, \\ Q = 26, G = 20, \\ \alpha = 45^\circ, R_1 = 20, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 29, \\ c = 31, d = 26.$$

Вариант 12

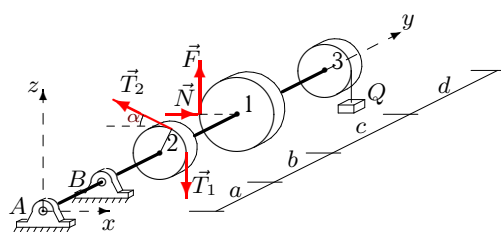
C19.



$$F = 0.3N, T_1 = 40, \\ T_2 = 23, P_1 = 24, \\ P_2 = 10, P_3 = 18, \\ Q = 10, G = 20, \\ \alpha = 30^\circ, R_1 = 22, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 25, \\ c = 26, d = 27.$$

Вариант 13

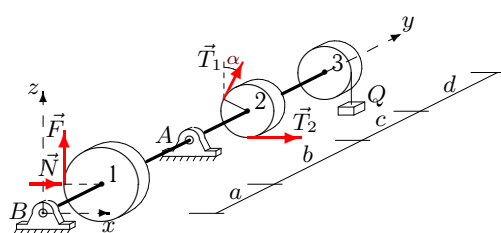
C19.



$$F = 0.3N, T_1 = 30, \\ T_2 = 57, P_1 = 40, \\ P_2 = 30, P_3 = 38, \\ Q = 18, G = 15, \\ \alpha = 60^\circ, R_1 = 18, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 27, \\ c = 30, d = 25.$$

Вариант 14

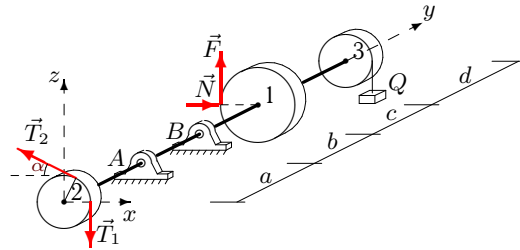
C19.



$$F = 0.1N, T_1 = 40, \\ T_2 = 78, P_1 = 22, \\ P_2 = 10, P_3 = 14, \\ Q = 14, G = 20, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 24, \\ c = 25, d = 26.$$

Вариант 15

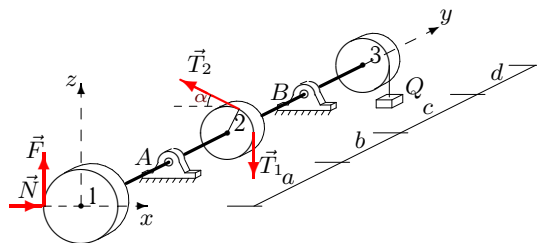
C19.



$F = 0.3N, T_1 = 50,$
 $T_2 = 96, P_1 = 20,$
 $P_2 = 10, P_3 = 18,$
 $Q = 22, G = 25,$
 $\alpha = 30^\circ, R_1 = 14,$
 $R_2 = 8, R_3 = 10,$
 $a = 24, b = 28,$
 $c = 29, d = 25.$

Вариант 16

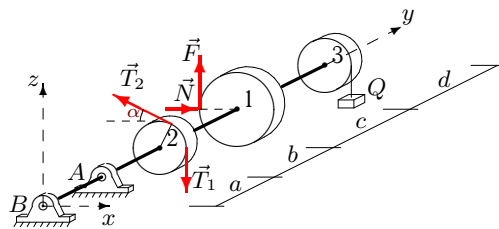
C19.



$F = 0.2N, T_1 = 60,$
 $T_2 = 118, P_1 = 36,$
 $P_2 = 30, P_3 = 34,$
 $Q = 14, G = 30,$
 $\alpha = 60^\circ, R_1 = 18,$
 $R_2 = 12, R_3 = 13,$
 $a = 22, b = 24,$
 $c = 27, d = 23.$

Вариант 17

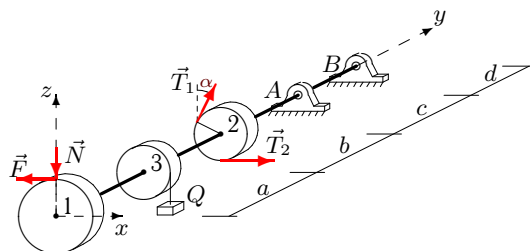
C19.



