



PRESIDÊNCIA DA REPÚBLICA
DEPARTAMENTO ADMINISTRATIVO DO SERVIÇO PÚBLICO

DIVISÃO DE SELEÇÃO

CONCURSO.....

PROVA.....

INSTRUÇÕES

NÃO ABRA O CADERNO ANTES DE O FISCAL MANDAR !

NÃO PERGUNTE NADA A NINGUEM !

NÃO SE DISTRAIA ! NÃO OLHE PARA O VIZINHO !

NÃO EMENDE ! NÃO RASPE !

Tudo quanto o candidato tem que fazer, nesta prova, está claramente explicado e indicado nas páginas a seguir.

Leia, pois, ATENTAMENTE, as instruções que vêm antes dos diversos exercícios. Regule-se por elas, POIS NENHUM ESCLARECIMENTO A MAIS PODERÁ SER DADO. Escreva a resposta de cada questão no lugar indicado.

Procure trabalhar TÃO DEPRESSA QUANTO POSSIVEL, mas sem atropelo. O tempo será suficiente para que o candidato possa examinar todas as questões. Se encontrar dificuldade em qualquer questão, passe adiante e procure resolver as demais; vá assim até o final da prova. Havendo tempo, volte então a examinar as questões em que encontrou dificuldade.

O fiscal da prova não poderá responder a pergunta alguma

NÃO SE DISTRAIA !

Somente neste talão é permitida a assinatura

Assinatura usual :.....

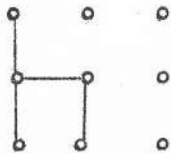
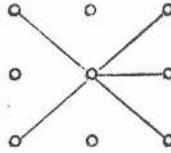
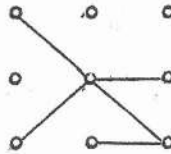
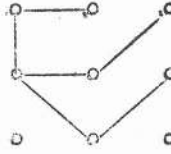
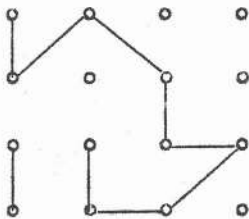
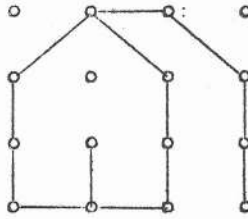
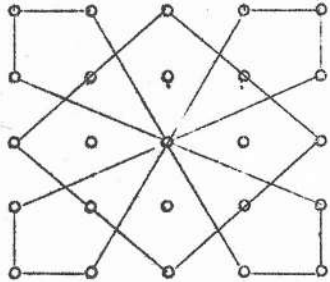
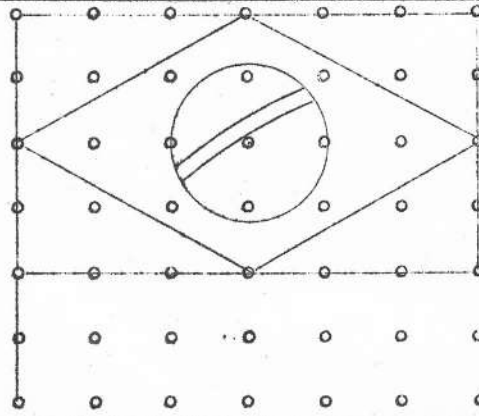
Nome, em letra bem legível :.....

Data desta prova...../...../ 194..... N. de inscrição :.....

Data do nascimento : dia.....mês..... ano.....

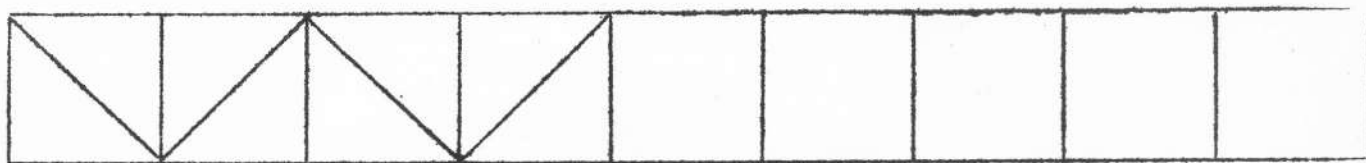
Cidade de realização da prova :.....

