

---

1948

"

"

"1

2.

[III]

[I]

;

( )

I II

II

I

1

[ (, — ),

2  
VI,

"





! —

” ”,

IX  
X

XI

1, 2, . 7, 11, 12

( , , ;  
) 3, 4, 5, 9, 22 -

13 -

8, 10, 19

14 -

15 — 21, -

<sup>23</sup> 24

”;

I:  
( )

3 14,  
:

" ( , 1 2,  
0, 1, 2, ..., 9).

1000 — 2000



'

" " " " "

"

'

-

( )

"

"

'

-

"

'

'

-

-

"

"

"

'

-

"

'

'

'

'

'

'

"

'

-

"

'

'

1

-

'

-



1

9 ( )

"

"

'

'

'

I.

\*

2- ;

( )

( ),

$$\frac{2-1}{-}$$

(

)

$$= 5$$

[1],

$$\frac{2.6-1}{52-2.5-3} = \frac{3}{4}$$

$$= 5$$

$$= \frac{3}{4}$$

=(\*)



$$f(-*) = \frac{2-1}{-2-3}$$

5,

$$f(5) = \frac{2.5-1}{5^2-2.5-3} = \frac{9}{12.5-3} = \frac{9}{9.5}$$

$$f(10) = \frac{2-10-1}{10^2-2.10-3} = \frac{-9}{100-20-3} = \frac{-9}{77}$$

$$= \frac{2-\frac{3}{2}-1}{(4)^2-24-3} = \frac{-\frac{1}{2}}{-16-3} = \frac{-\frac{1}{2}}{-19} = \frac{1}{38}$$

5,10,-

3

3, -jg<sup>19</sup>.

8

y=f(x)  
[1]

( ):

[1]

( )

=5,

1

$$f(x) = \frac{x-1}{x-3}$$

$$f(*) = 4 - \frac{1}{3}$$

1



$-j, 3$

$$f(5) = 4$$

$$f(x), \quad 5, \left(\wedge \frac{3}{4}\right) = 5$$

$$y = -j$$

$$\left(10, \frac{19}{77}\right), \left(\frac{3}{2}, -\frac{8}{15}\right)$$

$$\begin{matrix} [1]. \\ [1J, \end{matrix}$$

$f()$

[1]

(,,

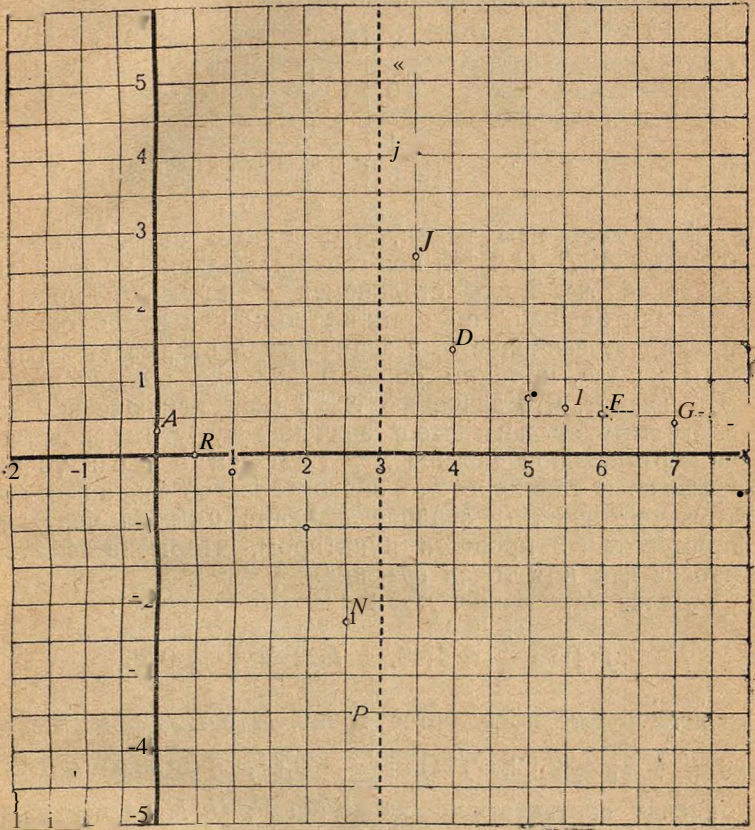
[1].

$$0 < < 1).$$

$=/()$

$$=/( )$$

[1].



.1

$= 0$  (  $= 0$  ,  $= 1$  , )

\_\_\_\_\_

1

1.

?



$$f(4) = -4, f(2) = -i,$$

X	
0	$\frac{1}{3}$
1	$-\frac{1}{4}$
2	-4.

1

$$= 3,$$

5,

$$= 3 ( \quad )$$

$$: = 3 - ;$$

$$= 3 ( \quad ),$$

$$-4 = 5, :$$

$$f(4) = -f = 1,40, \quad f(5) = -^{\wedge} = 0,75,$$

D

$$f(6) = \overset{11}{\sim} \overset{52}{>} = S \sim 0,41, f(8) = -g \overset{1}{\text{-----}} 0,33;$$

F, G,

?

$$, -100. :$$

$$f(i) = \frac{199}{9797} \sim \frac{200}{10000} \frac{1}{50}$$



2 ( — ):

$$v = \frac{\frac{2}{x} - \frac{1}{x^2}}{1 - \frac{2}{x} - \frac{3}{x^2}}$$

( : — » )

$$\wedge : \frac{2}{x} \rightarrow 0, -\frac{1}{x^2} \rightarrow 0, \frac{3}{x^2} \rightarrow 0j,$$

“  $\left( \frac{2}{x} - \frac{1}{x^2} \rightarrow 0 \right),$

$\left( 1 - \frac{2}{x} - \frac{3}{x^2} \rightarrow 1 \right).$

( „ — ” ) :

$$y = \frac{\frac{2}{x} - \frac{1}{x^2}}{1 - \frac{2}{x} - \frac{3}{x^2}} \rightarrow 0.$$

D, , F, G, ,

( )

1.

3	
4	$\frac{7}{5} = 1,40$
5	$\frac{3}{4} = 0,75$
6	$\frac{11}{21} \sim 0,52$
7	$\frac{13}{32} \sim 0,41$
8	$\frac{1}{3} \sim 0,33$
100	$\frac{199}{9797} \hat{=} 0,02$
->	->0

D

$$F, = 4$$

$$\frac{2 \cdot \frac{11}{2} - 1}{\left(\frac{11}{2}\right)^2 - 2 \cdot \frac{11}{2} - 3} = \frac{8}{13} \sim 0,62$$

1  
" "



D

®

D?

= 3,

D.

D, ?

= 3^-.

$$\frac{2 \cdot \frac{7}{2} - 1}{\left(\frac{7}{2}\right)^2 - 2 \cdot \frac{7}{2} - 3} = \frac{8}{3} \sim 2,67.$$

∴

— 3^- — = 3^-

= 3^.

$\frac{3}{2}$	$\frac{8}{3}$	-2,67
$\frac{3}{6}$ L	$\frac{51}{13}$	" 3,92
$\frac{3}{6}$ 4	$\frac{88}{17}$	" 5,18
$\frac{3}{100}$ L		— 125



$= 3 - \epsilon \sim 1^6$   $L$ ,  $\dots$  ;  $= 3 - 2 -$

$!$ ),  $= 3^1$ ,

$3$ ),  $(\dots)$   $3$

$- \rightarrow 3, > -3;$

$D$   $J$ ,  $L$   $"$   $= 3$ .

$3-j$  ,  $-$

$$\frac{2(3+h) - 1}{(3+h)^2 - 2(3+h) - 3} = \frac{5+2/h}{4/2+h} = \frac{5+2/h}{(4+h)/h}$$

$h \rightarrow 0$   $(, " )$   $\frac{5(5+2/h) \rightarrow 5}{4+h}$   $4(4+h \rightarrow 4)$ ,  $(/ \rightarrow 0)$ ,

$(4+h) h \rightarrow 0$ .  $5$ ,  $0$  ( $)$ :

$$\frac{5+2/h}{(4+h)h} \rightarrow 00$$

$J, D, /, F, G$ ,  $I$

?

$$2 < ; < 3.$$

$$2^{-1}, 2^{-2}, 2^{-3}$$

$2\frac{1}{2}$	$-\frac{2}{1} \sim -2,29$
$2\frac{2}{3}$	$\sim \frac{39}{11} \sim 3,55$
$2\frac{3}{4}$	$-\frac{24}{4} = -6$

( , N , Q)

”

$$3 \quad ( \quad 3)$$

$$- * - \quad - + 3, < 3.$$

$$\frac{2(3 - ft) - 1}{(3 - ft)^{1/2} - 2(3 - ft) - 3} \sim \frac{5 - 2}{(4 - ft) ft} \rightarrow \infty, 1 \quad [2]$$

ft

, , N , Q,

1

- ft

[1].



= 0,

$$\frac{2x-1}{x^2-2x-3} = 0;$$

$$1 \quad := \quad \frac{1}{2}.$$

$$R\left(\frac{1}{2}, 0\right) \quad ( \quad 1);$$

= 0

$$= -1, \quad = -2, \quad = -3 \quad . \quad .$$

= 3:

= - I

— 1“

0

“ —→ )<sup>1</sup>.

(,,

I

$$y = f(x) = \frac{1x^2 + 4}{2 + x}$$

: )

, b)

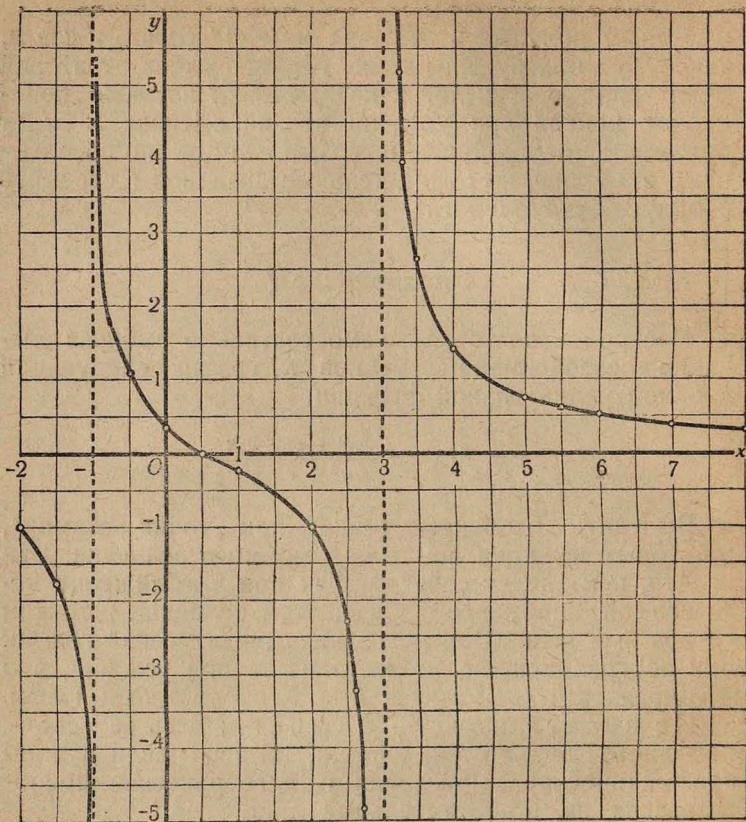
( )

$$y = \frac{2x - 1}{x^2 - 2x - 3} \quad ( \quad )$$

2.

1





Черт. 2

$$\begin{aligned}
 &= -1 + h, \\
 &= \frac{2(-1+h) - 1}{(-1+h)^2 - 2(-1+h) - 3} = \\
 &= \frac{-3 + 4 - 2ft + 3 - 2h}{-4h + \dots} \sim h \sqrt{4 - ft} = \infty.
 \end{aligned}$$

*1		X 1		*1	
0	$\frac{1}{3}$	7	$\frac{13}{32} - 0,41$	1	$\frac{88}{1} - 5,18$
1	$-\frac{1}{4}$	8	$\frac{1}{3} - 0,33$	3	$\frac{1}{100} - 125$
2	-1	100	$\frac{1}{\sim 50} - 0$	3-	->
3	$-\frac{7}{3} = 1,40$	>	$\frac{8}{3} - 2,67$	(.h -> 0)	$\frac{16}{-} - 2,29$
4	$\frac{11}{21} \sim 0,52$	>4	$\frac{51}{13} - 3,92$	4	$\frac{39}{-} - 3,55$
5		>4		4	$\frac{24}{5} - 4,80$
6				2	
				3-h	->-
				(-0)	

-*1		X	
$\frac{1}{2}$	0	$-\frac{3}{2}$	$-\frac{16}{9}$
$-\frac{1}{2}$	4-1,14	-1	->-
-1 +	->	(-0)	
{h > 0}	-1		
-2	$-\frac{7}{12}$		
-	$\frac{1}{5}$		
-10	$\frac{1}{5}$		
->-	->- 0		

1. ) ( - )  
 ( ) - ; -  
 (24 )



	I						I						
1	1	-2	-3	0	2	0	1	1	-2	-3	1	-1	0
2	1	-2	-3	0	1	-5	2	1	-2	-3	1	2	0
3	1	-1	-2	0	2	0	3	1	-1	-2	1	2	0
4	1	-1	-2	0	1	-4	4	1	-1	-2	1	-3	0
5	1	0	-1	0	2	-1	5	1	0	-1	1	-3	0
6	1	0	-1	0	1	-2	6	1	0	-1	1	-5	6
7	1	1	0	0	1	-3	*7	1	1	0	1	-6	9
8	1	-1	-6	0	3	0	*8	1	-1	-6	1	0	0
9	1	-1	-6	0	1	-1	*9	1	-4	4	1	-1	0
*10	1	-2	1	0	1	-2	*10	1	6	9	1	-3	0
*11	1	-4	4	0	1	1	*11	1	-4	4	1	0	0
*12	1	-6	9	0	1	-1	*12	1	-6	9	1	2	1

$b$  ) .

2.

:-\* —

\* 0 ,

; -  
-»  $k$ ,

$k$  —

( . .

;

1,  $k$

$I$

3.

) ^

(

4.

$$: = \frac{1}{x^2}$$

5.

→ "

" ( ) :

$$\frac{5 + 2ft}{(4 + ) ft^{**} 00 >$$

" " ?" ; " 4, " 5, " ?" . . .

6.

( , ) ,

7.

1\*



2.