$F = 0.1N, T_1 = 40,$
 $T_2 = 78, P_1 = 26,$
 $P_2 = 20, P_3 = 24,$
 $Q = 14, G = 20,$
 $\alpha = 45^\circ, R_1 = 16,$
 $R_2 = 10, R_3 = 11,$
 $a = 22, b = 24,$
 $c = 26, d = 23.$

Вариант 18

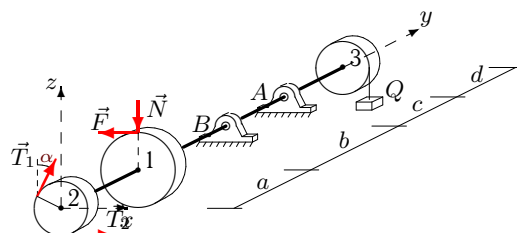
C19.



$F = 0.2N, T_1 = 60,$
 $T_2 = 32, P_1 = 42,$
 $P_2 = 30, P_3 = 34,$
 $Q = 10, G = 30,$
 $\alpha = 60^\circ, R_1 = 30,$
 $R_2 = 12, R_3 = 13,$
 $a = 22, b = 23,$
 $c = 26, d = 26.$

Вариант 19

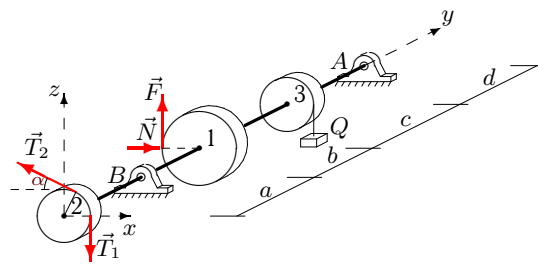
C19.



$F = 0.1N, T_1 = 50,$
 $T_2 = 26, P_1 = 32,$
 $P_2 = 20, P_3 = 24,$
 $Q = 26, G = 25,$
 $\alpha = 45^\circ, R_1 = 28,$
 $R_2 = 10, R_3 = 11,$
 $a = 22, b = 27,$
 $c = 29, d = 26.$

Вариант 20

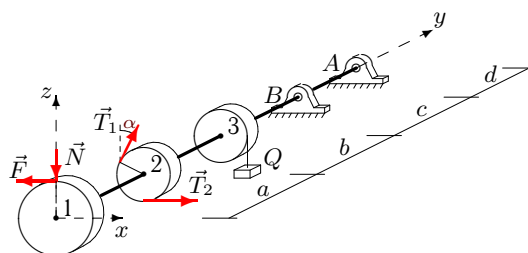
C19.



$$F = 0.3N, T_1 = 50, \\ T_2 = 98, P_1 = 32, \\ P_2 = 20, P_3 = 28, \\ Q = 14, G = 25, \\ \alpha = 45^\circ, R_1 = 20, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 26, \\ c = 28, d = 26.$$

Вариант 21

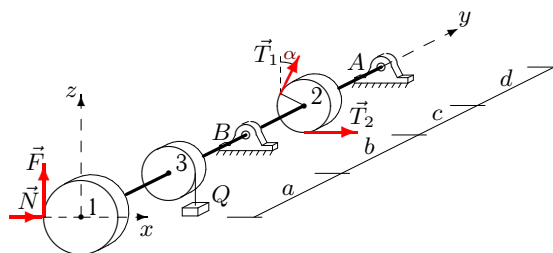
C19.



$$F = 0.4N, T_1 = 60, \\ T_2 = 34, P_1 = 44, \\ P_2 = 30, P_3 = 38, \\ Q = 10, G = 30, \\ \alpha = 60^\circ, R_1 = 26, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 25, \\ c = 28, d = 27.$$