1a Parte

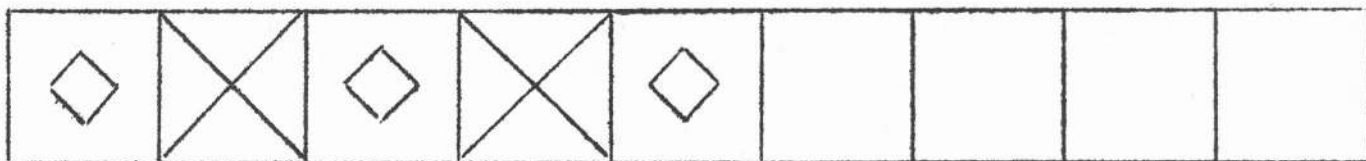
1 	2 
3 	4 
5 	6 
	7 
	8 

2ª Parte

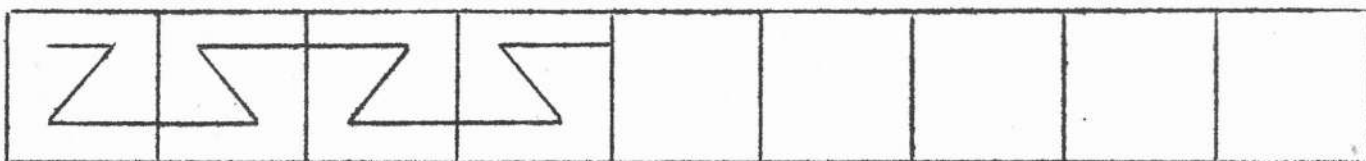
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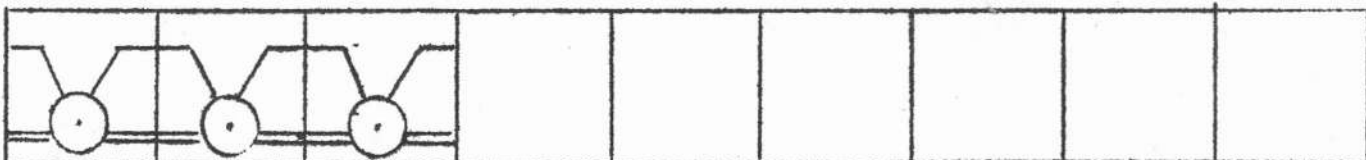
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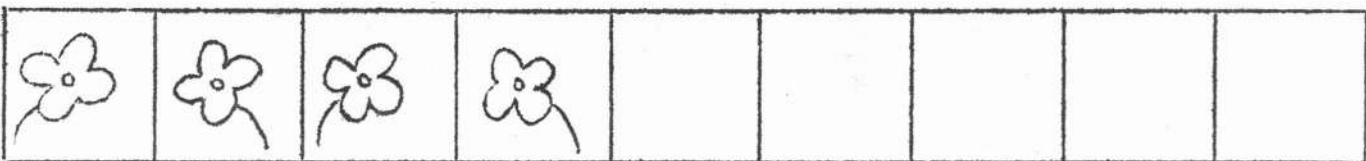
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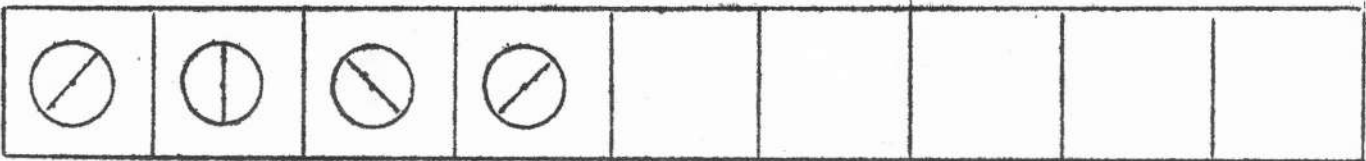
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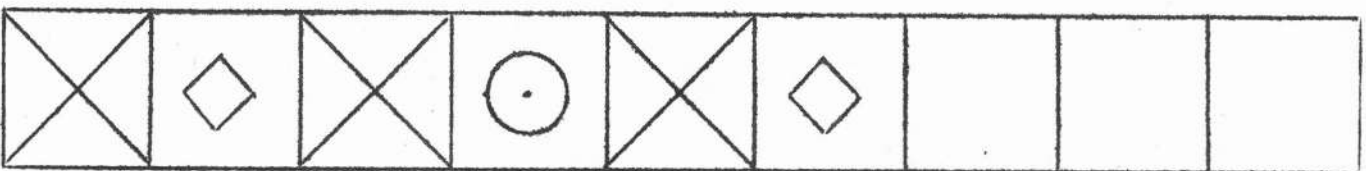
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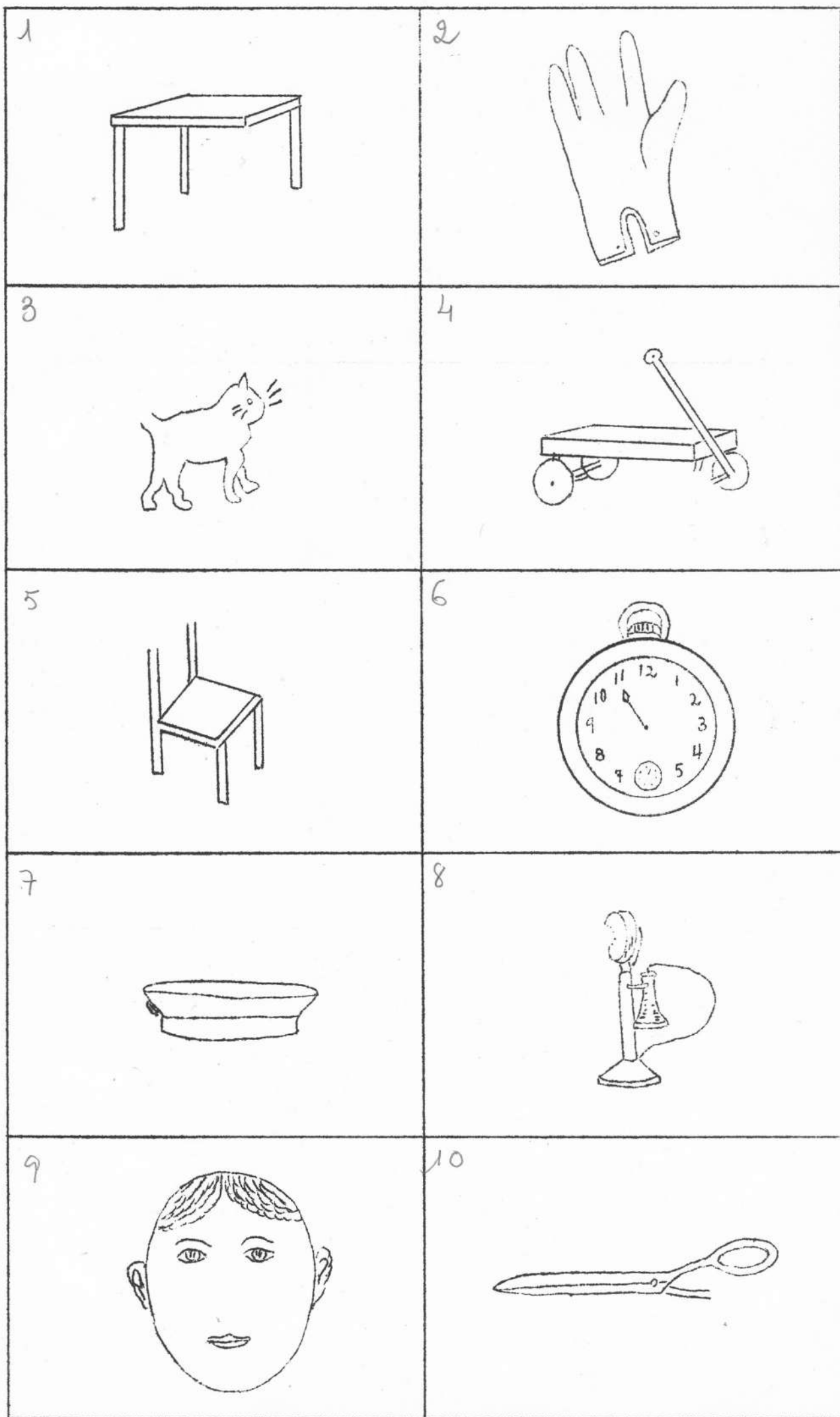
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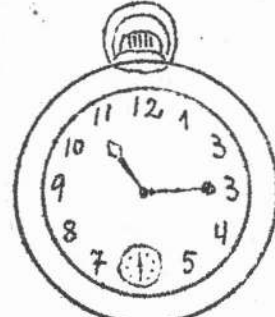
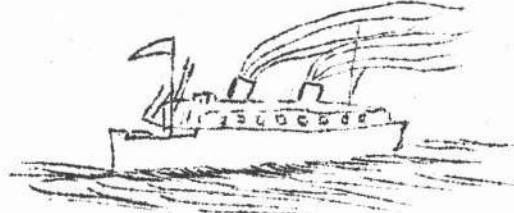
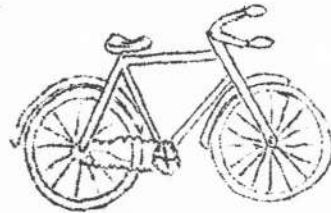
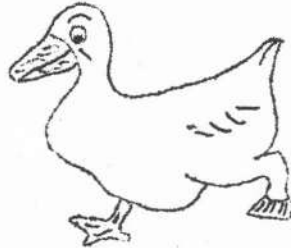
7



3^a Parte



4a Parte

1		2	
3		4	
5		6	
7		8	
9		10	

Correção		Revisão	

TOTAL DE PONTOS:
Habilitado :

Tabulação

e

Distribuição

por frequência

(Papantes)

Teste - E R -

1943



Teste E.R

1ª Parte
Cópia de desenhos

x	T	f	d	fd	fd²	fa
0		1	5	5	25	1
1		1	4	4	16	2
2			3	0	0	2
3		2	2	4	8	4
4		6	1	6	6	10
5		9		-19		19
6		17	1	17	17	36
7		13	2	36	72	49
8		13	3	3	9	62
		62		56	153	
			37			

$$M = 5,5 + \frac{37}{62} \times 1$$

$$\sigma = \pm \sqrt{2,114905}$$

$$\sigma = \pm 1,454$$

$$M = 5,5 + 0,597$$

$$M = 6,097$$

$$\frac{62}{2} = 31$$

$$Q_1 = \frac{62}{4} = 15,5$$

$$M_i = 6 + \frac{22 \times 1}{17}$$

$$Q_2 = 5 + \frac{55}{9}$$

$$M_i = 6 + \frac{22}{17}$$

$$Q_4 = 5 + 0,611$$

$$Q_1 = 5,611$$

$$M_i = 6 + 1,294$$

$$Q_5 = 15,5 \times 3 = 46,5$$

$$M_i = 7,294$$

$$Q_3 = 7 + \frac{10,5}{13}$$

$$\sigma = \pm \sqrt{\frac{153}{62} - 0,594^2}$$

$$Q_3 = 7 + 0,808$$

$$Q_3 = 7,808$$

$$\sigma = \pm \sqrt{2,467741 - 0,352836}$$



$$Q = \frac{7,808 - 5,611}{2}$$

$$P_{15,87} = \frac{15,87 \times 62}{100}$$

$$Q = \frac{2,196}{2}$$

$$P_{15,87} = 9,839$$

$$Q = 1,098$$

$$P_{15,87} = 4 + \frac{5,839}{6}$$

$$M_0 = (3 \times 7,294) - (2 \times 6,097)$$

$$P_{15,87} = 4 + 0,973 \quad P_{15,87} = 4,973$$

$$M_0 = 21,882 - 12,194$$

$$M_0 = 9,688$$

$$P_{84,13} = \frac{84,13 \times 62}{100}$$

$$CV = \frac{1,454 \times 100}{6,097}$$

$$P_{84,13} = 52,161$$

$$CV = 23,848$$

$$P_{84,13} = 8 + \frac{3,161}{13}$$

$$\sigma = \frac{1,454}{\sqrt{62}}$$

$$P_{84,13} = 8 + 0,243$$

$$\sigma = \frac{1,454}{7,874}$$

$$P_{84,13} = 8,243$$

$$\sigma = 0,185$$

$$\sigma = \frac{1,454}{\sqrt{124}}$$

$$\sigma = \frac{1,454}{11,136}$$

$$\sigma = 0,131$$

$$S = \frac{6,097 - 9,688}{1,454}$$

$$S = \frac{3,591}{1,454}$$

$$S = 2,470$$



Teste LR

2ª Parte
Séries de Desenho

x		f	d	fd	fd^2	fa
0		8	4	12	48	3
1		6	3	18	54	9
2		4	2	8	16	13
3		11	1	11	11	24
4		8	-	49		32
5		14	1	14	14	46
6		14	2	28	56	60
7		2	3	6	18	62
		62		48	217	
			-1			