( )

" ( " ) ;

$$A^*) = f = S = 3 - \frac{1}{2}$$

$$) = \frac{x - \frac{1}{2}}{(-3)(-x+1)} \cdot$$

t<sup>2</sup>]

3 -1.)

$$\frac{1}{2} < \frac{1}{2}$$

$$\begin{aligned} &< 3 &> 3. &> \frac{-f-1}{-1} \\ &- < -1 & & \end{aligned}$$

$\frac{1}{2}$  3. " "

( ), :

I, < ; < -1;

II,

: -1 < <  $\frac{1}{2}$ ;

III,

: - < < 3;

IV,

: - 001.

f( )

	-	-I	* $\frac{1}{2}$	-3	f(••)
I	- < X < -1	-	-	-	-
	-1 < < -	+	-	-	+
	$\frac{1}{2}$ < < 13	+	+	-	-
IV	3 < <	+	+	+	+

1

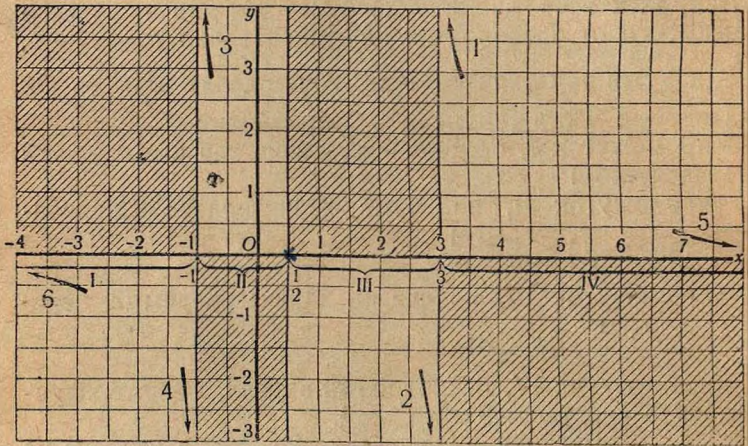
<

( , )



-f-

$y=f(x)$   
 I III. II IV,  
 $= f(x)$  ( II IV,



Черт. 3

II IV), I III —  
 ( „ „ I III).  
 „ „ „ „ II IV „ „  
 I III: ( .3.)

$$f\left(\frac{1}{2}\right) = 0,$$

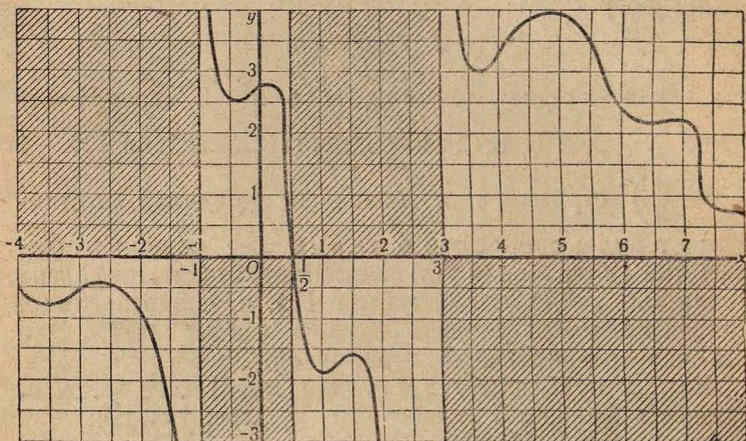
$$\left(\frac{1}{2}, \right), —$$

$$„ „ = — 1 = 3,$$

3 , . . . 01. = 3. ( )  
 IV):  
 -\*3, >3.  
 [2] , =/( )  
 :  
 [ | = !/(\*)! — , —3  
 { — 3—>0), ( —) — 1  
 и  $x - \frac{1}{2}$  )  
 IV ;  $f(x)$  ( :  
 „ 0 „ 0 IV), , ,  
 3 ,  
 3 ( — = 3 III):  
 —>3, <3,  
 , ( 2 ) = — 1 ( —  
 3 4).  
 —\* 2 ( , 5 6), —> —  
 1 : 1) , „ ,  
 (  $\frac{1}{2}$  , ), 2) \* , „ = 3 \ ,  
 2 „ 3“ .  
 ! : — , —



3)



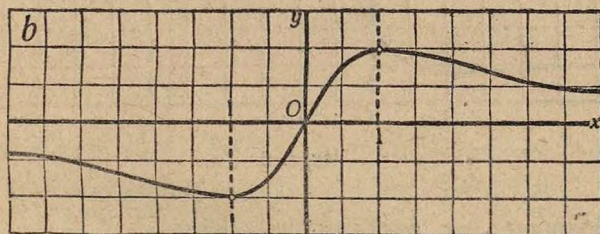
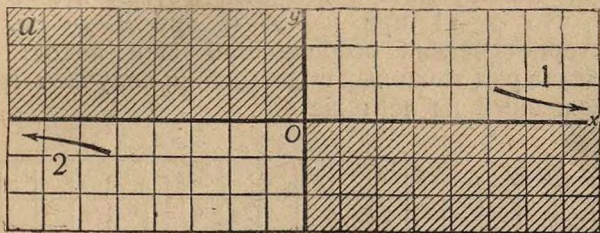
.4

4.

( )

$$y = f(x) = \frac{2x}{x^2 + 1}$$

$- < 0, \quad \rightarrow / (0) = 0. \quad \rightarrow$   
 $0, < < \quad y > 0. \quad \rightarrow 0$   
 $\rightarrow$



Черт. 5

[3],

5 .

$$* = \frac{x^2 + x + 1}{(x^2 - x + 1)} = [ 4 ]$$

$$* + 1 = \left( \frac{1}{2} \right)^2$$

$$2 - + 1 = ( \quad - j )^2 4 - | > ,$$

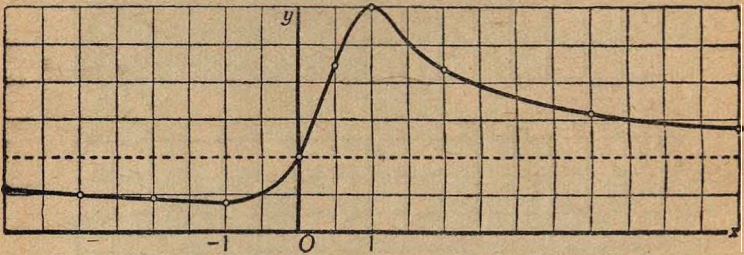


$$\Delta > 0.$$

—\* 1 —>

—> —

6.



.6

( . .

$$^2 - | -bx - | -c$$

( 0);

$\frac{a}{a}$

$a$

$$^2 - | - | - ( + - | - q).$$

[5]

$x^2 - f -$

$$x^2 + px + q = \left( x^2 + px + \frac{p^2}{4} \right) + ? \sim = p^2$$

$$= \left( + \frac{p}{2} \right)^2 - ( - < 0'$$

[6]

$\frac{p}{4} - q > 0$ , ( : )  
 " ) :

$$x^2 + px - f - q = \sqrt{p^2 - 4q} \left( x + \frac{p}{2} - \sqrt{\frac{p^2}{4} - q} \right),$$

[6]  $\frac{p^2}{4} - q < 0$ ,  $-\left(\frac{p^2}{4} - q\right) > 0$ ,

$$\frac{p^2}{4} - q = 0,$$

$$x^2 + px - q = (x - p_1 y)$$

$$\left( = - \frac{p}{2} \right).$$

$$\frac{p^2}{4} < ,$$

$$2 + \frac{-f - q}{2} - \dots$$

[5],

$$\left( \frac{\dots}{\dots} \right),$$



(

)

"2

( . . )

)

1

$$\frac{2x}{-2}$$

$x < -1$ $-10 < 1$ $1 < 0$	$(0 \quad -1)$ $(-1 \quad 1)$ $(1 \quad 0)$
----------------------------------	---

$$= \frac{x^2 - 1}{x - 1}$$

6,

$x < -1$ $-1 < x < 1$ $1 < x$	$(1 \quad \frac{1}{3})$ $(-g \quad 3)$ $(3 \quad 1)$
-------------------------------------	--

$$\frac{2 - 1}{* - 2 - 3}$$

( . 2)

3 . .



$-1 < x < 3$	$(0 \quad -)$ $( \quad -)$ $( \quad 0)$
--------------	---

$$= -\frac{2}{x^2+1} - \frac{1-1}{x^2+1} = -\frac{2}{x^2+1}$$

$$= \frac{2}{x^2+1} - \frac{1}{x^2+1}$$

$$\left( \frac{1}{x^2} \right)$$

( . . . . . 243).

$$\frac{1}{1} ; \quad =$$

$$f(x, y) = \frac{1}{(x^2 + y^2)^2}$$

$$\frac{\partial f}{\partial x} = -\frac{2x}{(x^2 + y^2)^3}$$

$$\frac{\partial f}{\partial y} = -\frac{2y}{(x^2 + y^2)^3}$$

$$x^2 y^2 = 1, \quad x^2 = 1, \quad y^2 = 1, \quad x = \pm 1, \quad y = \pm 1$$

$$3x^2 y^2 = 1$$

$$\frac{1}{2} \frac{2x}{x^2 + y^2} - \frac{2y}{(x^2 + y^2)^2}$$

171  
> -1

$$0) \quad 3(x^2 + y^2 - 1) = 0$$

2

$$f(x, y) = \frac{1}{x^2 + y^2} - \frac{4}{x^2 + y^2}$$

f(x)

- 1.
- 2.
- 3.



fatbi ;

4.

„ ”)

(„ ”),  
( „ ”),  
\_ ^

-+ - ).

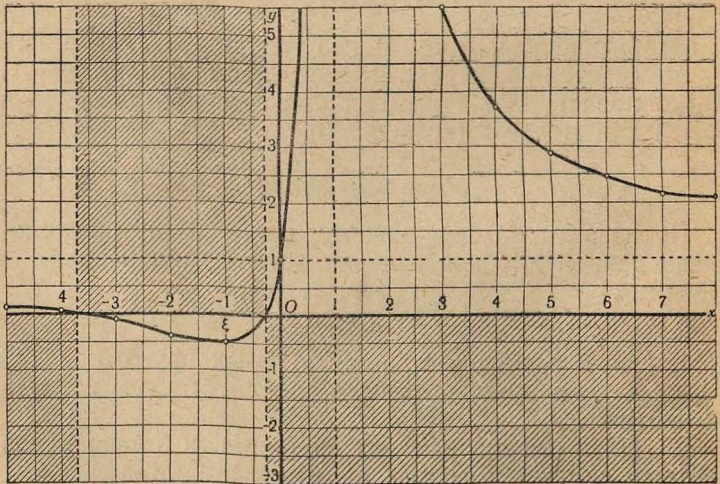
5.

6.

, 4

7.

$$=f(*) = \frac{2 + 4 + 1}{2 - 2x - f - 1}$$



$$2 - 2 - 2 - 4 - 1 - 1 = 0.$$

$$f(x) = 0 \quad = -2 - \sqrt{3} \approx -3,73$$

$$:= -2 - (\sqrt{3}) \approx -0,27.$$

$$= 1.$$

— < :<	+
“ < * <	+
< * <	

— < <	1'-----0,50
ξ < x < 1	~ -0,50
1 < ^ < 00	1

$$* = 4 \text{-----} 1,0$$

x	:	:	:
0	1	-1	$-\frac{1}{2} \approx -0,50$
2	13	-2	$-\frac{1}{3} \approx -0,33$
3	$\frac{11}{2}$	-3	"^'-0,12
4	$\frac{11}{3} \sim 3,67$	-4	$\frac{1}{25} = 0,04$
5	$\frac{23}{8} \sim 2,88$	-5	$\frac{1}{6} \wedge 0,17$
6	$\frac{61}{25} \sim 2,44$	->	->1
7	$\frac{13}{6} \sim 2,17$		
10	$\frac{47}{27} \sim 1,74$		
	->1		



1.

1,

1,

$$\left( \begin{array}{c} \therefore, \quad 2, \quad j c^2 - f - 1, \quad 2 - \backslash, \quad - I, \quad ( - I)^2, \quad 2 - \backslash - \sim \{ - I \\ 30 \end{array} \right).$$

*D.*

*I*, *b*

-}

*D.*

( 2).

$$\left( \begin{array}{c} 0,007; \\ 0,000005). \end{array} \right).$$

$$, - \quad 0,03, - \quad 0,15;$$

$$\left( \begin{array}{c} 4 - \quad 1:1. \\ 2:1, \\ 0,20 \quad 0,07. \end{array} \right).$$

2:1

*D*

2.

*D*

3.  $f(x)$

$$\sim \frac{x^2 + x + 1}{x - 1}$$

$$= x - 2 + \frac{3}{x - 1}$$

$$= x - 2 + \frac{3}{x - 1}$$

→  $(x - 2 + \frac{3}{x - 1})$

3.

3

$$4 - 96^3 = y^i - 100^2 \quad [1]$$



$$= 9;$$

$$/ -100/+1215 = 0;$$

$$= 50 \pm \sqrt{2500 - 1215} = 50 + \sqrt{1285} - 50 \pm 35,85 =$$

$$= 14,15 \quad 85,85.$$

$$- \pm \sqrt{14/5} \sim + 3,76$$

$$\sim + \sqrt{55,85^1} + 9,26.$$

и

$$\begin{array}{r} X \ 81 \\ \underline{81} \\ 648 \\ \underline{6561} \end{array}$$

$$\begin{array}{r} X \ 96 \\ \underline{81} \\ 768 \\ \underline{7776} \end{array}$$

$$\begin{array}{r} - \ 7776 \\ \underline{6561} \\ 1215 \end{array}$$

$$\begin{array}{r} /12^{\cdot}85 = 35,85 \\ \underline{9} \\ 65 \ | \ 385 \\ \underline{5 \ | \ 325} \\ 708 \ | \ 6000 \\ \underline{8 \ | \ 5664} \\ 7165 \ 133600 \end{array}$$

$$\begin{array}{r} /14,15 = 3,76 \\ \underline{9} \\ 67 \ 1 \ 515 \\ \underline{7 \ 1 \ 469} \\ 746 \ 4 \ \odot \odot \end{array}$$

$$\begin{array}{r} /85,85 = 9,26 \\ \underline{81} \\ 182 \ | \ 485 \\ \underline{2 \ | \ 364} \\ 1846 \ | \ 121 \ \odot \odot \end{array}$$

1.

( ( 35,85) <sub>^</sub>

( 14,15 85,85).

” ”

” - “ ( ” )

” - “

14,15

46©©:

4550 4650.

6

0,01):

747 X 7 > 4650.

, 746X6 < 4550,  
85,85

121 ©©,  
12 050 12150.

6

1846 X 6 < 12050,

1847 X 7 > 12 150.

2.

-15 < x < -15, -12 < ^ < +12!

( )

„ ( .8)^2.

3.

1 « < 12, 1 < < 12 (

).