Вариант 22

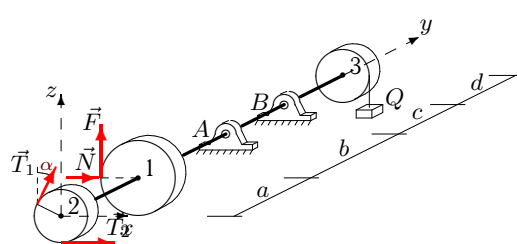
C19.



$$F = 0.3N, T_1 = 60, \\ T_2 = 118, P_1 = 36, \\ P_2 = 20, P_3 = 28, \\ Q = 14, G = 30, \\ \alpha = 45^\circ, R_1 = 28, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 26, \\ c = 28, d = 28.$$

Вариант 23

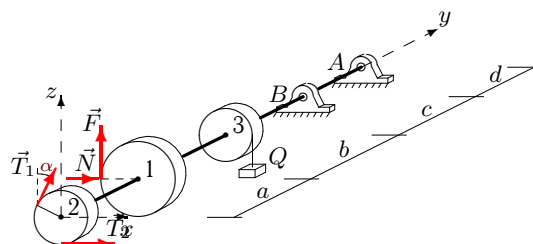
C19.



$$F = 0.4N, T_1 = 50, \\ T_2 = 96, P_1 = 26, \\ P_2 = 10, P_3 = 18, \\ Q = 22, G = 25, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 28, \\ c = 29, d = 28.$$

Вариант 24

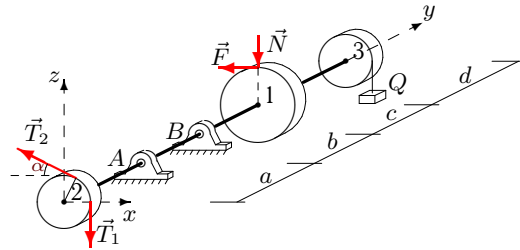
C19.



$$F = 0.3N, T_1 = 50, \\ T_2 = 96, P_1 = 44, \\ P_2 = 30, P_3 = 38, \\ Q = 22, G = 25, \\ \alpha = 60^\circ, R_1 = 26, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 28, \\ c = 31, d = 27.$$

Вариант 25

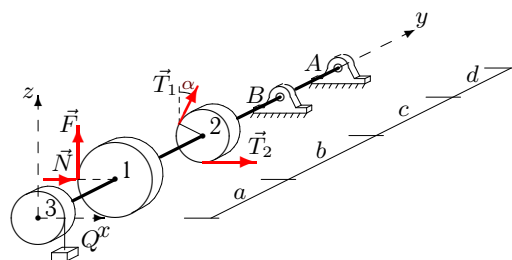
C19.



$$F = 0.1N, T_1 = 50, \\ T_2 = 26, P_1 = 26, \\ P_2 = 20, P_3 = 24, \\ Q = 10, G = 25, \\ \alpha = 45^\circ, R_1 = 16, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 23, \\ c = 25, d = 23.$$

Вариант 26

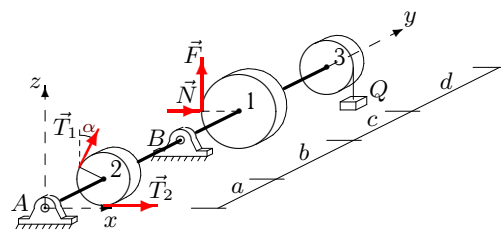
C19.



$$F = 0.4N, T_1 = 70, \\ T_2 = 138, P_1 = 46, \\ P_2 = 30, P_3 = 38, \\ Q = 14, G = 35, \\ \alpha = 60^\circ, R_1 = 30, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 26, \\ c = 29, d = 28.$$

Вариант 27

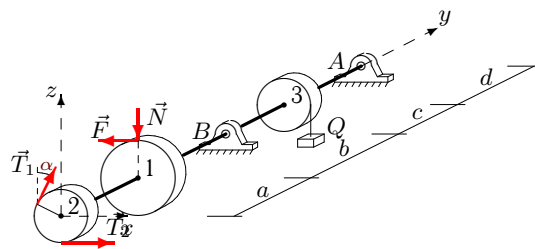
C19.