$$M = 4,5 + \frac{1}{62} \times 1$$

$$Q_1 = 3 + 2,273$$

$$Q_1 = 5,273$$

$$M = 4,5 + 0,016$$

$$Q_3 = 15,5 \times 3 = 46,5$$

$$M = 4,516$$

$$Q_3 = 6 + \frac{0,5 \times 1}{14}$$

$$\frac{62}{2} = 31$$

$$2$$

$$Q_3 = 6 + 0,036$$

$$M_i = 4 + \frac{7 \times 1}{8}$$

$$Q_3 = 6,036$$

$$M_i = 4 + \frac{7}{8}$$

$$Q = \frac{6,036 - 5,273}{2}$$

$$M_i = 4 + 0,875$$

$$Q = 0,382$$

$$M_i = 4,875$$

$$2$$

$$Q = 0,382$$

$$Q = \frac{62}{4} = 15,5$$

$$M_o = (3 \times 4,875) - (2 \times 4,516)$$

$$M_o = 14,625 - 9,032$$

$$Q_1 = 3 + \frac{2,5 \times 1}{11}$$

$$M_o = 5,593$$



$$\sigma = \pm 1 \sqrt{\frac{217}{62} - 0,016^2}$$

$$\sigma = \pm 1 \sqrt{3,5 - 0,000256}$$

$$\sigma = \pm 1 \times \sqrt{3,499744}$$

$$\sigma = \pm 1 \times 1,871$$

$$\sigma = \pm 1,871$$

$$\sigma = 1,871$$
$$M = 7,874$$

$$\sigma = 0,226$$
$$M$$

$$\sigma = 1,871$$
$$PD = 11,136$$

$$\sigma = 0,168$$
$$PP$$

$$S = \frac{4,516 - 3,231}{1,871}$$

$$S = \frac{1,285}{1,871}$$

$$S = 0,687$$

$$CV = \frac{1,871 \times 100}{4,516}$$

$$CV = \frac{187,1}{4,516}$$

$$CV = 41,480$$

$$P_{15,87} = \frac{15,87 \times 62}{100} = 9,839$$

$$P_{15,87} = 2 + \frac{0,839 \times 1}{6}$$

$$P_{15,87} = 2 + 0,1398$$

$$P_{15,87} = 2 + 0,140$$

$$P_{15,87} = 2,140$$

$$P_{84,13} = \frac{84,13 \times 62}{100}$$

$$P_{84,13} = 52,161$$

$$P_{84,13} = 6 + \frac{6,161 \times 1}{14}$$

$$P_{84,13} = 6 + \frac{6,161}{14}$$

$$P_{84,13} = 6 + 0,440$$

$$P_{84,13} = 6,440$$



Teste ER

3ª Parte

Completamento de Desenho

x	T	f	d	fd	fd²	fa
0	I	1	7	7	49	1
1	III	3	6	18	108	4
2		0	5	0	0	4
3	II	2	4	8	32	6
4	I	1	3	3	9	7
5	I	1	2	2	6	8
6	II	2	1	2	2	10
7	IIII	11	-	41	-	21
8	IIII	8	1	8	8	29
9	IIIIII	16	2	32	64	45
10	IIIIII	17	3	51	153	62
		62		91	431	
				50		

$$M = 7,5 + \frac{50}{62} \times 1$$

$$\frac{62}{4} = 15,5$$

$$M = 7,5 + 0,806$$

$$Q_1 = 7 + \frac{6,5}{11} =$$

$$M = 8,306$$

$$M_i =$$

$$Q_1 = 7 + 0,591$$

$$M_i = 9 + \frac{12 \times 1}{16}$$

$$Q_1 = 7,591$$

$$Q_2 = 15,5 \times 3 = 46,5$$

$$M_i = 9 + \frac{9}{16}$$

$$Q_3 = 10 + \frac{1,5}{17}$$

$$M_i = 9 + 0,125$$

$$Q_3 = 10 + 0,882$$

$$M_i = 9,125$$

$$Q_3 = 10,882$$

$$M_o = (3 \times 9,125) - (2 \times 8,306)$$

$$Q = 10,882 - 7,591$$

$$M_o = 27,375 - 16,612$$

2

$$M_o = 10,763$$

$$Q = \frac{3,291}{2} = 1,646$$



$$P_{15,87} = \frac{15,87 \times 62}{100} = 9,839$$

$$S = \frac{8,306 - 10,763}{2,510}$$

$$P_{15,87} = 6 + \frac{4,839}{2}$$

$$S = \frac{2,457}{2,510}$$

$$P_{15,87} = 6 + 0,920$$

$$S = 0,979$$

$$P_{15,87} = 6,920$$

$$CV = \frac{2,510 \times 100}{8,306}$$

$$P_{84,13} = \frac{84,13 \times 62}{100} = 52,162$$

$$8,306$$

$$CV = \frac{251}{8,306}$$

$$P_{84,13} = 10 + \frac{7,162}{17}$$

$$8,306$$

$$CV = 30,219$$

$$P_{84,13} = 10 + 0,421$$

$$P_{84,13} = 10,421$$

$$\sigma = + 1 \sqrt{\frac{431 - 0,806^2}{62}}$$

$$\sigma = + 1 \sqrt{6,951612 - 0,649636}$$

$$\sigma = + 1 \times \sqrt{6,301976}$$

$$\sigma = + 1 \times 2,510$$

$$\sigma = 2,510$$

$$\sigma = 2,510$$

$$M = 7,874$$

$$\sigma = 0,319$$

$$M$$

$$\sigma = 2,510$$

$$DP = 11,136$$

$$\sigma = 2,254$$

$$DP$$



Teste ER

Correção de Desenho

x	T	f	d	fd	fd ²	fa	4ª Parte
0							
1	I	1	6	6	36	1	
2	I	1	5	5	25	2	
3	III	4	4	16	64	6	
4	III	3	3	9	27	9	
5	III	4	2	8	16	13	
6	III	3	1	3	3	16	
7	I	2	-	-47		18	
8	IIII	9	1	9	9	27	
9	IIII IIII	19	2	38	76	46	
10	IIII IIII I	16	3	48	144	62	
		62		95	400		
				48			

$$M = 7,5 + \frac{48}{62} =$$

$$Q = 10 + \frac{0,5}{16}$$

$$M = 7,5 + 0,774$$

$$Q = 10 + 0,313$$

$$M = 8,274$$

$$Q = 10,313$$

$$M_i = 9 + \frac{4 \times 1}{62}$$

$$Q = 10,313 - 0,065$$

$$Q = \frac{1,248}{2}$$

$$M_i = 9 + 0,065$$

$$M_i = 9,065$$

$$Q = 0,624$$

$$Q = 9 + \frac{4}{19}$$

$$M_0 = (3 \times 9,065) - (2 \times 8,274)$$

$$M_0 = 27,195 - 16,548$$

$$M_0 = 10,647$$

$$Q = 9 + 0,211$$

$$Q = 9,211$$



$$P_{15,87} = 9,839$$

$$S = \frac{8,274 - 10,647}{2,419}$$

$$P_{15,87} = 5 + \frac{0,839}{4}$$

$$S = -\frac{2,373}{2,419}$$

$$P_{15,87} = 5 + 0,210$$

$$P_{15,87} = 5,210$$

$$S = -0,981$$

$$P_{84,13} = 52,161$$

$$CV = \frac{2,419 \times 100}{8,274}$$

$$P_{84,13} = 10 + \frac{6,161}{16}$$

$$CV = \frac{2419}{8,274}$$

$$P_{84,13} = 10 + 0,385$$

$$CV = 29,236$$

$$P_{84,13} = 10,385$$

$$\sigma = \pm 1 \sqrt{\frac{400 - 0,7742}{62}}$$

$$\sigma = \pm 1 \sqrt{6,451613 - 0,599076}$$

$$\sigma = \pm 1 \times \sqrt{5,852537}$$

$$\sigma = \pm 1 \times 2,419$$

$$\sigma = \pm 2,419$$

$$\sigma_M = \frac{2,419}{7,874}$$

$$\sigma_M = 0,307$$

$$\sigma_{DP} = \frac{2,419}{11,136}$$

$$\sigma_{DP} = 0,217$$

Testes. E R

Nota Global

1943



Testes - E R

Tabulação e Nota Global

X	T	f	d	fd	fd²	fa
0-2						
3-5	I	1	7	7	1	1
6-8	I	1	6	6	2	2
9-11	III	3	5	15	5	5
12-14			4		5	5
15-17	III	3	3	9	8	8
18-20	III	3	2	6	11	11
21-23	III I	6	1	6	17	17
24-26	III III	10			27	27
27-29	III III I	13	1	13	40	40
30-32	III III III	16	2	32	56	56
33-35	III I	6	3	18	62	62
		62		63	336	