1

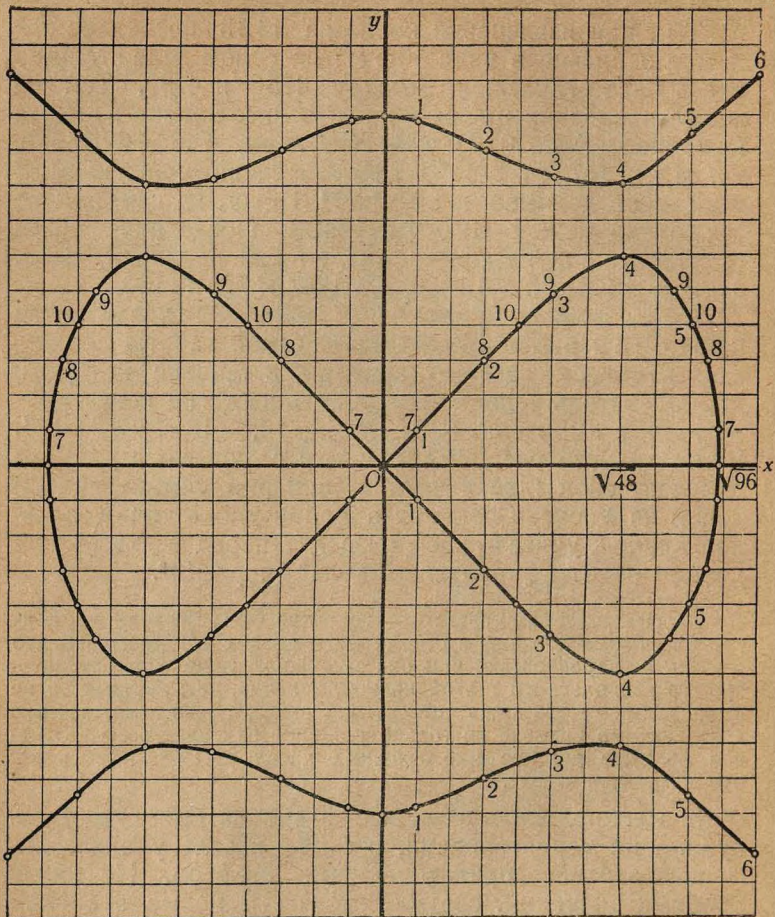
2

: 1)

, 2)

( )





.8

$$\begin{array}{ccccccc} : & & N & & 24, & - & \\ N & & & & : & & \\ = 1, & = 3, & = 5, & = 7, & = 9, & = 11, & \\ = 1, & = 5, & = 5, & = 4, & = 7, & = 12, & \\ = 10, & = 6, & = 2, & = 4, & = 8, & = 6, & \\ = 8, & = , & = 5, & = , & = 12, & = 9; & \end{array}$$

$$= ( = 1, 2, \dots, n.j.$$

$$4. ( ) -$$

$$= 0, -\theta, ; = \sqrt[9]{6} \text{ ---}$$

$$( ), ; = j/\sqrt{48}.$$

$$= \frac{\pm \sqrt{50 \pm \sqrt{4 - 96^{**} + 2500}}}{\pm 48 \pm \sqrt{2}} \quad [2]$$

И

$$5. ( )$$

1)

$$;^4 - 96 :^* + 2500 = ( * - 48)^2 + 196 > 0,$$

$$[1] \quad [2] :$$

$$\sqrt{^4 - 96 :^2 + 2500} < 50 \quad [4]$$

$$/ \sqrt{^4 - 96 ;^2 + 2500} > 50. \quad [5]$$

$$[4] \quad [5],$$

$$;^2 ( :^2 - 96) < 0 \quad [4']$$

$$^2 ( ^2 - 96) > 0. \quad [5']$$



$$x^2 > \sqrt{9} \cdot 7 \quad ; = \sqrt{96}$$

2)  $36 < x < 64, \quad 6 < |j| < 8,$

$$-100 + 2304 = (-36)(x^2 - 64) < 0;$$

$$6 < x < 8 \quad [1] \quad ;$$

>8

$$x^2 + 2304 < 48 \quad [6]$$

$$-x^2 > 48. \quad [7]$$

$$[6] \quad [7]$$

$$(x^2 - 100) < 0 \quad [6']$$

$$(x^2 - 100) > 0. \quad [7']$$

$$x > 10 \quad ; \quad x < 10$$

3)  $[2]$

$$= 50 \pm \sqrt{(x^2 - 48)^2 + 4^2}$$

$$= \dots : = )/48.$$

$$= \sqrt{b^2 - 4ac} = \sqrt{(-x^2 - 96)^2 - 4 \cdot 2500}$$

$$x < 10 \quad ; \quad 0 < |x| < \sqrt{96}, \quad ; \quad 0, \dots ; \sqrt{96} <$$

4)  $( \dots )$

$$[1]:$$

$$4 = \pm \sqrt{0,96 - 0,01} \{ ? + - \} (4)1$$

( , ) rto

$$\frac{y}{x} = (,,$$

$$\frac{y}{x} \rightarrow \pm \sqrt{0,96} \sim \pm 0,98,$$

45°.

4.

$$x = -\frac{p}{2} \pm \sqrt{\frac{p^2}{4} - q}$$

$2x - jQ >$

$$x^2 - j4x - 10 = 0$$
$$= -2 \pm \sqrt{14} - 2 \pm 3,74;$$

1,74:

$$1,735 < * < 1,745.$$



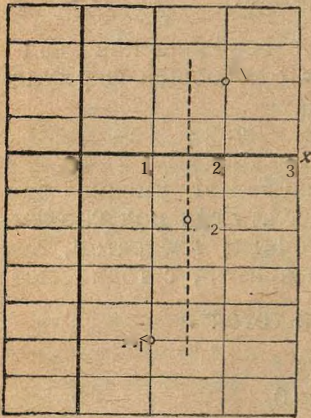
$$y = f(x) = x^2 - 4x - 10$$

$$f(0) = 1^2 - 4 \cdot 1 - 10 = -5 < 0,$$

$$f(2) = 2^2 + 4 \cdot 2 - 10 = 2 > 0.$$

(. 9)

(1, -5) (2,2).



(,, ")

$B_v$

. 9

1 2,

$$x^2 - 4x - 10 = 0.$$

$$= f(x),$$

$$y = f(x)$$

$$, = 1,5. \quad : \quad 1 \quad 2, \quad -$$

$$f(1,5) = 1,5^3 - \{-4 - 1,5 - 10 = -1,75 < 0.$$

$$\left. \begin{matrix} 1 \\ 1,5 \end{matrix} \right\} - 1,75.$$

$$2 \quad : \quad - \quad 2 \quad \cdot \quad 2 \quad -^2$$

$$, \quad 1,5, \quad 1,75;$$

$$= 1,7 \quad = 1,8.$$

$$2^2 : \quad = 1,7. \quad 2 \quad :$$

$$f(1,7) = 1,7^2 + 4 - 1,7 - 10 = -0,31 < 0.$$

$$\left. \begin{matrix} 1,7 \\ 8 \end{matrix} \right\} ( \quad - 0,31 )$$

$$, \quad 1,8, \quad :$$

$$f(1,8) = 1,8 + 4 - 1,8 - 10 = 0,44 > 0.$$

$$B_i ( \quad , \quad 1,8 \quad 0,44, \quad )$$

$$: \quad \quad ) ; \quad 3 \quad 2 \quad ($$

$$\quad \quad \quad \quad \quad 1,7 \quad 1,8.$$

$$, \quad \quad 0,1 \quad :$$

$$1,7 < * < 1,8.$$



$$: = 1,75.$$

$$/(1,75) = -1,75^2 - j - 4 \cdot 1,75 - 10 - 0,07 > 0.$$

$$1,70 <^* < 1,75.$$

1,73, 1,74.

$$/(1,74) = 1,74^2 + 4 \cdot 1,74 - 10 - 0,01.$$

$$/(1,74) = 0,012.$$

1,74

X	f(x)	
1	-5	,
2	2	
1,5	-1,75	^2
1,7	-0,31	
1,8	0,44	2
1,75	0,07	
1,74	-0,012	4

1,74, 1,75;

$$* = 1,745:$$

1

4 [I].

$$f(1,745) = 1,745^2 + 4 \cdot 1,745 - 10 \sim 0,026 > 0.$$

$$1,745,$$

4.

$$1,74 < 1,745;$$

$$-1,74.$$

(. 10),

10

$$= 1,744$$

$$:= 1,743;$$

$$-1,741, -$$

$$f(1,741) \sim -0,004 < 0.$$

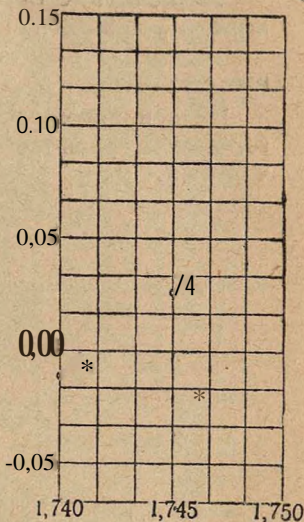
$$\sim 1,7415 ($$

$$): f(1,7415) \sim 0,001177 < 0,$$

$$f(1,742) \sim 0,003 > 0.$$

$$1,7415 < 1,742,$$

$$\sim \sqrt{742}$$



. 10



4

$$- - 1 = 0,$$

. = ...

$$= 1,2.$$

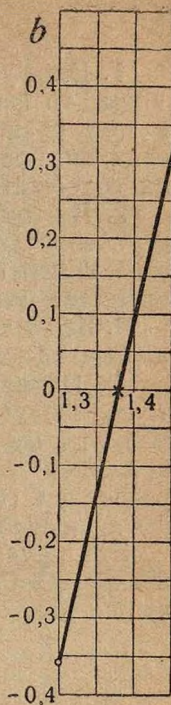
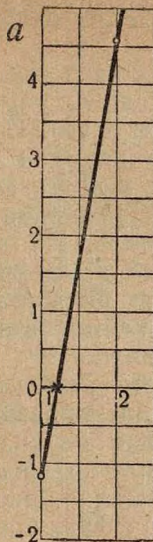
$$\boxed{3 - 1,2 - 1 = 0.}$$

I-----:-----

X	*2	?	1,2 :	X <sup>s</sup> -1,2 -1
1	1	1	1,2	-1,2
2	4	8	2,4	+4,6
	1,69	2,20	1,56	-0,36
1,4	1,96	2,74	1,68	+0,06
1,37	1,877	2,571	1,644	-0,073
1,38	1,904	2,627	1,656	-0,029
1,39	1,932	2,686	1,668	+0,018
1,385	1,918	2,657	1,662	-0,005

$$\begin{array}{r}
 *2 = 1,69 \\
 \underline{31} \\
 169 \\
 \underline{51} \\
 2,20 \\
 \underline{-1,56} \\
 0,64 \\
 \underline{-0,36} \\
 -0,36
 \end{array}$$

$$\begin{array}{r}
 1,96 \\
 \underline{41} \\
 196 \\
 \underline{78} \\
 2,74 \\
 \underline{1,68} \\
 1,06 \\
 \underline{0,06} \\
 0,06
 \end{array}$$



. 11

$$\begin{array}{r}
 * = 1,370 \\
 \underline{731} \\
 1370 \\
 \underline{411} \\
 96 \\
 *2 = 1,877 \\
 \underline{731} \\
 1877 \\
 \underline{563} \\
 131 \\
 *3 = 2,571
 \end{array}$$

$$\begin{array}{r}
 1,37 \\
 \underline{1,2} \\
 274 \\
 \underline{137} \\
 1,644 \\
 \underline{-2,644} \\
 +2,571 \\
 \underline{-0,073} \\
 -0,073
 \end{array}$$

$$\begin{array}{r}
 * = 1,380 \\
 \underline{831} \\
 1380 \\
 \underline{414} \\
 110 \\
 *2 = 1,904 \\
 \underline{831} \\
 1904 \\
 \underline{571} \\
 152 \\
 * = 2,627
 \end{array}$$

$$\begin{array}{r}
 1,38 \\
 \underline{1,2} \\
 276 \\
 \underline{138} \\
 1,656 \\
 \underline{-2,656} \\
 +2,627 \\
 \underline{-0,029} \\
 -0,029
 \end{array}$$

.....

$$1,385 < * < 1,390$$

$$j_c - 1,39.$$



1.

2.

3.

4.

( )

— —1=0,

$$u = \frac{x^3 - 1}{x}$$

12.

( )

)

—1,2.

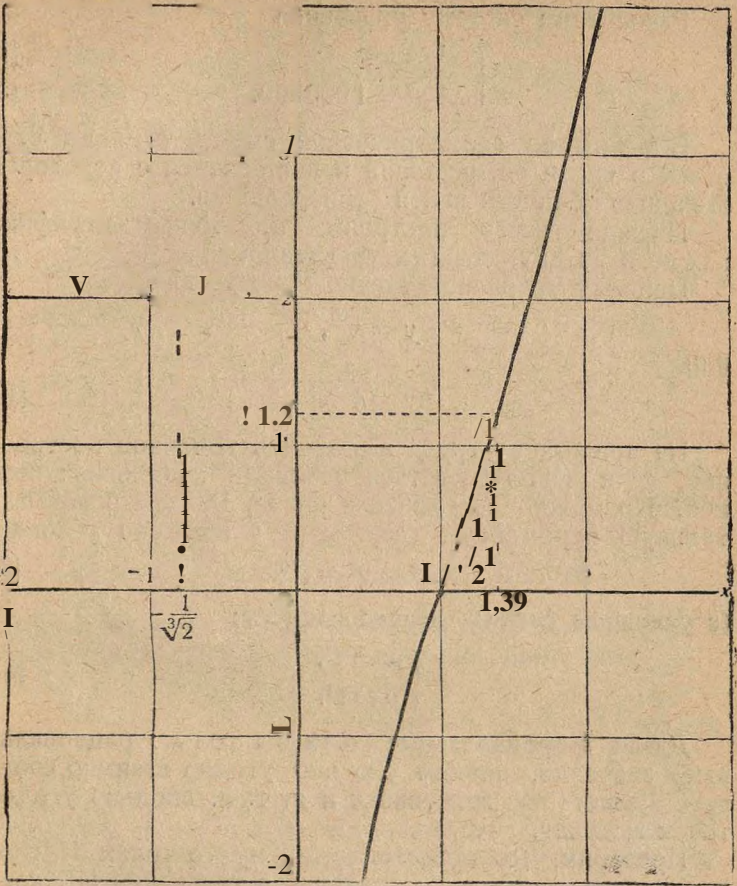
$$u < \frac{3}{4} \text{-----} 1,89$$

$\sim \gg \frac{8}{4}$

5.

$$0,5sSw=s4,0$$

— 0,5; 0,6; 0,7 . . .



.12

5.