$$F = 0.3N, T_1 = 30, \\ T_2 = 58, P_1 = 24, \\ P_2 = 10, P_3 = 18, \\ Q = 14, G = 15, \\ \alpha = 30^\circ, R_1 = 22, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 26, \\ c = 27, d = 27.$$

Вариант 28

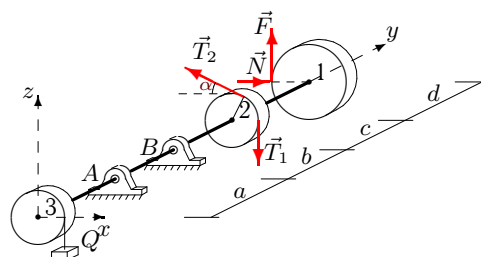
C19.



$$F = 0.4N, T_1 = 50, \\ T_2 = 29, P_1 = 34, \\ P_2 = 20, P_3 = 28, \\ Q = 26, G = 25, \\ \alpha = 45^\circ, R_1 = 24, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 29, \\ c = 31, d = 27.$$

Вариант 29

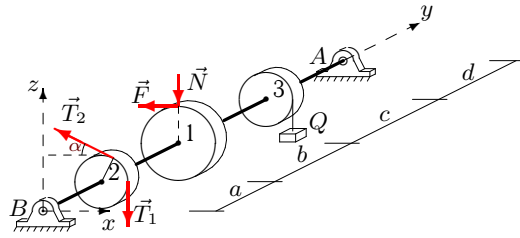
C19.



$$F = 0.3N, T_1 = 70, \\ T_2 = 137, P_1 = 20, \\ P_2 = 10, P_3 = 18, \\ Q = 18, G = 35, \\ \alpha = 30^\circ, R_1 = 14, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 27, \\ c = 28, d = 25.$$

Вариант 30

C19.



$F = 0.4N$, $T_1 = 40$,
 $T_2 = 24$, $P_1 = 42$,
 $P_2 = 30$, $P_3 = 38$,
 $Q = 10$, $G = 20$,
 $\alpha = 60^\circ$, $R_1 = 22$,
 $R_2 = 12$, $R_3 = 14$,
 $a = 24$, $b = 25$,
 $c = 28$, $d = 26$.

Отвeты

	N	X_A	Z_A	X_B	Z_B
1	150.000	-196.778	28.409	-124.222	-3.031
2	50.000	-45.758	-350.638	73.486	520.910
3	63.462	40.094	198.777	-274.556	-169.091
4	2.273	-37.180	-59.276	-36.093	113.840
5	93.889	-65.013	-481.449	98.513	679.838
6	42.222	240.696	166.607	-182.459	-75.274
7	207.778	-381.297	24.067	292.164	51.656
8	211.818	-61.571	547.218	21.753	-287.362
9	65.000	1.479	24.034	41.356	197.632
10	63.111	-23.014	86.006	-15.694	117.105
11	80.333	15.160	114.903	25.203	115.167
12	35.758	-4.642	158.499	-27.631	-75.382
13	13.333	-0.396	-306.924	15.562	424.561
14	68.462	-184.003	49.345	17.542	-10.832
15	35.238	190.897	-65.515	-142.996	151.944
16	142.778	-173.133	-2.739	89.355	75.993
17	141.250	-346.950	256.268	260.854	-181.548
18	77.667	-109.972	629.333	41.544	-435.667
19	187.857	86.179	-81.336	-128.749	360.837
20	52.000	-37.689	42.219	54.985	41.885
21	43.462	119.161	-326.983	-187.738	492.444
22	49.048	-36.421	-48.111	-173.053	118.970
23	14.231	-365.936	-68.875	230.706	120.881
24	31.282	496.579	-185.826	-667.163	310.442
25	218.750	12.193	-237.633	28.067	592.998
26	51.667	307.204	-223.173	-557.492	330.506
27	12.727	-31.087	-54.368	-54.640	105.569
28	54.375	47.932	-0.216	-90.538	152.236
29	84.762	43.345	65.434	-9.461	11.638
30	37.727	9.975	95.280	17.116	101.663