$$M = 25,5 + \frac{14}{62} \times 3$$

$$26,178 - 6,951 = 19,227$$

$$M = 25,5 + 0,226 \times 3$$

$$M = 25,5 + 0,678$$

$$M = \underline{26,178}$$

$$\sigma = \pm 3 \sqrt{\frac{336}{62} - 0,226^2}$$

$$\sigma = \pm 3 \sqrt{5,419355 - 0,051076}$$

$$\sigma = \pm 3 \sqrt{5,368279}$$

$$\sigma = \pm 3 \times 2,317 \quad \sigma = \pm \underline{6,951}$$



$$P_{16} = \frac{16 \times 62}{100}$$

$$P_{16} = 9,92$$

$$P_{16} = 18 + \frac{1,92 \times 3}{3}$$

$$P_{16} = 18 + \frac{5,76}{3}$$

$$P_{16} = 18 + 1,92$$

$$P_{16} = \underline{19,92}$$

$$\frac{62}{2} = 31$$

$$M_i = 27 + \frac{4 \times 3}{13}$$

$$M_i = 27 + \frac{12}{13}$$

$$M_i = 27 + 0,923$$

$$M_i = \underline{27,923}$$

$$M_o = (3 \times 27,923 - 2 \times 26,178)$$

$$M_o = 83,769 - 52,356$$

$$M_o = \underline{31,413}$$

$$CV = \frac{6,951 \times 100}{26,178}$$

$$CV = \frac{6,951}{26,178}$$

$$CV = \underline{26,552}$$

$$\sigma_M = \frac{6,951}{\sqrt{62}}$$

$$\sigma_M = \frac{6,951}{7,874}$$

$$\sigma_M = \underline{0,883}$$



$$\sigma_{DP} = \frac{6,951}{\sqrt{62 \times 2}}$$

$$Q_3 = 30 + 1,219$$

$$\sigma_{DP} = \frac{6,951}{\sqrt{124}}$$

$$Q_3 = 31,219$$

$$Q = 31,219 - 23,25$$

$$Q = 7,969 + 2 = 9,984$$

$$\sigma_{DP} = \frac{6,951}{11,136}$$

$$P_{15,87} = \frac{15,87 \times 62}{100}$$

$$\sigma_{DP} = 0,624$$

$$P_{15,87} = 9,839$$

$$S = \frac{26,178 - 31,413}{6,951}$$

$$P_{15,87} = \frac{18 + 1,839 \times 3}{3}$$

$$S = \frac{5,235}{6,951}$$

$$P_{15,87} = \frac{18 + 5,517}{3}$$

$$P_{15,87} = \frac{18 + 1,840}{3}$$

$$S = 0,753$$

$$P_{15,87} = \frac{19,840}{3}$$

$$\frac{62}{4} = 15,5$$

$$P_{84,13} = \frac{84,13 \times 62}{100} = 52,161$$

$$Q_1 = 21 + \frac{4,5 \times 3}{6}$$

$$P_{84,13} = 30 + \frac{12,161 \times 3}{16}$$

$$Q_1 = 21 + \frac{13,5}{6}$$

$$P_{84,13} = 30 + \frac{36,483}{16}$$

$$Q_1 = 21 + 2,25$$

$$P_{84,13} = 30 + 2,280$$

$$Q_1 = 23,25$$

$$P_{84,13} = 32,280$$

$$Q_3 = 15,5 \times 3 = 46,5$$

$$Q_3 = 30 + \frac{5,5 \times 3}{16}$$

$$Q_3 = 30 + \frac{19,5}{16}$$



Teste ER

Significância do S

$$M = 26,178$$

$$N = 62$$

$$26,178 - 24 = 2,178$$

$$\frac{10}{3} = 3,33...$$

$$3,33 \times 2,178 = 7,253$$

$$17 + 7,253 = 24,253$$

$$\text{Signif do S} = \frac{62}{2} \pm 3 \sqrt{\frac{62}{4}}$$

$$\text{Signif do S} = 31 \pm 3 \times \sqrt{15,5}$$

$$\text{Signif do S} = 31 \pm 3 \times 3,93$$

$$\text{Signif do S} = 31 \pm 11,79$$

$$\text{Signif do S} = 19,21 \text{ e } 42,79$$



Teste - E R

Tabulação Nota Global

x	Π	f	d	fd	fd^2	fa
0-2						
3-5	I	1	7	7	1	1
6-8	I	1	6	6	2	2
9-11	II	3	5	15	5	5
12-14			4		5	5
15-17	III	3	3	9	8	8
18-20	II	3	2	6	11	11
21-23	II I	6	1	5	17	17
24-26	II II	10			27	27
27-29	II II I	13		13	40	40
30-32	II II II I	16		32	56	56
33-35	II I	6		18	62	62
		62				

$$M = 25,5 + \frac{14}{62} \times 3$$

$$26,178 - 6,951 = 19,227$$

$$M = 25,5 + 0,226 \times 3$$

$$M = 25,5 + 0,678$$

$$M = 26,178$$

$$\sigma = \pm 3 \sqrt{\frac{336}{2} - 0,226^2}$$

$$\sigma = \pm 3 \sqrt{5,419355 - 0,051076}$$



$$\sigma = +3\sqrt{5,368279}$$

$$\sigma = \pm 3 \times 2,317$$

$$\sigma = \pm 6,951$$

$$P_{16} = \frac{16 \times 62}{100}$$

$$P_{16} = 9,92$$

$$P_{16} = 18 + \frac{1,92 \times 3}{3}$$

$$P_{16} = 18 + 1,20$$

$$P_{16} = 19,20$$

$$\frac{62}{2} = 31$$

$$M_i = \frac{27 + 4 \times 3}{13}$$

$$M_i = \frac{27 + 12}{13}$$

$$M_i = 27 + 0,923$$

$$M_i = 27,923$$

$$M_o = (3 \times 27,923 - 2 \times 26,178)$$

$$M_o = 83,769 - 52,356$$

$$M_o = 31,413$$



$$C.V. = \frac{695,1 \times 100}{26,178}$$

$$C.V. = \frac{695,1}{26,178}$$

$$C.V. = 26,552$$

$$\sigma_M = \frac{695,1}{\sqrt{62}}$$

$$\sigma_M = \frac{695,1}{7,874}$$

$$\sigma_M = 0,883$$

$$\sigma_{DP} = \frac{695,1}{\sqrt{62 \times 2}}$$

$$\sigma_{DP} = \frac{695,1}{11,136}$$

$$\sigma_{DP} = 0,624$$

$$S = \frac{5,235}{695,1}$$

$$S = 0,753$$

$$\frac{62}{4} = 15,5$$

$$Q_1 = 21 + \frac{4,5 \times 3}{6}$$

$$Q_1 = 21 + \frac{13,5}{6}$$

$$Q_1 = 21 + 2,25 \quad Q_1 = 23,25$$



$$Q_3 = 15,5 \times 3 = 46,5$$

$$Q_3 = 30 + \frac{6,5 \times 3}{16}$$

$$Q_3 = 30 + \frac{19,5}{16}$$

$$Q_3 = 30 + 1,219$$

$$Q_3 = 31,219$$

$$Q = \frac{31,219 - 23,25}{2}$$

$$Q = 3,984$$

$$P_{15,87} = \frac{15,87 \times 62}{100}$$

$$P_{15,87} = 9,839$$

$$P_{15,87} = \frac{18 + \frac{9,839 \times 3}{3}}$$

$$P_{15,87} = \frac{18 + 5,517}{3}$$

$$P_{15,87} = 18 + 1,840$$

$$P_{15,87} = 19,840$$

$$P = \frac{84,13 \times 62}{100} = 52,161$$



$$P_{84,13} = 30 + \frac{12,161 \times 3}{16}$$

$$P_{84,13} = 30 + \frac{36,483}{16}$$

$$P_{84,13} = 30 + 2,280$$

$$P_{84,13} = 32,280$$

Teste ER

Curva Ajustada

	x	f	f'	$[F-F']\Delta$	$N=62$
$y = 0,432$	0-2				$M = 26,178$
$y = 0,884$	3-5	1	0,13	0,87	$\sigma = \pm 6,951$
$y = 1,296$	6-8	1	0,37	0,63	$\lambda = 3$
$y = 1,628$	9-11	3	1,04	1,96	$3 = 0,432$
$y = 2,160$	12-14	0	2,91	2,91	6,951
$y = 2,592$	15-17	3	4,68	1,68	$y = \frac{62}{2,507 \times 6,951} \times 3$
$y = 3,024$	18-20	3	7,27	4,87	
	21-23	6	9,74	8,74	
	24-26	10	10,67	1,67	$y = \frac{62}{17,426/57} \times 3$
	27-29	13	9,74	3,26	
	30-32	10	7,27	8,73	
	33-35	6	4,68	1,32	$y = 3,558 \times 3$
			2,91		
			1,04		$y = 10,674$
			0,37		
			0,13		

$$\begin{aligned}
 y_1 &= 0,912048 \times 10,67 = 9,74 \\
 y_2 &= 0,68135 \times 10,67 = 7,27 \\
 y_3 &= 0,4388 \times 10,67 = 4,68 \\
 y_4 &= 1,27270 \times 10,67 = 2,91 \\
 y_5 &= 0,09702 \times 10,67 = 1,04 \\
 y_6 &= 0,03512 \times 10,67 = 0,37 \\
 y_7 &= 0,0081 \times 10,67 = 0,13
 \end{aligned}$$