}



$$( \quad^3 = \quad^3, \quad [1]$$

$$1 \quad^3 \quad^2 = 1000 \ 000. \quad [2]'$$

$$= t^4,$$

$$y' = V^* \quad [$$

$$( \quad ) t$$

$$x^* = y^* = t^{13} \quad [3]$$

(  $tx^0$ ),

$$\begin{cases} x = t^3, \\ y = t^4. \end{cases} \quad [4]$$

t ( , , ) , [4],

[1]. [4],

[1]. ( ; )

[1], [4]

$$t = \sqrt[3]{x}$$

$$\left( \frac{t}{[4]}, \dots \right)$$

$$= V = (\bar{j} ; )^4 (\neq 0),$$

[ ]:

$$y = \overline{fx^*} (23.0)$$

$$= \pm \frac{1000}{*}$$

$$= \pm \frac{1000}{\sqrt{\quad}} \quad [2']$$

$$= \sqrt[3]{\frac{1000000}{\quad}} = \dots ( \dots, 0 ) \Rightarrow$$

$$\begin{cases} = \sqrt{2}, \\ = - \dots, \end{cases} \quad [5]$$

$$\dots < \sqrt{\quad} \dots (0) \quad [5] \quad [2]$$

$$[2], \quad [5] \quad [1],$$

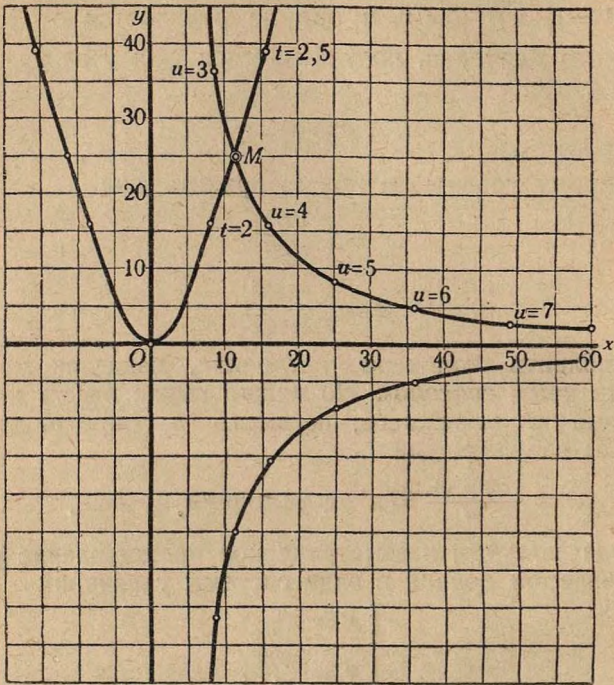
[2],

$$[1] \quad [2] \quad \dots \quad 13.$$

$$[2], \quad [1] \quad [2] \quad \dots \quad \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad [1]$$



(1), (2).



Черт. 13

[4]  $t$  [2],

\*" = 1000000, [6]

ИЛИ

$t = 1\,000\,000 \frac{1}{17}$  [6']

17- -

[4].

$$| *3 = \gg$$

$$\backslash \sigma = 10^5 f, \quad [2]$$

, , t §

$$[1] - [2]$$

$$= 3, = 4, - = 2, 8 = 3.$$

$$\left( \begin{array}{l} x^4 = y^3 \\ \backslash x^3 j; a = 1\,000\,000 \end{array} \right. \quad [ \quad 1 \quad ] \quad [2]$$

$$\backslash x = t^3 \quad ( = 2$$

$$\backslash = t^{4 \text{ [1]}} \backslash v = \wedge - \circ \quad [2]$$

$$\boxed{t^{17} = 1\,000\,000} \quad [3]$$

$$t = 1000\,000^{\frac{1}{17}}$$

( : 13)

$t$		<4	18		0-1	
2	4	16	256	65500	~130000	<106
3	9	81	6560	~43.10	~130.108	>106
2,5	6,25	39,1	1530	-2340000	~5-108	>106
2,3	5,29	28,0	784	615000	-1,41 -10»	>106
2,2	4,84	23,4	548	300000	660000	<106
2,25	5,06	25,6	655	429000	965000	<106
2,26	5,11	26,1	681	464000	105900!	>106
2,255	5,085	25,86	668,7	447200	1007000	>106

$$2,25 < \wedge < 2,255$$

$$\boxed{\text{£-2,25}}$$

$$M \quad x = t^{3\wedge}, \quad 4$$

$$\pm (*\wedge 25,6$$



$$\begin{array}{r} 615 \\ 32 \\ \hline 123 \\ 18 \\ \hline 141 \end{array}$$

$$\begin{array}{r} 429 \\ 522 \\ \hline 858 \\ 86 \\ 21 \\ \hline 965 \end{array}$$

$$\begin{array}{r} 464 \\ 622 \\ \hline 928 \\ 93 \\ 28 \\ \hline 1049 \end{array}$$

$$\begin{array}{r} 4472 \\ 5522 \\ \hline 894 \\ 89 \\ 22 \\ 2 \\ \hline 1007 \end{array}$$

1.

, [3, y, 8 -

[2]), [1]), y ( 8 ( [J ( y ( , y ( - )).

$t^n - 10^i \quad (\quad = aS-j-PY < 16).$

		7	
2	3	1	1
2	5	1	1
3	4	1	1
2	3	1	2
3	5	1	1
2	7	1	1
2	5	1	2
4	5	1	1
3	7	1	1
2	3	1	4
2	3	3	1

		Y	0
2	5	1	3
2	7	1	2
2	9	1	1
3	4	2	1
3	8	1	1
4	7	1	1
5	6	1	1
5	7	1	1
2	3	1	5
2	3	3	2
2	5	1	4

		Y	5
2	7	1	3
2	9	1	2
3	4	1	3
3	10	1	1
4	5	1	2
5	8	1	1
3	5	1	3
3	7	1	3
2	3	5	1
2	5	3	1

< , (1)

);

(1)

, t i,

- 2.
- 3.
- 4.
- 5.

t 8

1)

1 000000

1,

«

»

$$\lg_{10} x = X, \lg_{xg} y = Y,$$

$$\beta X = a Y, \delta X + \gamma Y = \delta$$

$$\begin{cases} \frac{X}{(1 - V)} \\ + \frac{1}{8} - \end{cases} \quad [2']$$

$$(X, Y) \quad [1']$$

(2') —

(, (3),

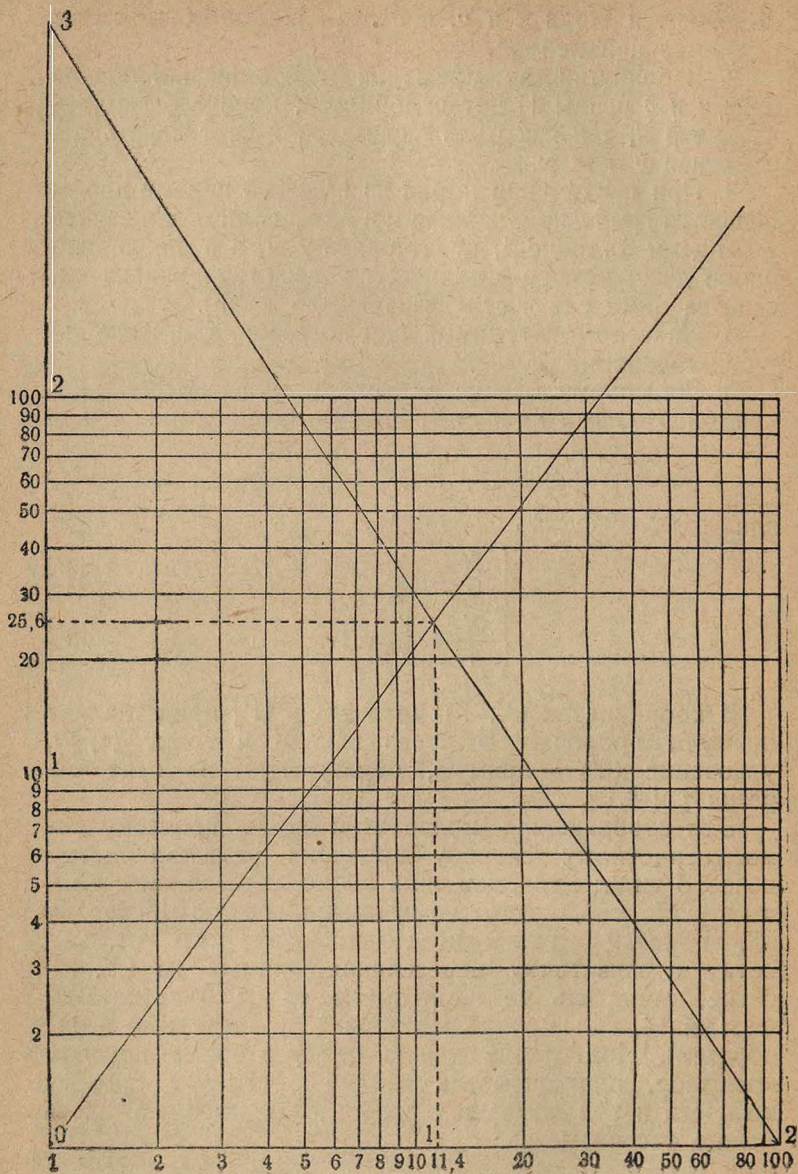
(X,

(, Y)-

(, -)- (

14,





6.

t

$$\ddot{x} = \frac{1}{2} \frac{(*+!)(<-1)^*}{<*+3>} \sim 2 t(P+3) \frac{1}{m} \frac{(f+!) \ll (*-!) \dots}{m}$$

?

11

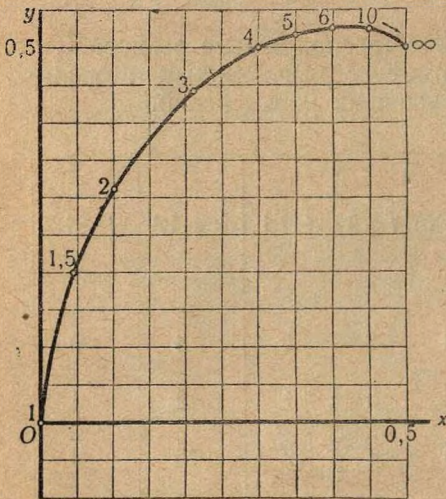
62)

t		.3	tt. 3)	t. 1	t- 1	(<+!)•	(-D) <sup>2</sup>
1	1	4	4	2	0	4	0
2	4	7	14	3	1	9	1
3	9	12	36	4	2	16	4
4	16	19	76	5	3	25	9
5	25	28	140	6	4	36	16
6	36	39	234	7	5	49	25

\*



$(n+1) \cdot (-1)^n \cdot (n-1)!$	$(n-1)!$	$\frac{(t+1)(t-1)^2}{(t+3)}$	$\frac{(t+1)^2(t-1)}{(t+3)}$	$x$	$y$
0	0	0,00	0,00	0,00	0,00
3	9	$\frac{3}{14} = 0,21$	$\frac{9}{14} = 0,64$	0,10	0,32
16	32	$\frac{4}{9} = 0,44$	$\frac{8}{9} = 0,89$	0,22	0,44
45	75	$\frac{45}{76} = 0,59$	$\frac{75}{76} = 0,99$	0,30	0,50
96	144	$\frac{24}{35} = 0,69$	$\frac{36}{35} = 1,03$	0,35	0,52
175	245	$\frac{175}{234} = 0,75$	$\frac{245}{234} = 1,05$	0,38	0,52



2, 3, 4, 5, 6,

$t = \sqrt{\quad}$

$t$

[1]

. 15

$t$

( . 15);

$t=1, 8 \dots$ ;

$\text{£}=10$

$$; = \frac{891}{2060} \sim 0,43 \quad = \frac{1089}{2060} \sim 0,53.$$

(,, " ,  $\text{£} = 2$   $\text{£}=3$ )  
(  $\text{£}=1$   $\text{£}=2$ ), —

( )  $0,53.$   
 $\text{£}=100:$

100 ?  $=0,4949 =$   
 $= 0,5048: 90$

" " ,  $\text{£}$  " ? [1]

$\text{£}^8:$

$$= \frac{0+9 \left( \frac{1}{1+\frac{1}{t^3}} \right)}{1+\frac{1}{t^3}}, \quad v = \frac{1}{2} \cdot \frac{\left(1+\frac{1}{t}\right)^2 \left(1-\frac{1}{t}\right)}{1+\frac{3}{t^2}}$$

$\text{£}^*$

$$\left(1+\frac{1}{t}\right)\left(1-\frac{1}{t}\right)^2 \rightarrow 1, \quad \left(1+\frac{1}{t}\right)^2\left(1-\frac{1}{t}\right) \rightarrow 1,$$
$$1+\frac{3}{t^2} \rightarrow 1,$$

$\sim \text{£}^* - 0,50, \quad \sim \text{£}^* \wedge^1 - 0,50.$



1 2,

$$t = 1,5 =$$

$$: = 0,04 = ? 0,20.$$

1 ( ; ),

100, 10, 9, 8 . . .

1,

1,

, <=1,01,

( , ).

[1]

$$= \frac{t+1}{t-1}$$

$$\frac{y}{X} = \dots$$

4 ( . ) .

t ( , )

[2]

< + 1 - \* 2, t - 1 - > 0, 2, 1.

$$\frac{1+1}{-1} \rightarrow ( t > 1, < > 1).$$

t -> 1

1:

t

1 ?

$$t \rightarrow t - 2$$

(  $t = 0$      $t = 1$  )  
 ?

t:

t	X	
$\frac{1}{2}$	$\frac{3}{12} \sim 0,12$	$\frac{9}{2} \sim 0,35$
1	$\frac{2}{-} - 0,29$	$\frac{4}{-----} 0,57$
1	$\frac{45}{\sim} 0,46$	$\frac{75}{98} \sim$
$\frac{1}{10}$	$- 1,5$	$- 1,8$
$\frac{1}{100}$	$\sim 17$	$---- 17$
->	$-$	$\rightarrow -$

[1],  $t^* 0$

t

(  $t = 1$  ),

(  $t = 0$      $t = 1$  )

t = 0

"

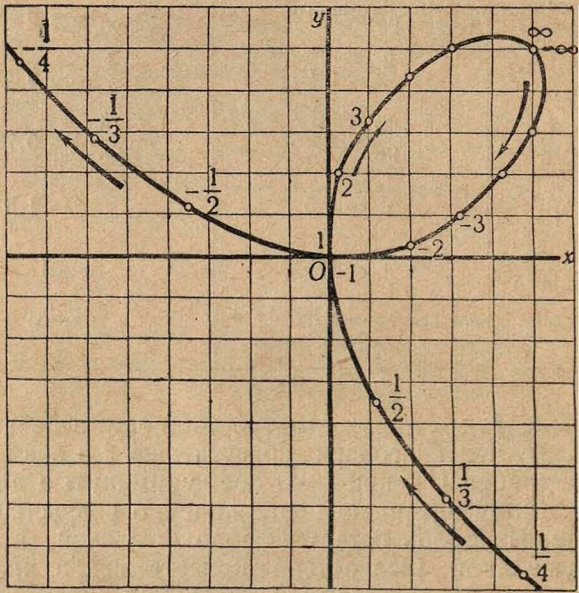
"

"

" "



$t \rightarrow 2$   $:= \wedge$   
 $= 28^+$   $0$   $\wedge -2, -$   $\%$   
 $t \rightarrow -t$   
 [1]—



. 16

$t$   
 $(, )$   
 $(, )$   
 $t = -0$   $t = -0$

$f=0$   $f = -j-\infty$ .

16,





[3] ( [1]

1.

12.

6

$$x \approx \frac{-(t+W(at+1))}{(-\ll 0^3 + (\wedge+1)^3)}, \quad y = \frac{(t+a)(at+y)}{(<+ )^3 + - )^8}, \quad 14$$

=...

t.

( t).

$$: \frac{p}{q}$$

t

: f = - v

$$\left( - \frac{1}{2} < * < + \right)$$

$$\left( \frac{=}{t} \right) =$$

2

24.

t

$$\frac{-(+)(\wedge)^{\wedge}}{(puyqv f+(pv+qu)^a)} \frac{-(pu+qv)2(pv+qu)}{(pu+qv)^a+(pv+qu)^f}$$

):

$$\begin{aligned} & t, v; , qv, pv, qu; \\ & pu + qv, (pu + qv)^a, (pu+qv)^a \\ & pv + qu, (pv + qu)^*, (pv+qu)^P; \\ & (pu + qv) (pv + qu) \setminus (pu - f qv)^* (pv + qu); \\ & (pu + qv)^3 + (pv + qu)^*; \\ & x, y. \end{aligned}$$

$$h = pu, k = qv, l = pv, m = qu; r = h + k, s = l + m;$$

$$P^2 = r s Q = r^* s, R = r^a + s^a, \frac{P}{R} y = \wedge$$

$$a = \frac{2}{g}$$

$$- 2, 9=5). \quad (.70-71).$$

$$x = \frac{(2u+5v)(5u+2v)^2}{(2u+5vp+(5\ll+2))} \cdot \frac{(2+5>)^2(5+2)}{-(2u+5v)^a+(5u+2v)\gg 1}$$

1.

$$f, = 1, 9 = 0); \quad = 0 \quad (\wedge = 1)$$

[4]

$$- * , : \quad \sim + \mathbb{F}' \quad \sim \frac{t^2}{1+}$$

2.



$t = \frac{v}{v}$		V	$h=2u$	$k=Sv$	$l=2v$	$=5$	$r=h-\lambda-k$	$s=l+m$
0	0	1	0	5	2	0	5	2
1	1	1	2	5	2	5	7	7
2	2	1	4	5	2	10	9	12
5	5	1	10	5	2	25	15	27
	1	0	2	0	0	5	2	5
$\frac{1}{2}$	1	2	2	10	4	5	12	9
-1	-1	1	-2	5	2	-		-3
-2	-2	1	-4	5	2	-10	1	-8'
-5	-5	1	-10	5	2	-25	-5	-23
$-\frac{3}{2}$	-3	2	-6	10	4	-15	4	~11

( , ).

3.

,  $t$  -  
 2); , ( . -

4.

(10 -15), -  
 ( , -

$t = \frac{v}{v}$   $t = \frac{v}{v}$  J - .

	2	2	5	52	43	$P=rs^2$	$r^2s$	$R=r^* \cdot \sqrt{s}$	$x \sim R$	$y = \frac{Q}{R}$
5	25	125	2	4	<b>8</b>	20	50	133	0,15	0,38
7	49	343	7	49	343	343	343	686	0,50	0,50
9	81	729	12	144	<u>1730</u>	<u>1300</u>	972	<u>2460</u>	0,53	0,39
15	225	<u>3380</u>	27	729	<u>19 700</u>	<u>10 900</u>	<u>5</u>	<u>23100</u>	0,47	0,26
2	4	8	5	25	125	50	20	133	0,38	0,15
12	144	<u>1730</u>	9	81	729	972	<u>1300</u>	<u>2460</u>	0,39	0,53*1
3	9	27	-3	9	-27	27	-27	0	—	-2
1	1	1	-8	64	-512	64	-8	-511	-0,13	0,02
—	525	-125	-23	529	<u>-12 200</u>	<u>-2640</u>	-575	<u>-12 300</u>	0,21	0,05
4	16	64	—	121	<u>-1330</u>	484	-176	<u>-1270</u>	—	0,14

5.

6.

$$t - \frac{1}{t}$$

2





[1]. " [1]: ,

$$( , ) = 0 \quad [3]$$

[2] :

$$F(x_0 - 0) = F(x_0) \quad [4]$$

[3] [4],

$$(x_0 - ) = 0 \quad [5]$$

[5] , (x\_0 - 0)

[1]. , -

( . 17 ), -

[1], ; -

2. [1]

$$F( - , ) = F(x, ) \quad [6]$$

[1] ( . 17 ).

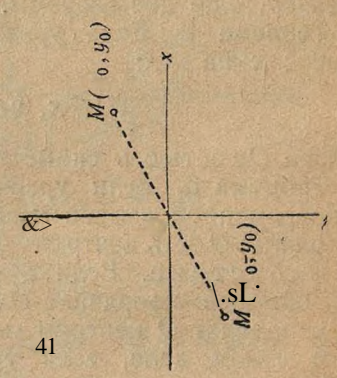
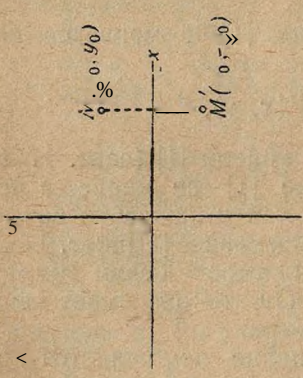
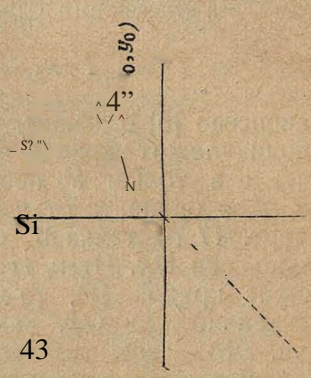
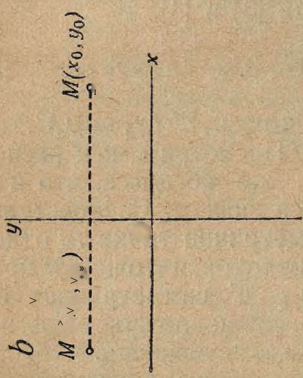
3. [1]

[1] ( . 17 ).

— 1.

( , -





XI, т. 17.

1) = \* ( ), 2)  $2=2$   
 ( ), 3)  $*_2 + \frac{2}{a} \frac{y^2}{b^2} = 1$  (  
 ), 4) — ( ,  
 ?), 5)  $^3 - \cdot^3 =$  ( ,  
 ?), 6)  $\frac{-}{2} - \frac{* \Delta}{-}$ , 7) \* +  
 =  $\cdot -$  — , 8)  $\cdot -^2 = \cdot -$  , 9)  $= -1$ , 10) \* — 96 \* =  
 = — 100  $\cdot^2$ .

,  
 4. [1]  
 , :

$$F(y, x) = \overline{F}(x, ), \quad [7]$$

$$[1] ( \quad 17 d)^l. \quad =$$

7

(1)  $\cdot -^* = 1$ , (2)  $* -^* = 1$  (3)  $—^* = -1$ ,

( . . ).

90°. : 1 = 10

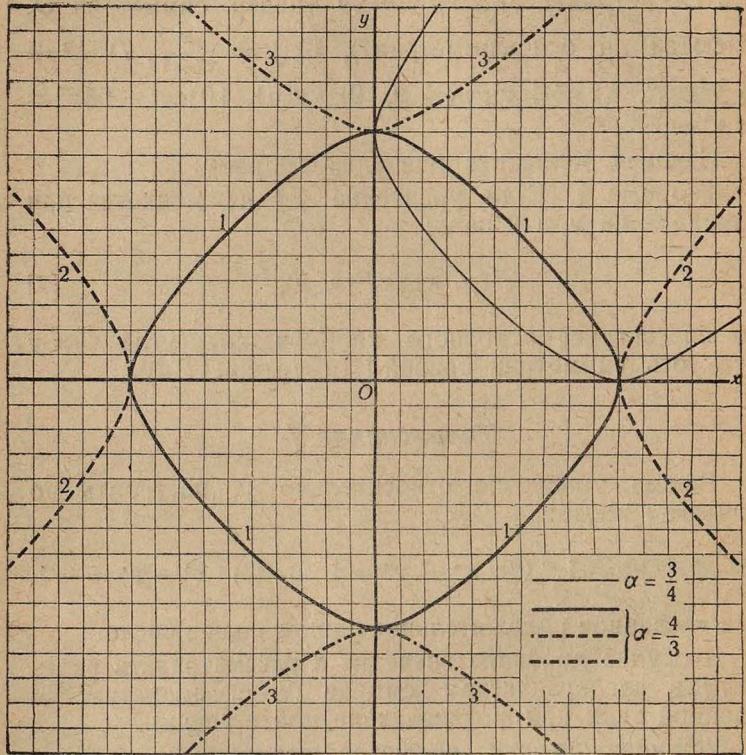
0,1.

1 4



$$-\frac{4}{3}$$

Основной лист



. 18

1)  $\sqrt[3]{*} + \sqrt[3]{*} = h$

2)  $\sqrt[3]{\frac{3}{1}} - \sqrt[3]{\frac{3}{*}} = 1$

3)  $\sqrt[3]{x^4} - \sqrt[3]{\frac{3}{4}} = -1$

4) \_\_\_\_\_

$y = \pm V(i - W)$

4) \_\_\_\_\_  
3) \_\_\_\_\_

$\bullet V = \pm l''' (j/j? - 1)'$

4) \_\_\_\_\_

$\bullet v = \pm |(1-f^\wedge)^3$

7(2>

x	$x^4$	$\sqrt[3]{?}$	$1 - \sqrt[3]{x^4}$	$(1 - \sqrt[3]{x^4})^3$	$\sqrt[4]{\frac{\sqrt[3]{1-x^4}}{1-x^4}}$
0,0	0,0000	0,00	1,00	1,0000	1,00
0,1	0,0001	0,05	0,95	0,8574	0,96
0,2	0,0016	0,12	0,88	0,6805	0,91
0,3	0,0081	0,20	0,80	0,5120	0,85
0,4	0,0256	0,29	0,71	0,3579	0,77
0,5	0,0625	0,40	0,60	0,2160	0,67
.....	.....	.....	.....	.....	.....
x	$X^*$	$\sqrt[3]{X^*}$	$\sqrt[3]{*4-1}$	$(\sqrt[3]{X^*} - 1)^3$	$\sqrt[4]{\frac{\sqrt[3]{X^*}}{X^* - 1}}$
1,0	1,0000	1,00	0,00	0,0000	0,00
i,i	1,4641	1,14	0,14	0,0027	0,23
1,2	2,0736	1,28	0,28	0,0220	0,39
1,3	2,8561	1,42	0,42	0,0741	0,51
1,4	3,8416	1,57	0,57	0,1852	0,66
1,5	5,0625	1,72	0,72	0,3732	0,77
.....	.....	.....	.....	.....	.....



X	$1 \pm \frac{3}{4}$	$(\pm 4\%)$	$\sqrt{\frac{ft}{V}}$
0,0	1,00	1,00	1,00
0,1	1,05	1,16	1,04
0,2	1,12	1,40	1,09
0,3	1,20	1,73	1,15
0,4	1,29	2,15	1,21
0,5	1,40	2,74	1,29
0,6	1,51	3,44	1,36
0,7	1,62	4,15	1,44
0,8	1,74	5,27	1,52
0,9	1,87	6,54	1,61
1,0	2,00	8,00	1,66
.....	.....	.....	.....

«= -4

( . . . 18).

$$\pm j / \sqrt[4]{3 + j} \sqrt[4]{8} = 1, \quad = "j" / (1 \pm \sqrt[4]{3})$$

X	X <sup>3</sup>	$\sqrt[4]{X^3}$	$\sqrt[4]{X^3}$	$\sqrt[4]{1}$	1+	$\sqrt[4]{1-}$	$\sqrt[4]{1-}$	$\sqrt[4]{1-}$	$\sqrt[4]{1+}$
0,0	0,000	0,000	0,000	1,000	1,000	1,000	1,000	1,00	1,00
0,1	0,001	0,032	0,179	0,821	1,179	0,936	1,056	0,77	1,24
0,2	0,008	0,089	0,298	0,702	1,298	0,889	1,091	0,62	1,42
0,3	0,027	0,164	0,405	0,595	1,405	0,841	1,120	0,50	1,57
0,4	0,064	0,253	0,503	0,497	1,503	0,792	1,145	0,39	1,72
0,5	0,125	0,354	0,595	0,405	1,595	0,740	1,168	0,30	1,86
...	...	...	...	...	...	...	...	...	...



1. 2-  
 3. 4- , 6- , 9-  
 8-  
 2.

( = 1 = 2) :

$$a = 3 \cdot \frac{1}{2} \cdot \frac{1}{3}$$

$$4, \dots, 9 \cdot \frac{2}{3} \cdot \frac{3}{2} \cdot \frac{111}{4 \cdot 6 \cdot 9} \dots$$

$$8, \frac{1}{8} \cdot \frac{34}{4 \cdot 3} \cdot \frac{2}{9} \cdot \frac{9}{2}$$

$$= 0; 0,2; 0,4; \dots$$

$$= 0,1; 0,3; 0,5; \dots$$

3.

$$= 1$$

$$= 2$$

$$a = \frac{1}{2}$$

$$= \frac{2}{3}$$

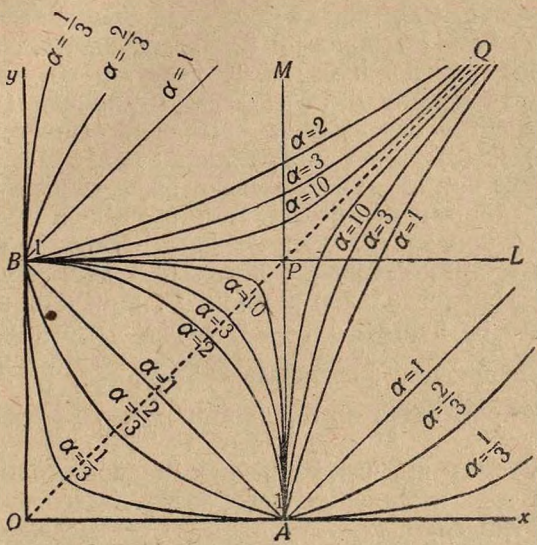
4.

” ” [1]

(1,0) (0,1)

( . 19).

1\*\*\*\*6. = 1  
 , = 2—  
 , ”



Черт. 19

= 100

$$2^{-\frac{1}{100}} \sim 0,9931.$$

(2, 2~°).

1

( , ) — (0 < x, y < 1).

$$\varphi(\alpha) = x^\alpha + y^\alpha.$$

$$\varphi'(0) = 2,9 \quad \varphi''(0) = 0;$$

$$\varphi(1) = 1$$

$$(0 < \alpha < 1).$$



„ " (2) (3)

$\xrightarrow{2} \frac{1}{2} = 2 \frac{1}{2}$  „  
APQ; „\*0 (3).

(2) (3) > 1.

QPAx, (1) yBPQ.  
(2) (3) —

< 1 — > 1

1 ;

$$= \frac{1}{3}, \frac{2}{3}, 1, 2, 3, 10,$$

5.