$$\sigma = \sqrt{\frac{7,27(62-7,27)}{62}}$$

$$\sigma = \sqrt{\frac{7,27 \times 54,73}{62}}$$

$$\sigma = \sqrt{\frac{397,8871}{62}}$$

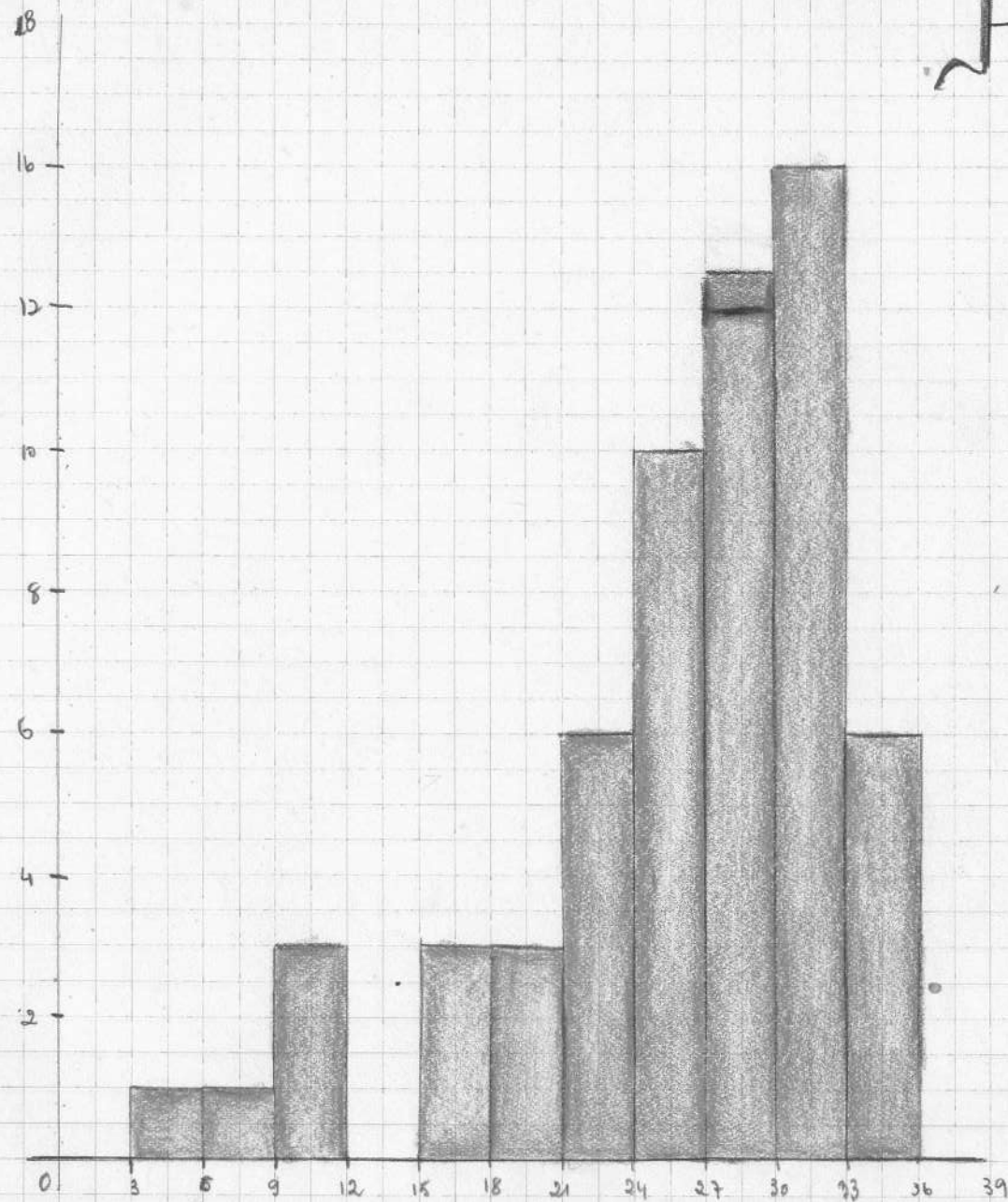
$$\sigma = \sqrt{6,41753387}$$

$$\sigma = 2,53$$

$$\Delta = 8,73$$

$\Delta = 31$ significant

Histograma Testes ER





Teste E R

Significância do "S"

$$M = 26,178$$

$$N = 62$$

$$26,178 - 24 = 2,178$$

$$\frac{10}{3} = 3,33,11$$

$$3,33 \times 2,178 = 7,253$$

$$17 + 7,253 = 24,253$$

Significância do "S"

$$\frac{62}{2} \pm 3 \sqrt{\frac{62}{4}}$$

$$\text{Sig do "S"} = 31 \pm 3 \times \sqrt{15,5}$$

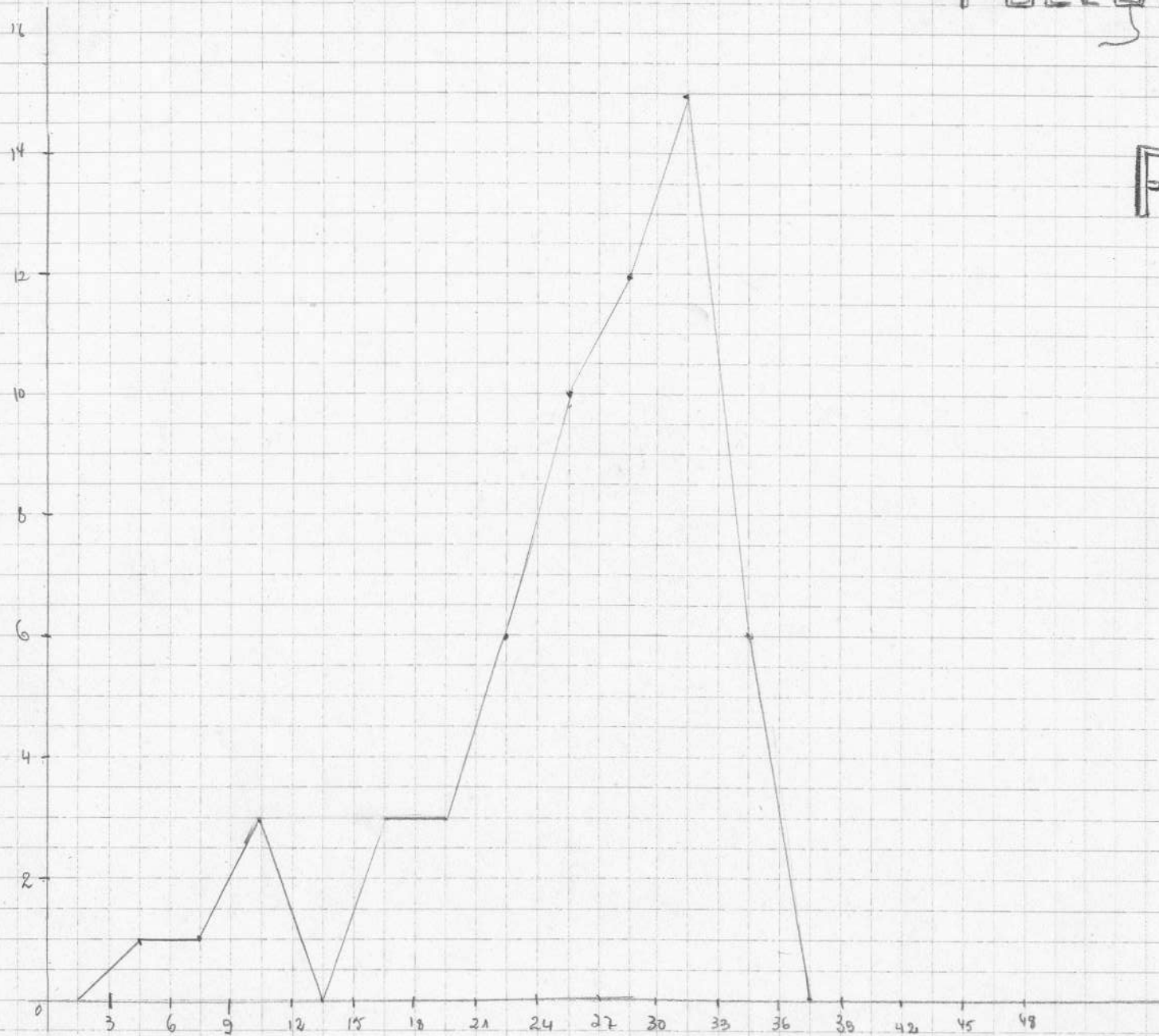
$$\text{Sig do "S"} = 31 \pm 3 \times 3,93$$