I. —

II. —

III. —

); I

« 15 [I], »

II

» ;

III —  
(1)  
(3)

2

(2)

(1)

(3)

(I)

III

$$(4) \quad *+ * = -1,$$

(1)

6.

$$\frac{x}{a} + \frac{y}{b} = 1.$$

8.

$$f(x) = \dots \quad [1]$$

$$f(x) = \dots$$

$$f(x) = \dots$$

$$f(x-h) = \dots$$

$$f(x-h) - f(x) = \dots = mh. \quad [2]$$

$h,$





$$\frac{f(x+h) M^* + \frac{kN}{M^*} M^h}{f W M^* N} \quad [$$

$$[ \quad ] \quad [1].$$

$$[2'] \quad h,$$

$$\frac{f^+(x)}{f^-(x)} = !, \quad [3']$$

$f(x)$

$$f(x) - f(x) ;$$

$N,$

$$[1'] \quad = 0:$$

$$f(0) = N. \quad [4']$$

$N$  " [ ]

" = 0.

" "

" — "  $N,$

$\% \dots P_N,$

$$N + \frac{P}{100} N = + P$$

$$[3'] \quad = 0, f(0) = N, f(1) =$$

$$= O + I \frac{P}{100} N >$$

$$! + \& = " \bullet \quad [5]$$



$$17 = 100 (-1) \tag{6}$$

[1] [ ]

N.

( . .

),

;

"1.

=

=

= 3,

$$= -j/ = 2$$

$$[ \quad ] - \{ - =$$

$$\backslash \quad \% - \backslash - = \backslash$$

( ^ , ).

)

(

"

"

$$y = M^{KN} = 2$$

= 1

$$( TM = \backslash M' > N = y_2 -$$

77  
15

XI Xi).

N (

IV

V

\ ,

( " ")

( " ")

( — )

8

5

I.

(

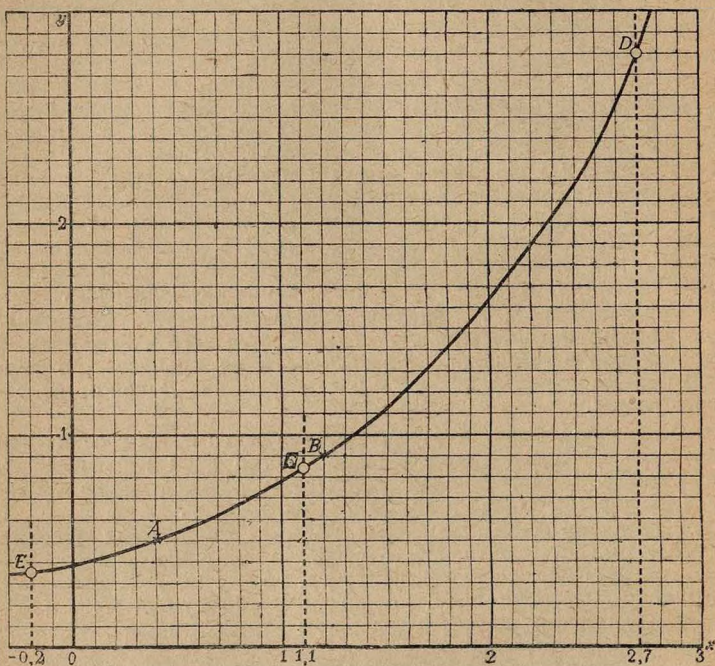
II.

)

2—3

|





Черт. 20

$$= M \cdot N.$$

$$M^{0a}N = 5,$$

$$\sqrt{M^2}N = 9,$$

$$M = \left(\frac{9}{5}\right)^{\frac{5}{4}} = 2,085; N = (-y - J) = \sqrt[125]{3,73}.$$

$$\boxed{= 2,085^{-3,73}}$$

\* 12,085\*1 .

0	1	3,73
0,5	1,444	5,37
1	2,085	7,79
1,5	3,011	11,23
2	4,347	16,23
2,5	6,278	23,43

I.

$$\left(\frac{9}{5}\right) = 1,85 = 18,893$$

$$\frac{125 \ 19}{35 \ 13,89} \quad /13,89 = 3,73$$

$$\left(\frac{9}{5}\right)^{\frac{5}{4}} = 2,085$$

$$/2,085 = 1,444$$

1,44	2,09	301	4,35	6,28
<u>373</u>	<u>373</u>	<u>373</u>	<u>373</u>	<u>373</u>
432	627	903	1305	1884
101	146	211	305	440
4	6	9	13	19
<u>5,37</u>	<u>7,79</u>	<u>11,23</u>	<u>16,23</u>	<u>23,43</u>

II.

$$0,4 \lg + \lg N = 0,6990$$

$$1,5 \lg + \lg N = 0,9542$$

$$0,8 \lg M = 0,2552$$

$$\lg M = 0,3190$$

$$M = 2,084$$

$$1,2 \lg M + 3 \lg M = 2,0970$$

$$2 \lg TV = 1,1428$$

$$\lg M = 0,5714$$

$$= 3,727$$

$$\lg y = 0,3190* + 0,5714$$

*	0,3190*	lg	
0	0	0,5714	3,73
1	0,3190	0,8904	7,77
2	0,6380	1,2094	16,20
<5	0,1595	0,7309	5,38
1,5	0,4785	1,0499	11,22
2,5	0,7975	1,3689	23,39
1,1	0,3409	0,9123	8,17
2,7	0,8613	1,4327	27,08
-0,2	1,9362	0,5076	3,22



1.

$$\left( \begin{array}{c} : 1 = 10 \\ ( \quad ) \end{array} \right) \begin{array}{c} 2-3 \\ \end{array}$$

, 8; 9; 12; 15; 16 20 ,

2.

$$\left( \begin{array}{c} - \\ - \end{array} \right) \left( \begin{array}{c} - \\ - \end{array} \right) < [0$$

(  
3.

[7]

9.

$$\left( \quad \right)$$

"

$$2^1 = 2^2. \quad [1]$$

"

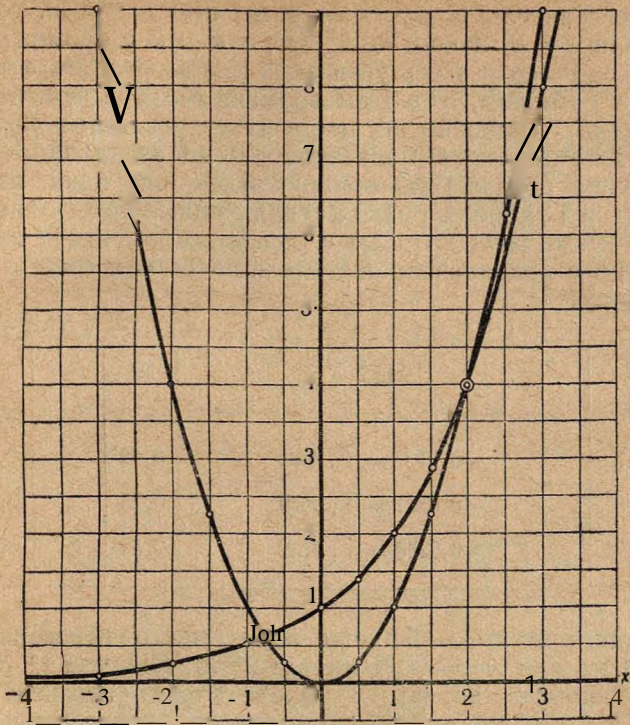
-2.-

$$2^2 = 2^2.$$

-4:

$$2^4 = 4^2.$$

[1],



.21

2 —

$(-3, 1), (-2, 2), (-1, 3), (0, 4), (1, 2), (2, 4), (3, 8), (4, 16)$

2

$(0, 0), (1, 1), (2, 4), (3, 9), (4, 16)$

2 —

>0

<0.  
21,

<0.



$-1 < 5 < 0$  (2)  $\frac{-1}{2^2} > 1^2$ ;  $2^* < 4$ ,  
 $:= 0$ ,  $[1].$   
 $-0,7$

:	$xlg2$	2		*
-0,7	-0,2107 = ,7893	0,62	>	0,49
-0,8	-0,6321 = ,3679	0,23	<	0,64
-0,75	-0,2258 = ,7742	0,59	>	0,56

$2 < 2^2$ ,  $:= -0,8$  ;  $-0,75$  : 2 ;  $2^2$  -  
 $-0,8 < < -0,75$ .  
 $0,8$

$-0,77; -0,78; -0,79$  " (  $= -0,76$ ;

$0 < < 1$  = \*  $2^0$ ,  $= 2$ ,  $= 2$

$[1];$   $= 3$ ,  $2$ ;  $4$

$1$   
 $2 > 1$ ;  $2 < 2^*$ ,  $0 < 2 < 2$ ,  $< 1$

100.  $2^{10}$

1024,

10

2

[1]

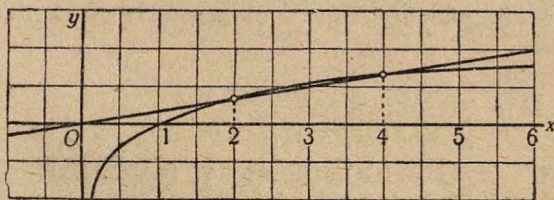
[1]

$$.d_{g_{10}} 2 = 21 g_{10} \cdot x,$$

[2]

$$\frac{\lg 2}{2} x = \lg_{10} x.$$

[2']



Черт. 22

( . 22);

$$= \wedge \lg_{10} 2 \approx 0,15.$$

( „ ”)

9

1000

—10 000

%

Q



$$1000 - (1 + 4)^n \rightarrow 1000 - (1 + 4);$$

$$10000 - Q \cdot 1000$$

$$1000 \cdot M^x = 10000 - Q \cdot 10000$$

$$= 10 - Qx. \quad [3]$$

$$( \quad Q).$$

$$: 1)$$

$$[3]; 2)$$

$$= 18, \quad Q = 1,5$$

$$( \quad . 23)$$

$$= \sqrt[18]{\quad} = 1,5 > 18$$

$$\lg M = 0,07188 \sim 0,0719$$

$$-1,18 - r = 10 - 1,5 :$$

$x$	$x \lg M$			$1 - x$
5,12	0,3681	2,334	>	2,320
5,11	0,3674	2,330	<	2,335
5,115	0,36766	2,3316	>	2,3275

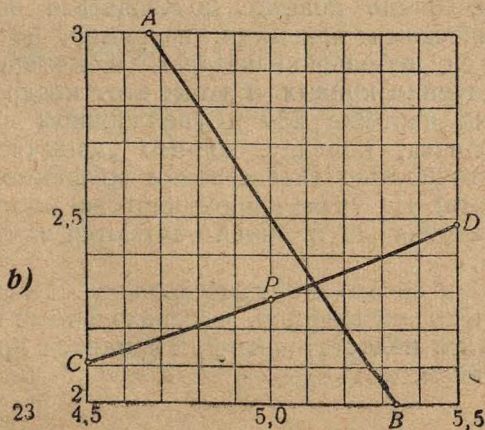
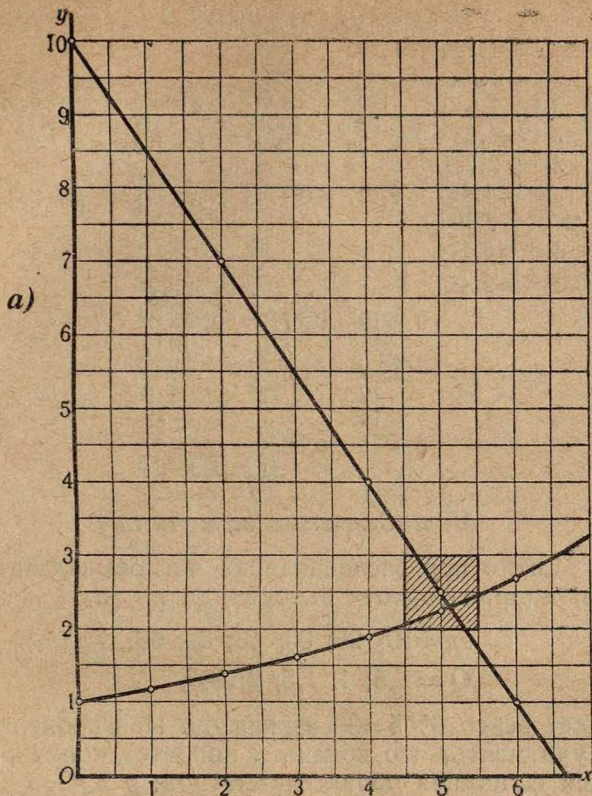
$$5,11 <^* < 5,115$$

$$- 5,11$$

$$\ll = 10 - Q^* \sim 2,33.$$

5,11

2330





= 1,180	1,392	4,435	10-1,5* = 3
<sup>2</sup> = 1,292	<u>3461</u>	<u>2931</u>	
* = 1,643	<u>1392</u>	<u>4435</u>	* = <del>1,5</del> <sup>70 14</sup> <del>4,67</del> 7
<sup>4</sup> = 1,938	835	1331	
> = 2,287	56	399	10- 1,5* = 2
	<u>4</u>	<u>9</u>	
MS = 4,435	<u>2,287</u>	<u>6,174</u>	<u>80</u> <u>16</u>
<sup>4.5</sup> = 2,106			* = <u>15</u> <u>3</u> - 0,
= 6,174			
<sup>5&gt;5</sup> = 2,485			

$$X = 5,12?$$

0,0719	0,0719	0,07188
<u>215</u>	<u>115</u>	<u>5115</u>
<u>3595</u>	<u>3,595</u>	<u>35940</u>
72	72	719
14	7	72
<u>0,3681</u>	<u>0,3674</u>	<u>35</u>
		<u>0,36766</u>

1.  
Q

$$=10; 20; 30; 40; 50; 60;$$

$$Q = 0,5; 1; 1,5; 2; 2,5,$$

$$6X5=30$$

2.

23

23b

( )

3.

10.

( )

10

= “(1 — )?”,

^ —

1)

$$0 \leq x \leq 1.$$

0,1,

2)

3)

$$\alpha = \frac{1}{2}, \quad \beta = \frac{2}{7}.$$

( .24)

$$= \pm \sqrt{\frac{1}{7} (1-x)}$$

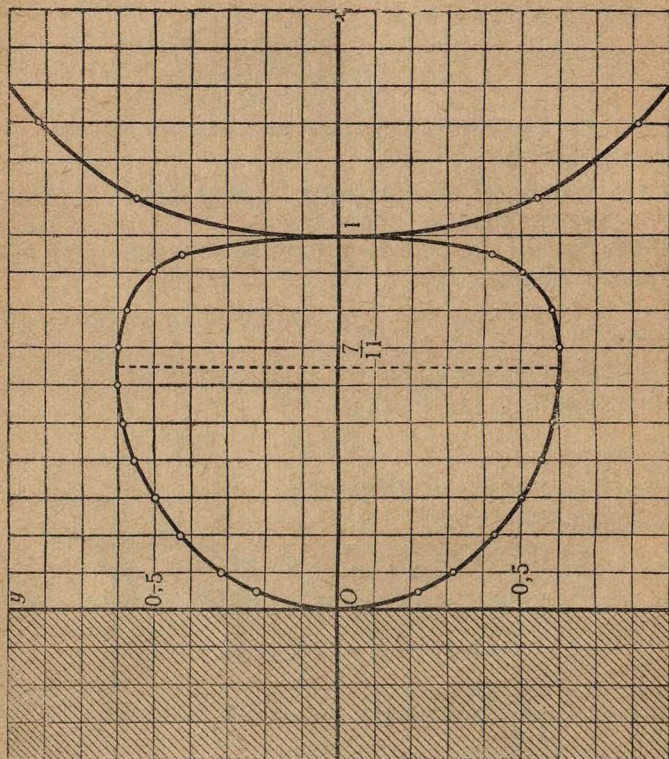
$$= \sqrt{1-x}$$

14.