$$\text{Sig do "S"} = 31 \pm 11,79$$

$$\text{Sig do "S"} = 19,21 \text{ e } 42,79$$

Teste ER

Polígono de Frequência





Teste ER

1ª Parte

Cópia de Desenhos

x	T	f	d	fd	fd ²	fa
0		1	5	5	25	1
1		1	4	4	16	2
2			3	0	0	2
3		2	2	4	8	4
4		6	1	6	6	10
5		9	-	-19		19
6		17	1	17	17	36
7		13	2	26	72	49
8		13	3	3	9	62
		62		56	163	

$$M = 5,5 + \frac{37}{62} \times 1$$

$$\sigma = \pm \sqrt{2,14905}$$

$$M = 5,5 + 0,597$$

$$\sigma = \pm 1 \times 1,454$$

$$M = 6,097$$

$$\sigma = \pm 1,454$$

$$M_{ii} = 6 + \frac{22}{17} \times 1$$

$$Q = \frac{62}{4} = 15,5$$

$$M_{ii} = 6 + \frac{22}{17}$$

$$Q_{ii} = 5 + \frac{5,5}{9}$$

$$M_{ii} = 6 + 1,294$$

$$Q_{ii} = 5 + 0,611$$

$$M_{ii} = 7,294$$

$$Q_{ii} = 5,611$$



$$Q_3 = 75,5 \times 3 = 46,5$$

$$Q_3 = 7 + \frac{10,5}{13}$$

$$Q_3 = 7 + 0,808$$

$$Q_3 = 7,808$$

$$Q = 7,808 - 5,611$$

$$Q = \frac{2,196}{2}$$

$$Q = 1,098$$

$$M_0 = (3 \times 7,294) - (2 \times 6,097)$$

$$M_0 = 21,882 - 12,194$$

$$M_0 = 9,688$$

$$C.V. = \frac{1,454 \times 100}{6,097}$$

$$C.V. = 23848$$

$$\sigma_M = \frac{1,454}{\sqrt{62}}$$

$$\sigma_M = \frac{1,454}{7,874}$$

$$\sigma_M = 0,185$$



$$\sigma_{DP} = \frac{1,454}{\sqrt{124}}$$

$$\sigma_{DP} = \frac{1,454}{\sqrt{11,136}}$$

$$\sigma_{DP} = 0,131$$

$$S = \frac{6,097 - 0,9688}{1,454}$$

$$S = \frac{-3,591}{1,454}$$

$$S = -2,470$$

$$P_{15,87} = \frac{5,87 \times 62}{100}$$

$$P_{15,87} = 9,839$$

$$P_{15,87} = 4 + \frac{5,839}{6}$$

$$P_{15,87} = 4 + 0,973$$

$$P_{15,87} = 4,973$$

$$P_{84,13} = \frac{84,13 \times 62}{100}$$

$$P_{84,13} = 52,161$$



$$P_{84,13} = 8 + \frac{3,161}{13}$$

$$P_{84,13} = 8 + 0,243$$

$$P_{84,13} = 8,243$$



Teste ER

2ª Parte
Séries de Jensenho

x	T	f	d	fd	fd²	fa
0		3	4	12	48	3
1		6	3	18	54	9
2		4	2	8	16	13
3		11	1	11	11	24
4		8	-	49	-	32
5		14	1	14	14	46
6		14	2	28	56	60
7		2	3	6	18	62
		62		48	217	

-1

$$M = 4,5 + \frac{1}{62} \times 1$$

$$M = 4,5 + 0,016$$

$$M = 4,516$$

$$62 = 31$$

2.

$$M_i = 4 + \frac{7 \times 1}{8}$$

$$M_i = 4 + 0,875$$

$$M_i = 4,875$$

$$Q_1 = \frac{62}{4} = 15,5$$

$$Q_1 = 3 + \frac{25 \times 1}{11}$$



$$Q_1 = 3 + 2,273$$

$$Q_1 = 5,273$$

$$Q_3 = 15,5 \times 3 = 46,5$$

$$Q_3 = 6 + \frac{0,5 \times 1}{14}$$

$$Q_3 = 6 + 0,036$$

$$Q_3 = 6,036$$

$$Q = 6,036 - 5,273$$

$$Q = 0,763$$

$$Q = \frac{0,763}{2}$$

$$Q = 0,382$$

$$M_0 = (3 \times 4,875) - (2 \times 4,516)$$

$$M_0 = 14,625 - 9,032$$

$$M_0 = 5,593$$

$$\sigma = \pm 1 \sqrt{\frac{217}{62} - 0,016^2}$$

$$\sigma = \pm 1 \sqrt{3,5 - 0,000256}$$

$$\sigma = \pm 1 \sqrt{3,499744}$$

$$\sigma = \pm 1 \times 1,871$$

$$\sigma = \pm 1,871$$



$$\sigma_M = \frac{1,871}{7,874}$$

$$\sigma_M = 0,226$$

$$\sigma_{DP} = \frac{1,871}{11,136}$$

$$\sigma_{DP} = 0,168$$

$$S = \frac{4,516 - 5,593}{1,871}$$

$$S = \frac{1,871}{1,871}$$

$$S =$$

$$C.V. = \frac{1,871 \times 100}{4,516}$$

$$C.V. = \frac{187,1}{4,516}$$

$$C.V. = 41,480$$

$$P_{15,87} = \frac{15,87 \times 62}{100} = 9,839$$

$$P_{15,87} = 2 + 0,839$$

$$P_{15,87} = 2 + 0,140 \quad P_{15,87} = 2,140$$



$$P_{84,13} = \frac{84,13 \times 62}{100}$$

$$P_{84,13} = 52,161$$

$$P_{84,13} = 6 + \frac{6,161 \times 1}{14}$$

$$P_{84,13} = 6 + 0,440$$

$$P_{84,13} = 6,440$$



Teste E.R

3ª Parte

Completamento de desenho

x	T	f	d	fd	fd²	fa
0	I	1	-7	-7	49	1
1	III	3	-6	-18	108	4
2		0	5	-	-	4
3	I	2	4	-8	32	6
4	I	1	3	-3	9	7
5	I	1	2	-2	6	8
6	I	2	1	-2	2	10
7	IIII	4	-	-4	-	21
8	IIII	4	1	8	8	29
9	IIIIIIII	8	2	16	64	45
10	IIIIIIIIII	10	3	30	90	62
		62		91	1431	

SD

$$M = 7,5 + \frac{91}{62} \times 1$$

$$M = 7,5 + 0,806$$

$$M = 8,306$$

$$M_d = 9 + \frac{2 \times 1}{16}$$

$$M_d = 9 + 0,125$$

$$M_d = 9,125$$

$$M_o = (3 \times 9,125) - (2 \times 8,306)$$

$$M_o = 27,375 - 16,612$$

$$M_o = 10,763$$



$$P_{15,87} = \frac{15,87 \times 62}{100} = 9,839$$

$$P_{15,87} = 6 + \frac{9,839}{2}$$

$$P_{15,87} = 6 + 0,929$$

$$P_{15,87} = 6,929$$

$$\sigma = \pm \sqrt{\frac{431}{62}} = 0,806^2$$

$$\sigma = \pm \sqrt{6,95/62} = 0,649636$$

$$\sigma = \pm \sqrt{6,30/1976}$$

$$\sigma = \pm \sqrt{2,510}$$

$$\sigma = \pm 2,510$$

$$\sigma = 2,510$$

$$M = 7,874$$

$$\sigma_M = 0,319$$

$$\sigma = 2,510$$

$$DP = 11,136$$

$$\sigma = 2,254$$

$$DP$$

$$C.V. = 2,510 \times 100$$

$$8,306$$

$$C.V. = 251$$

$$8,306$$

$$S = 8,306 - 10,763$$

$$2,510$$

$$C.V. = 30,219$$

$$S = -2,457 \quad S = 0,979$$

$$2,510$$



$$\frac{62}{4} = 15,5$$

$$Q_1 = 7 + \frac{6,5}{11}$$

$$Q_1 = 7 + 0,591$$

$$Q_1 = 7,591$$

$$Q_3 = 15,5 \times 3 = 46,5$$

$$Q_3 = \frac{10 + 1,5}{17}$$

$$Q_3 = 10 + 0,882$$

$$Q_3 = 10,882$$

$$Q = 10,882 - 7,591$$

$$Q = \frac{3,291}{2} = 1,646$$

$$P = \frac{84,13 \times 62}{100} = 52,162$$

$$P_{84,13} = \frac{10 + 2,162}{17}$$

$$P_{84,13} = 10 + 0,421$$

$$P_{84,13} = 10,421$$



Teste ER

4ª Parte
Correção de Desenho

oc	T	f	d	fd	fd²	fa
0						
1	I	1	6	6	36	1
2	I	1	5	5	25	2
3	III	4	4	16	64	6
4	III	3	3	9	27	9
5	III	4	2	8	16	13
6	III	3	1	3	3	16
7	II	2	-	4		18
8	III	9	1	9	9	27
9	IIII	19	2	38	76	46
10	IIII	16	3	48	144	62
		62		96	400	
			48			