\* > 0.

$$|y| = \sqrt{x} \sqrt{1-x}^2, \quad \lg |y| = \frac{1}{2} \lg x + \frac{2}{7} \lg |1-x|.$$





Черт. 24

X	lg	$\frac{1}{-y \lg r}$	—	—	—	—	—
0,0	— 00	— 00	1,0	0,0000	0,0000	— 00	0,000
0,1	$\overline{1,0000}$	$\overline{1,5000}$	0,9	$\overline{1,9542}$	$\overline{1,9869}$	$\overline{1,4869}$	0,307
0,2	$\overline{1,3010}$	$\overline{1,6505}$	0,8	$\overline{1,9031}$	, 9723	$\overline{1,6228}$	0,420
0,3	$\overline{1,4771}$	$\overline{1,7385}$	0,7	$\overline{1,8451}$	$\overline{1,9557}$	$\overline{1,6942}$	0,495
• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •
0,9	,9542	,9771	0,1	,0000	,7143	,6914	0,491
1,0	0,0000	0,0000	0,0	— 00	—* 00	—' 00	0,000
0,05	$\overline{2,6990}$	,3495	0,95	,9777	,9904	,3399	0,219
0,95	$\overline{1,9777}$	$\overline{1,9888}$	0,05	2,6990	$\overline{1,6283}$	$\overline{1,6171}$	0,414
1,1	0,0414	0,0207	0,1	,0000	,7113	,7350	0,543
1,2	0,0792	0,0396	0,2	$\overline{1,3010}$	$\overline{1,8003}$	$\overline{1,8399}$	0,692
1,3	0,1139	0,0570	0,3	$\overline{1,4771}$	$\overline{1,8506}$	$\overline{1,9076}$	0,808
• • •	• • •	• • •	• • •	• • •	• • •	• • •	• • •

1.

1.



2. , , -

3. = 0 < 1 (, - 1 - < 1. )

4.  $0 \leq x \leq 1.$  ( , < 1 , )

5. ~ > \. :<0;

(0, 0) (1,1), = 0  
s < 1 45° = 1;  
45°, 135°). ( = 1

= 0,

6. = \ . )

7.

$$(0 < p < 1, q > 0)$$

5.

$$p = \frac{1}{7}, q = \frac{6}{7}$$

$$= \frac{1}{7+6} = \frac{1}{13}$$

$$= p(1 - q)$$

$$I_g T = \langle \lg p + p \lg (1 - q) \rangle$$

$$\frac{1}{X} - p = 0$$

и условие  $\frac{1}{X} - p = 0$

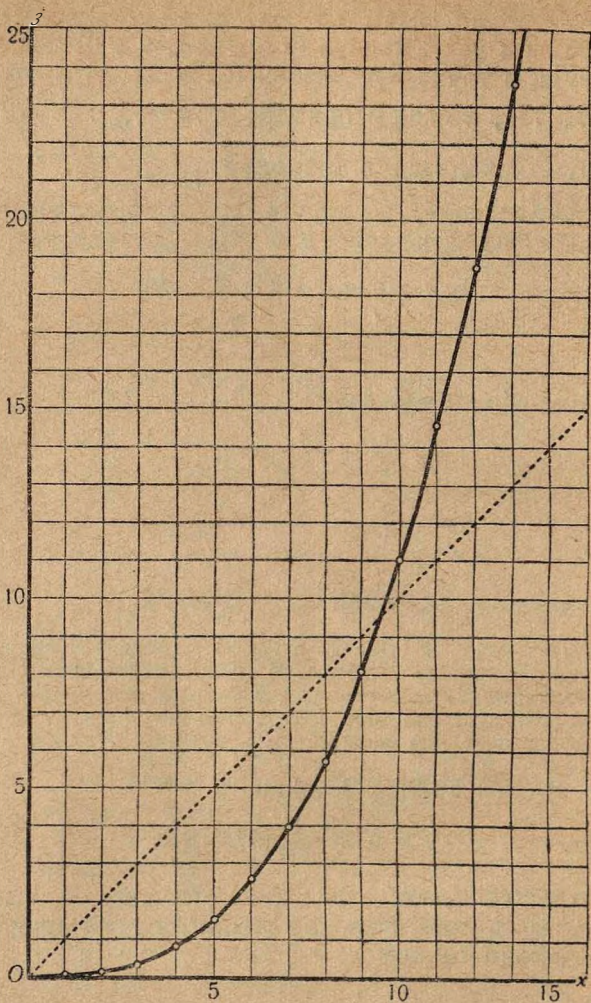
$$\frac{1}{X} - p = 0$$

$$\frac{\alpha}{1 + \beta} = 1 - \frac{\beta}{1 + \beta}$$

$$= /(*) = \left( \frac{1}{*3} + -*2 \right) \quad [1]$$

X				X	
0	0,00	5	1,50	10	11,00
1	0,02	6	2,52	11	52
2	0,12	7	3,92	12	18,72
3	0,36	8	5,76	13	23,66
4	0,80	9	8,10	14	29,40





Черт. 25

( . 25)

, ; = 10 , = 11.

—, —10.

$$= \frac{1}{jqj}(a^3 + ),$$

$$^3 - \sqrt{-2} - 1000 = 0.$$

, 9,7.

—0; 1; 2;...

	$\mathcal{X}$		$\mathcal{X}$		
0	0,0	5	7,7	10	9,7
1	4,3	6	8,1	11	10,0
2	5,6	7	8,6	12	10,4
3	6,5	8	9,0	13	10,7
4	7,2	9	9,4	14	10,9
				.....	

$>0, >0),$   
[1],

$x^g(y).$

[2]



$$a := g(y) - f(x).$$

:

$$\wedge = (*) = (*'' + 1).$$

$$x = g(y)$$

$$x = g(y) = \sqrt{2x^2 + 1}. \quad [4]$$

2x

$$= \sqrt{2x^2 + 1}$$

( \$9, 5);

$$(- < < -j- ).$$

$$= \sqrt{2x^2 + 1}$$

$$X^2 - 2X + 1 = ,$$

$$-1 \leq y \leq + 1$$

$$\frac{1 \pm \sqrt{1 - y^2}}{y},$$

$$*1 = \frac{1 - \sqrt{1 - y^2}}{y}$$

и

$$x_2 = \frac{1 - \sqrt{1 - 2}}{V} = \frac{1 - \sqrt{1 - 2}}{1 + \sqrt{1 - 2}}$$

$$* = ( ) = \frac{1 \pm \sqrt{1 - v^2}}{y}$$

$$-1 < \dots < +1,$$

$$- \sqrt{96} < \dots < -\sqrt{96}$$

$$y \leq -8$$

$$-10 < -8 \quad 8 < 10, \quad -6 < +6 \quad < -8$$

$$= f(x) = jQQ^1(-3 + 2) \quad (- < : < + ) : 0$$

$$\wedge > 0, \quad x = g(y)$$

$$x^5 - \sqrt{-x^2 - 0,063} = 0 \quad : \wedge = -0,3 \quad 2,3 = -0,35 +$$

$$+ 1^{\wedge} 0,3325, \quad = 0,00063 \quad = g(y)$$

$$y = f(x) =$$

$$= \frac{1}{-(-3 + 3)} \quad -1 \leq x \leq 0$$

(,, " )

$$y = f(x) \quad [6]$$

$$x = g(y); \quad [7]$$

[7]

1

$$-1 < < 0 \quad 0 < < 1.$$



[7]

$$y=g(x).$$

[8]

[6]

[7]  
[7]

[6]:

[8],

[7]

[6]:

( , ) ( , )

[8],

[6],

[8]

[6]

( .74)<sup>1</sup>.

25

[6],

$$= \frac{1}{100} ( + ).$$

11

$$y=f\{x\};$$

: 1)

( )

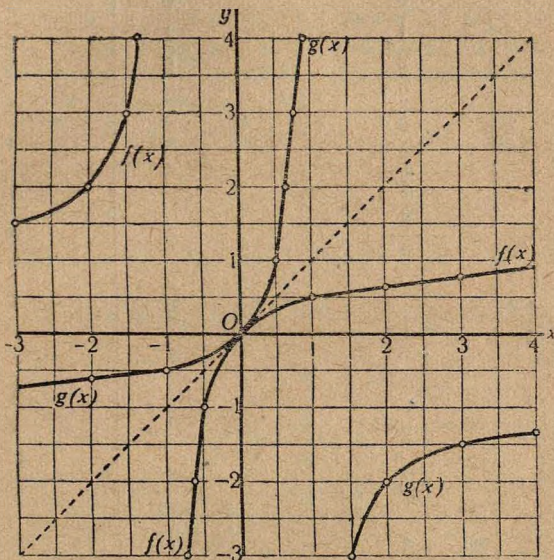
, 2)

$$= g(x),$$

3)

, 4)

$$* = *) = \frac{x}{1+x^2}$$



Черт 26

$$= \frac{x}{1+x^2}$$

$$= \frac{y}{1+y^2}$$

$$\sim 1 -$$

( . 26)

$$S(x) = T \& x -$$





f(x) :

- 1) + 2, 2) - 1, 3) 5\*, 4) - , 5) - , 6) 1- ,
- 7)  $\frac{1}{x}$ , 8)  $x + i, 9)^{\wedge 1}$ , 10) 2 - 1, 11) -f+1,

- 12) 1-2 , 13) 1-----f, 14) <sup>2</sup>, 15) -f, 16) ++ 1)<sup>2</sup>,

- 17) (1- )<sup>2</sup>, 18) 2 ( - )<sup>2</sup>, 19) 2 <sup>2</sup>-3, 20)  $\frac{1}{x-1}$

- 21)  $14 + \frac{1}{2-22}$ , 22)  $\frac{2}{1-}$ , 23)  $\sqrt{\pm 5}$ , 24) / , 25) 1 + //

- 26) / + 1, 27) -yL-, 28) / 2 + 3, 29) 2 / + 3,

- 30) 2/1 + 3, 31)  $\sqrt{1-}$ , 32) 1

- 33) > , + - 34)  $\frac{1}{*-\sqrt{}}$  35)  $\frac{x^2}{x^2-1}$  )<sup>^</sup>,

- 36)  $\frac{3}{\sqrt{}}$  37)  $\sqrt{\frac{x}{2+}}$  38)  $\sqrt{\frac{x}{2+}}$  39)  $\frac{1}{\sqrt{*+1}}$

- 40) 1 + // 41) (x<sup>2</sup>-f 2)<sup>3</sup>, 42) <sup>2</sup>- , 43) <sup>2</sup>+ +1,

- 44) 2 , 45) 2-\*, 46) 2-+ 47) 2 <sup>1</sup>X 48) 10/

- 49)  $\frac{101-}{10^{\wedge}-1}$ , 50) 1 10<sup>^</sup>, 51) 10<sup>^</sup> ,, ,, X  $\frac{+1}{-1}$ , 52) lgio+

- 53) /lg<sub>10</sub>x, 54) > +  $\frac{1}{2^x}$  55) 1 g s ( 1 + / ) ,

- 56)  $\frac{1}{> 1++'}$  57) - . - 58) -K+lgIO-K-



1) -2, 2) +1, 3) -<sup>x</sup>, 4) 2, 5) —, 6) 1—,

7)  $\frac{1}{x}$ , 8) - 2, 9) 2 ; -1, )^, ) 2(-1),

12)  $\frac{1-x}{2}$ , 13) 3(1-), 14) , 15) /5 , —

16) / -1, 17) 1- / , 18) 3+j/-f-, 19) ] / ^ ± -3, 2

20) 4- +1, 21) 4—2, 22) 1 - 4, 23)  $\frac{—}{1+1^{24}>^*!}$ .

25) ( — I)³. 26) ² — 27) + 2»)  $\frac{—*13 — 3}{2}$ ,

29) (+ )- ² 3, 30)  $\frac{(X-3)2}{\sqrt{2}}$ . 31) -4- :

32) 2 — -X². 33)  $\frac{J/15}{x}$ , 34) /+, 35)  $\sqrt{\frac{x}{x-1}}$ ,

36) ³ Z , 37) > > - ( )! • 38), 39)  $\frac{1}{iA^2 - 1}$ ,

40) (\* - m 41) ^ —₂, 42)  $\frac{1 \pm \sqrt{1+4x}}{2}$ ,

43)  $\frac{-1 + \sqrt{4x-3}}{—}$ , 44) lg₂x, 45) — lg₄x,

46) / — lg₂ : , 47)  $\frac{1}{'gQ-x}$ , 48) lg₁₀x, 49) lg₁₀ ~ -<sup>x</sup> / x —

50) lg\*₀x,  $\frac{C J \setminus |g|QX + 1}{lg_{10} x - 1}$ , 52) 10\*, 53) 10+

54) 10\*'+1, 55) (2\*—)]^ 56) 2<sup>1-r</sup>, 57)

58)  $\frac{—}{—} g(x)$  y=g(x) 2 ~ = 0,

$\hat{\phantom{x}}$  ( )

$$12 = f(\phantom{x})$$

$0 < \phantom{x} < 1$

$\hat{\phantom{x}}$  0,1

- 1)  $= fX$ ),      3)  $= \lg_{10}/(x)$ ,
- 2)  $= \hat{\phantom{x}}$ ,      4)  $= afM(\phantom{x})$

( .27)

$$= 1,2; \lg_{10}a = 0,0792.$$

$x$	0,0	0,1	0,2	0,3	0,4	0,5	...	1,0
$f(x)$	1,06	1,10	1,12	1,15	1,17	1,18	...	1,07
$(X)$	1,12	1,21	1,25	1,32	1,37	1,39		1,14
$\frac{1}{f(x)}$	0,94	0,91	0,8	0,87	0,85	0,85	...	0,93
$\lg_{10}W$	0,025	0,41	0,049	0,61	0,068	0,072	...	0,029
$f(x) \lg_{10}T$	0,083	0,087	0,088	0,091	0,092	0,093	...	0,084
$f(x)$	1,21	1,22	1,23	1,23	1,24	1,24	...	1,21