$$M = 7,5 + \frac{48}{62}$$

$$Q = 10 + \frac{0,5}{16}$$

$$M = 7,5 + 0,774$$

$$Q = 10 + 0,313$$

$$M = 8,274$$

$$Q = 10,313$$

$$M_i = 9 + \frac{4 \times 1}{62}$$

$$Q = 10,313 - 9,065$$

$$M_i = 9 + 0,065$$

$$M_i = 9,065$$

$$Q = 1,248$$

$$Q_1 = 9 + \frac{4}{19}$$

$$Q = 0,624$$

$$Q_1 = 9 + 0,211 \quad Q = 9,211$$



$$M_0 = (3 \times 9,065) - (2 \times 8,274)$$

$$M_0 = 24,195 - 16,548$$

$$M_0 = 7,647$$

$$P_{15,87} = 9,839$$

$$P_{15,87} = 5 + 0,839$$

$$P_{15,87} = 5 + 0,210$$

$$P_{15,87} = 5,210$$

$$P_{84,113} = 52,161$$

$$P_{84,113} = 10 + 6,161$$

$$P_{84,113} = 10 + 0,385$$

$$P_{84,113} = 10,385$$

$$\sigma = \sqrt{6,451613 - 9,599076}$$

$$\sigma = \sqrt{5,852537}$$

$$\sigma = 2,419$$

$$\sigma = 2,419$$

$$M = 7,874$$

$$\sigma = 0,307$$



$$T = 2,419$$

$$DP = 11,136$$

$$T_{DP} = 0,217$$

$$S = 8,274 - 10,647$$
$$2,419$$

$$S = 2,373$$
$$2,419$$

$$S = -0,981$$

$$C.V. = \frac{2,419 \times 100}{8,274}$$

$$C.V. = 29,226$$
$$8,274$$

$$C.V. = 29,226$$



Cálculos de Luxuá

Ajustada

Teste E R

	x	f	f'	$[f-f']\Delta$	
$u = 0,432$	0-2				$N = 62$
$y_1 = 0,884$	3-5	1	0,13	0,87	$M = 26,178$
$y_2 = 1,296$	6-8	1	0,37	0,63	$\sigma = \pm 6,951$
$y_3 = 1,628$	9-11	3	1,04	1,96	$i = 3$
$y_4 = 2,160$	12-14	0	2,91	2,91	$\frac{3}{62} = 0,432$
$y_5 = 2,592$	15-17	3	4,68	1,68	6,951
$y_6 = 3,024$	18-20	3	7,27	4,27	$y_0 = \frac{62}{2,507 \times 6,951} \times 3$
	21-23	6	9,74	3,74	
	24-26	10	10,67	0,67	$y_0 = \frac{62}{17,426157} \times 3$
	27-29	13	9,74	3,26	
	30-32	16	7,27	8,73	$y_0 = 3,558 \times 3$
	33-35	6	4,68	1,82	
			2,91		$y_0 = 10,674$
			1,04		
			0,37		
			0,13		

$$y_1 = 0,91248 \times 10,67 = 9,74$$

$$y_2 = 0,68135 \times 10,67 = 7,27$$

$$y_3 = 0,43852 \times 10,67 = 4,68$$

$$y_4 = 0,27270 \times 10,67 = 2,91$$

$$y_5 = 0,09202 \times 10,67 = 1,04$$

$$y_6 = 0,03510 \times 10,67 = 0,37$$

$$y_7 = 0,01181 \times 10,67 = 0,13$$

$$\sigma_{f'} = \sqrt{\frac{7,27(62-7,27)}{62}}$$

$$\sigma_{f'} = \sqrt{\frac{7,27 \times 54,73}{62}}$$

$$\sigma_{f'} = \sqrt{\frac{397,8871}{62}} \quad \sqrt{6,41753387}$$

$$\Delta = 8,73$$

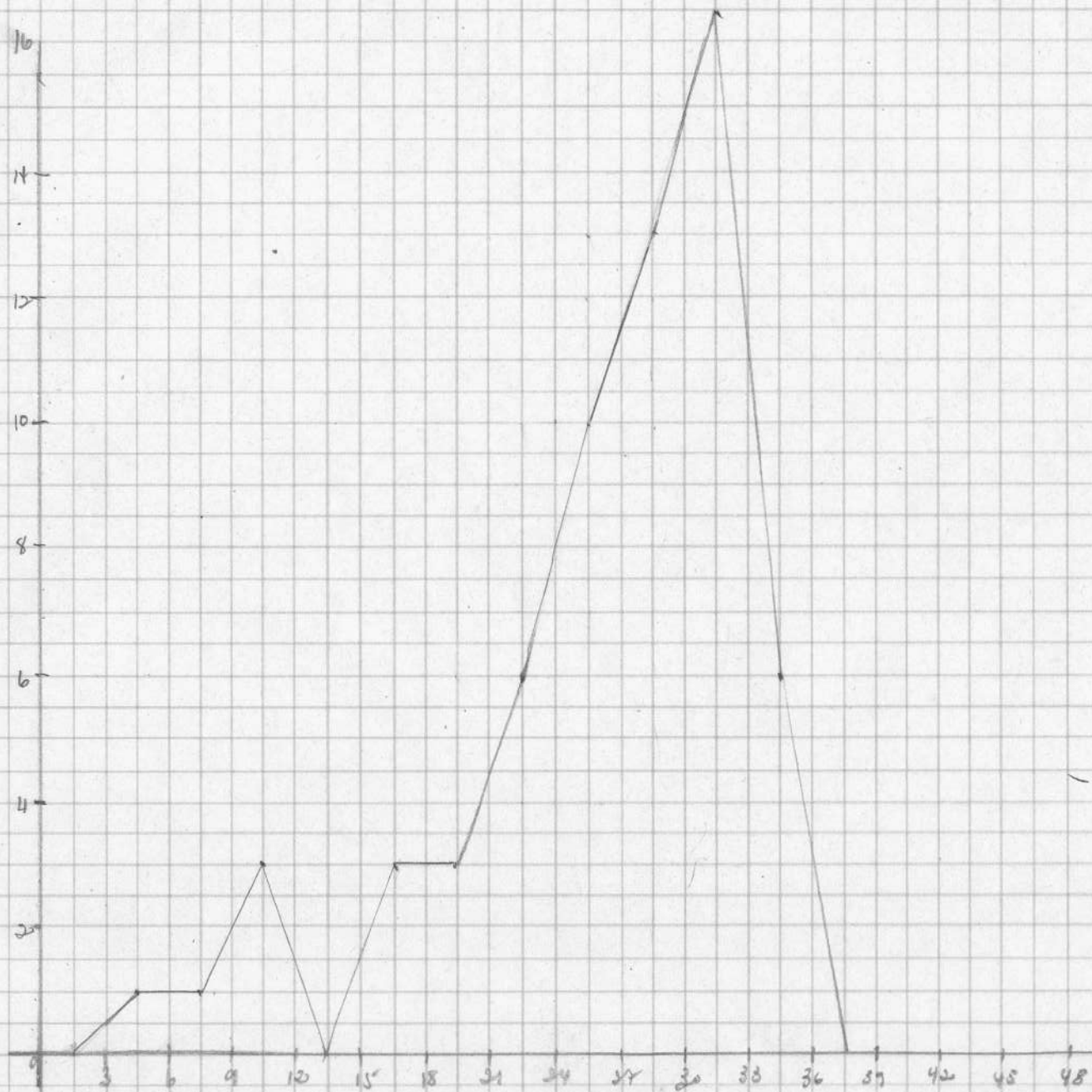
$$\Delta = 2,53$$

$\Delta = 3$ é significativa

$$\sigma_{f'} = 2,53$$

Teste E.R.

Polígono de
Frequência



Teste ER

Polígono de Frequência —
Curva Ajustada —

$$N = 62$$

$$M = 26,178$$

$$\sigma = \pm 6,951$$

$$i = 3$$

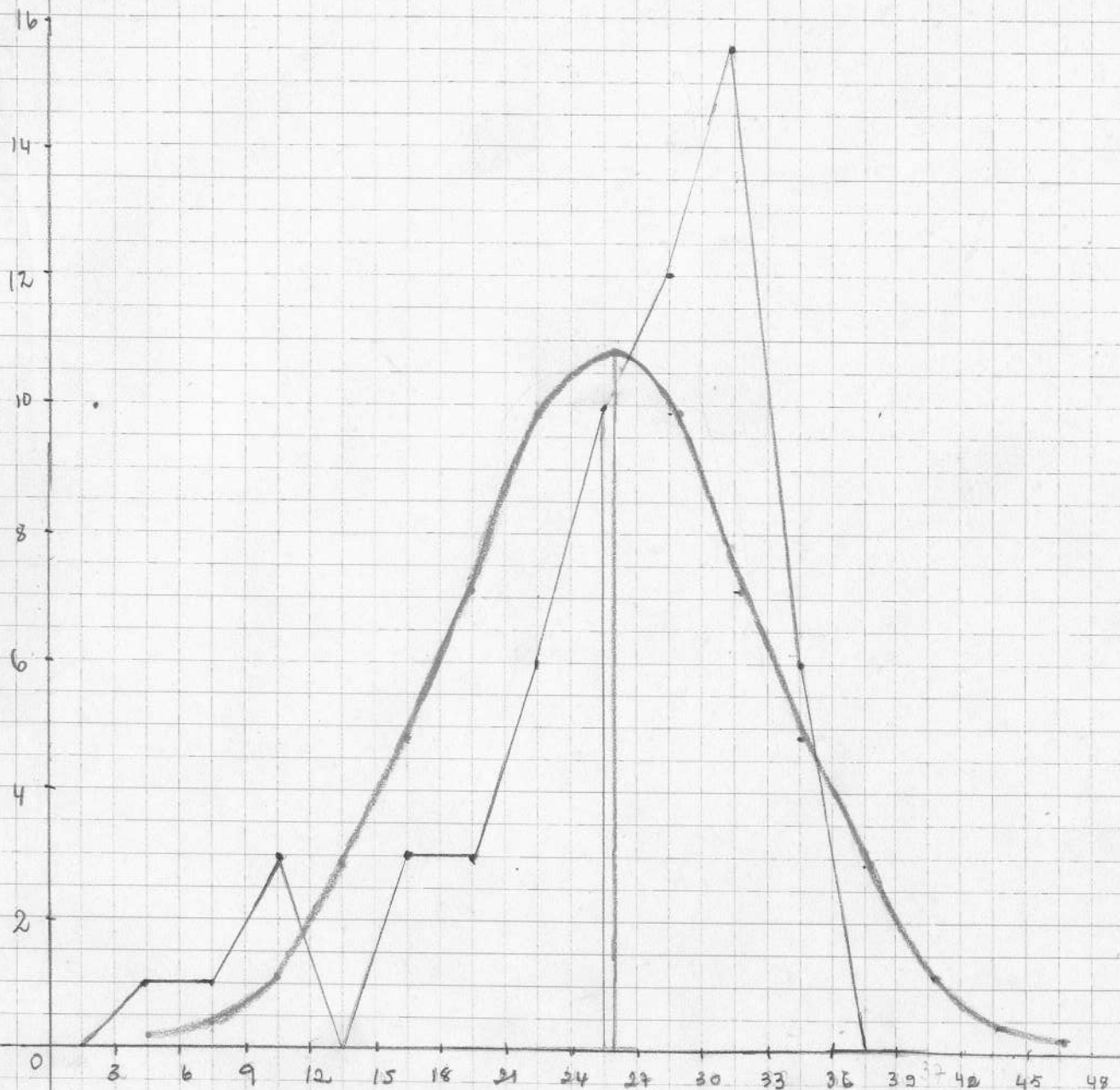
$$\frac{3}{6,951} = 0,432$$

$$y_0 = \frac{62}{2,507 \times 6,951} \times 3$$

$$y_0 = \frac{62}{17,426157} \times 3$$

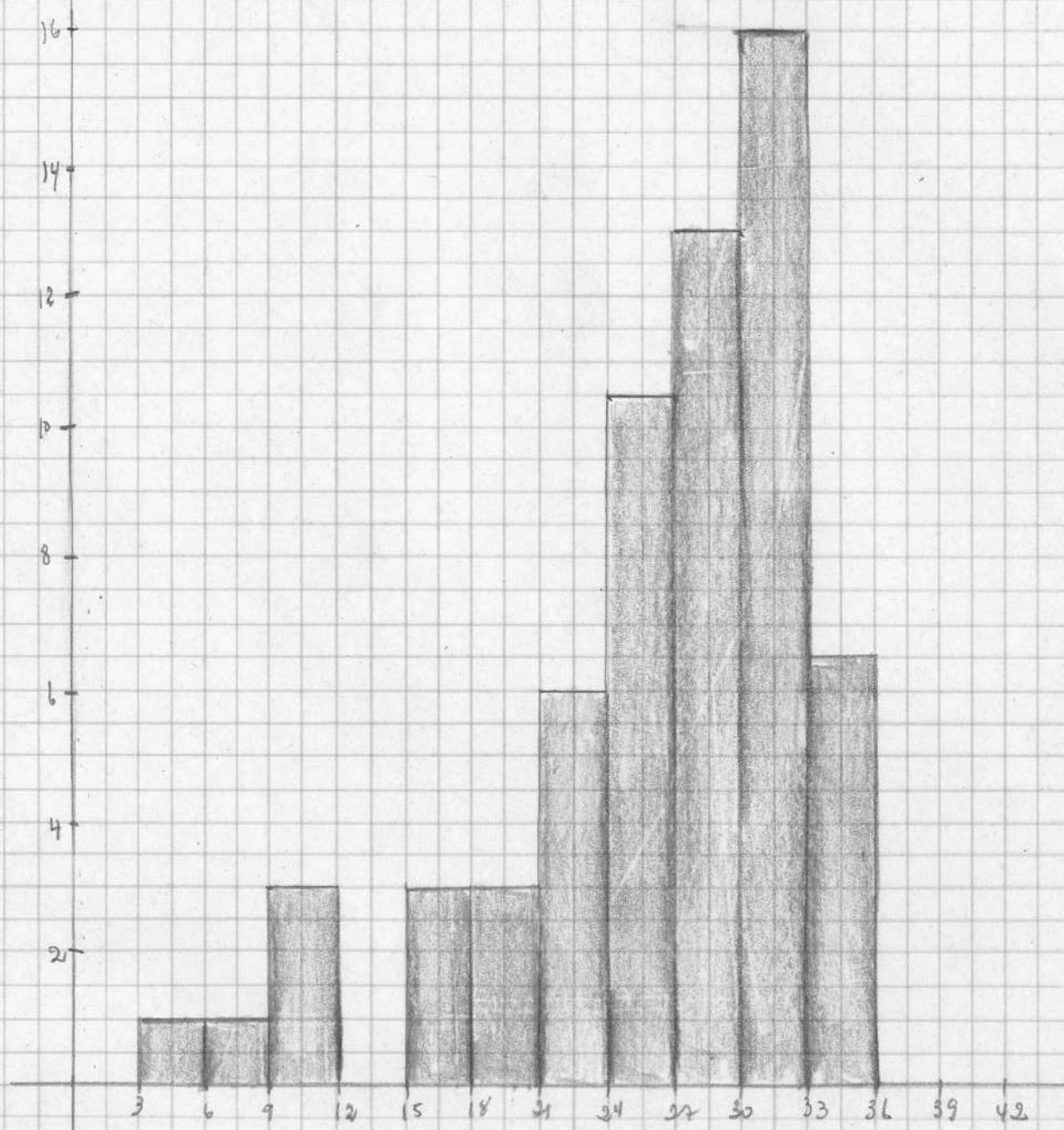
$$y_0 = 3,558 \times 3$$

$$y_0 = 10,674$$



Testo E.R.

Histogramma



Teste ER

1ª Parte

1 55 2 f 30 88,7

2 56 1 f 28 90,3

3 56 1 f 28 90,3

4 56 1 f 28 90,3

5 50 3 M 36 80,6

6 43 4 M 42 69,4

7 27 5 M 53 43,5

8 25 6 M 54 40,3

Nº de Acertos	Ordem de dif	Média graca fonte	Dif relativa	%
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Teste ER -

2ª Parte

1 53 1 f 32 85,5

2 40 4 M 44 64,5

3 52 2 f 34 83,9

4 48 3 M 37 72,4

5 25 5 M 54 40,3

6 11 7 M 65 17,7

7 21 6 M 57 33,8

Nº de acertos	Ordem de dif	Média para fonte	Inf relativo	%
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Teste ER

3ª Parte

1 61 1 f 15 98,3

2 56 2 f 28 99,3

3 55 3 f 30 88,7

4 28 6 M 52 45,2

5 54 4 f 31 87,1

6 54 4 f 31 87,1

7 28 6 M 52 45,2

8 44 5 M 41 71

9 55 3 M 30 88,7

10 56 2 M 28 90,3

Nº de acertos	Ordem de dif	Média graca forte	Dif. relativa	%
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Teste ER

4ª Parte

1	58	1	f	25	93,5	2	51	4	M	35	82,2
3	47	6	M	38	75,8	4	54	2	f	31	87,1
5	40	8	M	44	64,5	6	46	7	M	39	74,2
7	36	9	M	47	58,1	8	49	5	M	37	79
9	53	3	f	32	85,5	10	46	7	M	39	74,2

Nº de acertos	Ordem de dif	Média fracas forte	Dif relativa	%
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