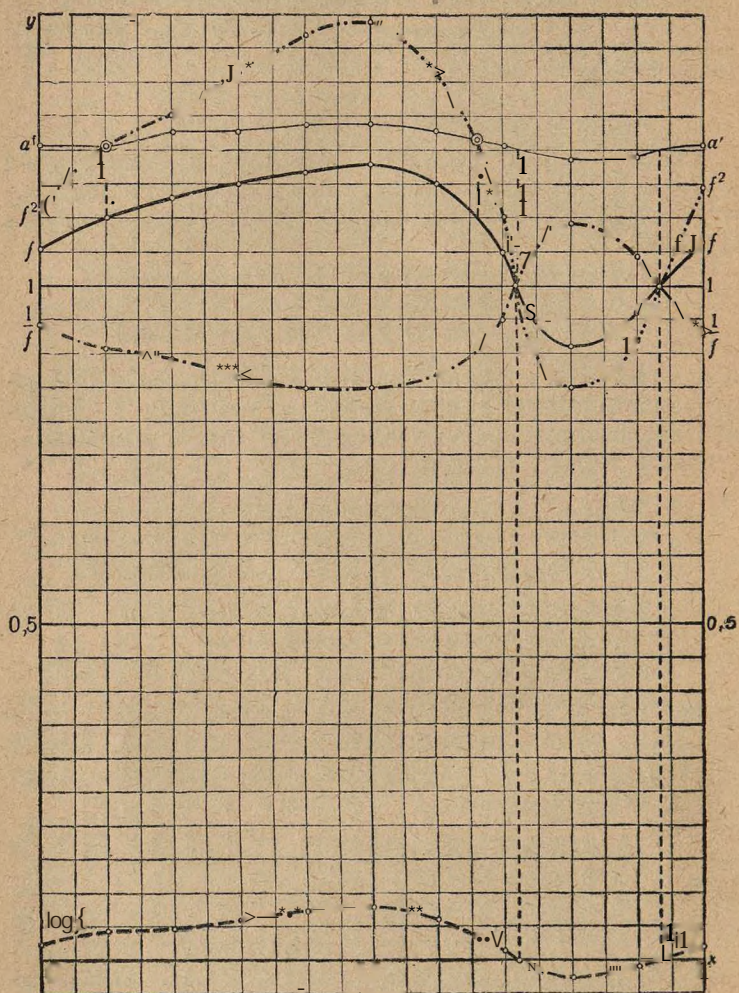
$$\begin{array}{r} 0,0792 \\ 601 \\ \hline 79 \\ 4 \\ \hline 0,083 \end{array}$$

$$\begin{array}{r} 0,0792 \\ Oil \\ \hline 79 \\ 8 \\ \hline 0,087 \end{array}$$

$$\begin{array}{r} 0,0792 \\ 211 \\ \hline 79 \\ 8 \\ \hline 1 \\ 0,088 \end{array}$$

и т. п.





$$= -1,5; \lg]0^{\wedge} = 0,1761. \quad ( \dots .28)$$

X	0,0	0,1	0,2	0,3	0,4	0,5	...	1,0
fix)	0,70	0,80	0,89	0,99	1,08	0,91	...	1,19
( )	0,49	0,64	0,78	0,97	1,16	0,83	...	1,41
$\frac{1}{\text{fix}}$	1,43	1,25	1,12	1,01	0,93	1,10	...	0,84
Igio fix)	-0,155	-0,097	-0,051	-0,004	0,033	-0,041	...	0,076
fix) lgio<<	0,123	0,141	0,156	0,174	0,190	0,160	...	0,209
af(*)	1,33	1,38	1,43	1,49	1,55	1,45	...	1,62

$$1. \quad y \sim f(x)$$

$$); \quad : 1 = 20 \quad ( \dots )$$

$$- 0,25 < \_ < 1,68.$$

$$\boxed{0,60 < / < 1,20}$$

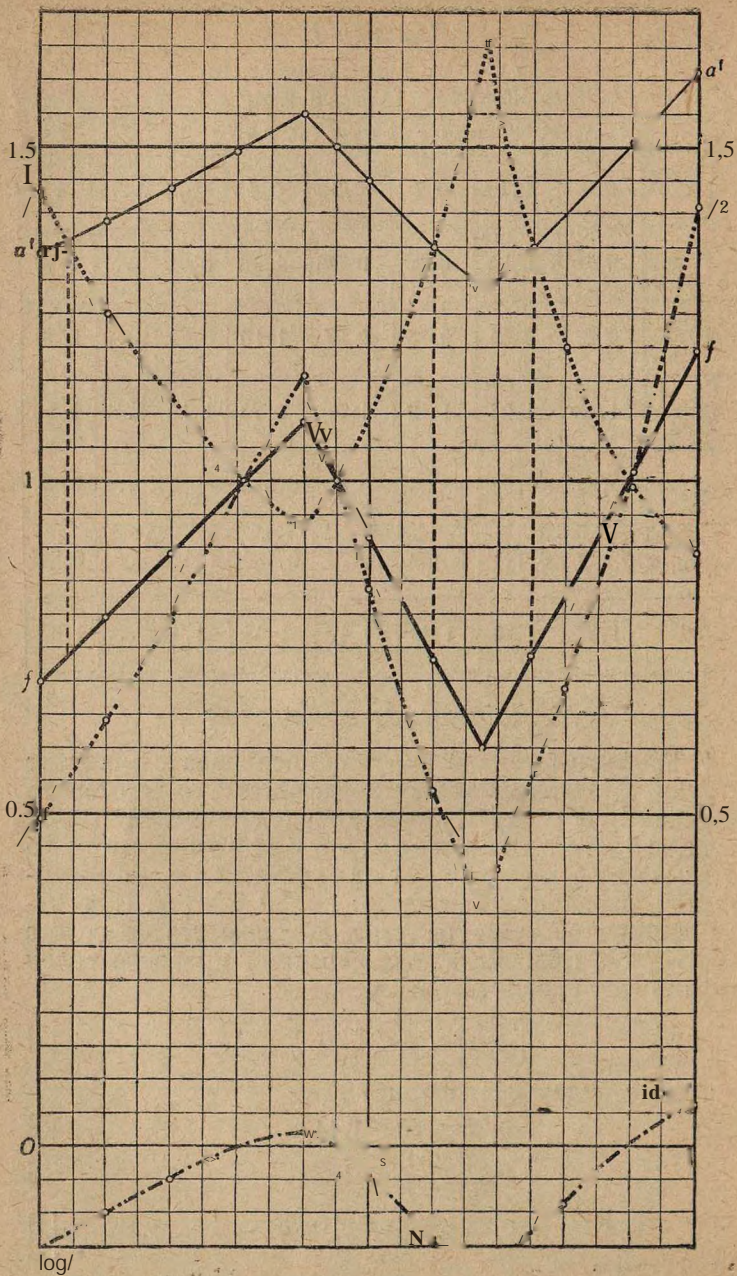
[

$$0,36 < / < 1,44, \quad [2]$$

$$0,83 < \frac{1}{\sim y} < 1,67, \quad [3]$$

$$-0,22 < \lg_{10} / < 0,08; \quad [4]$$





$$y=f, y=f, y=j^{-1} = \lg_{10} /$$

$$= /$$

$$\boxed{1,2 \leq a \leq 1,5} \quad [5]$$

$$1, \leq a \leq 1,2$$

$$= af$$

$$^> 1; < 1,5, af < 1,5^{1 \cdot 2 \wedge} 1,62;$$

$$1 < o' < 1,62,$$

$$= /$$

2.

$$?, /, /^2 \quad \frac{1}{f}, \quad / = 1. \quad [4]$$

$$\lg / \quad [1], [2], [3] \quad [6]$$

$$[1] \quad [5] \quad a^f \quad /^2:$$

$$af = f \setminus$$

$$af \quad - \cdot 1$$

$$a^f = \frac{1}{f}.$$

$$/ = /$$

$$\frac{1}{ft} < 1,2 \quad \frac{1}{2} - 1,166,$$

> 1,2;

$$, > / \# a^{\wedge} > f. \quad af \quad , \quad /.$$



Oaf,

[1] [5] ( ) (fi).

$$af - f^2$$

-1,2,  
/

27

af

/~1,1.

f

$$af \sim y^{-1}$$

-0,85:

af<sup>1</sup>

/>0,9,

28

=1,5.

af<sup>2</sup> p<sup>2</sup>

!

1

/% 0,74.

af

j<sup>1</sup>

29.

3.

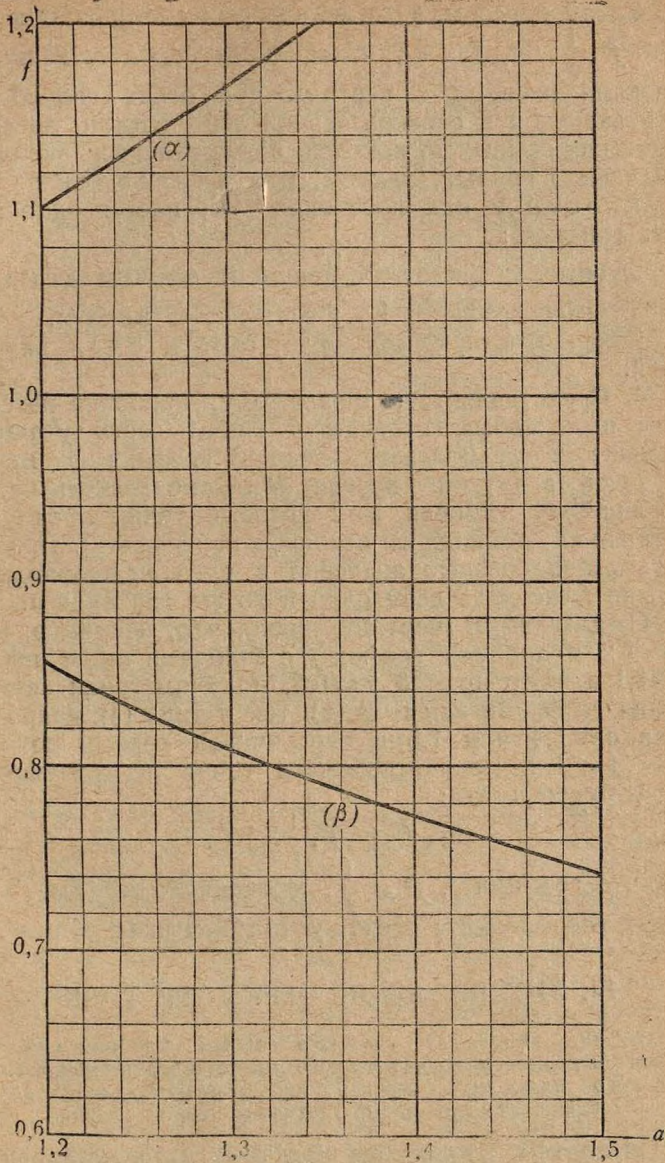
$$f = mx - n (>0),$$

$$(f^2)'' = [(nix - j - )^2]' = 2/ ^2 > 0,$$

$$\left( \frac{1}{fj} \right)' = \frac{1}{f} \left( \frac{1}{j} \right)' = \frac{1}{f} \left( \frac{W}{m\bar{x}} \right)' = \frac{1}{f} \left( \frac{W}{nf} \right)' > 0,$$

$$(Igm \{ })'' = [gn ( * + tl)]'' = - ( \wedge \frac{\mu^m}{f} - < 0,$$

$$(af)'' = [ + \sim + '' ? ] g^2 > 0. \quad (V. = 'gio > 0) >$$





$f^2, \frac{1}{f}, \lg_{10} /$

) , , ( )  
:  
 $f^2, j^{-1} /$   
 $\lg_{10} /$

4.

( —  $1-2$  ( )  
) .

( . 29) , , ,  
 $= 1,2$  /  
 $= 1,1$   $\neq 0,8$ ,  
( ), ( );

$0,8 < \_ < 1,2$ ,  $1,4$   $1,5$

:  
 $\lg_{10} f < f, f^2, \frac{1}{f} < a^f$ ,  
 $/, f^2^{-1}, \quad / = 1,$   
 $\lg_{10} / a^f.$

13.

" " ;  
" " ;  
" " ;

?

?

Q

Q

= -f-

[1]

11,

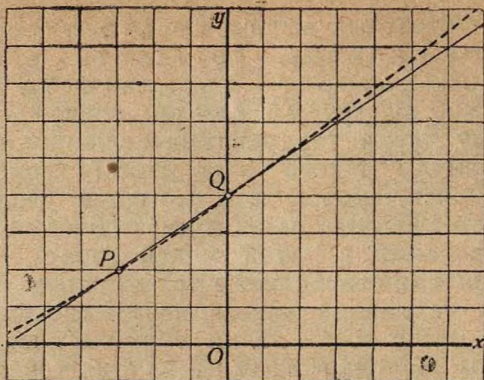
Q,

( 1. )

30

(-3,2) Q(0,4),





. 30

[1]

F

$$\begin{cases} 2 = -\dots \cdot (-3) \\ U = -\dots \end{cases}$$

$$= 4, \quad = 8;$$

[1] :

$$= 4 + \frac{2}{3}x,$$

$$2 - \dots - j - 12 = 0. \quad [2]$$

[2] ( " (3,6),

(6,8)

$$V = A + Bx + Cx^2. \quad [3]$$

0)

[3]

):

$$= \left( 2 + \frac{B}{x} + \frac{A}{x^2} \right) = \frac{2x^2 + Bx + A}{x^2} \quad [4]$$

$$= x^2, \quad [5]$$

$$= \frac{V}{(x^2 + 2)^2} \quad [6]$$

$$= \frac{(x^2 + 2)^{-2}}{(x^2 + 2)^2} = \frac{4}{4^2} \quad [7]$$

$$= \frac{1}{(x^2 + 2)^2} + \frac{4}{4^2} = \frac{1}{(x^2 + 2)^2} + 1 \quad [8]$$

[5],

[6]

[7]

[6]

2C



$$\frac{4}{[8]},$$

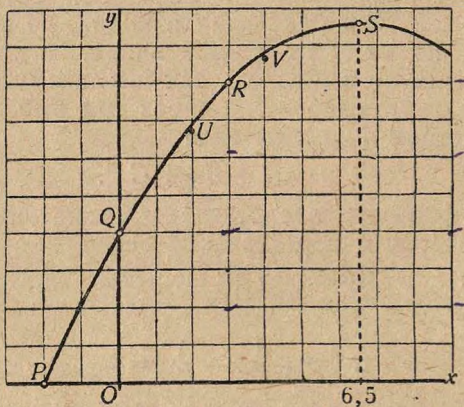
[7]

( | <1);

<0,

( | >1)

[3]



Черт. 31

, Q R.

[3],

[3].  
31

- 2

< x < 9,

, Q R,

( „ “)

{-2, 0), Q (0, 4), R (3, 8).

(3),

$$\begin{cases} -25 - 4 = 0, \\ 1 + \quad + 9 = 8. \end{cases}$$

$$-4, -\frac{26}{15}, \dots$$

$$y = j5^2(30 - \dots) \quad [9]$$

$$= \frac{2(289 - (x - \frac{13}{2}))}{15 \cdot 14} - \frac{289}{30} - \frac{2}{15}(x - \frac{13}{2})$$

$$\frac{289}{15}$$

$$x = \dots = 6,50;$$

$$\frac{289}{15} \sim 9,63.$$

S;

[9]

$$X = 2 \quad : \quad - \frac{104}{15} = 6,93; \quad = 4$$

$$= 8,8.$$

13

$$0 < 10, 0 < 10$$

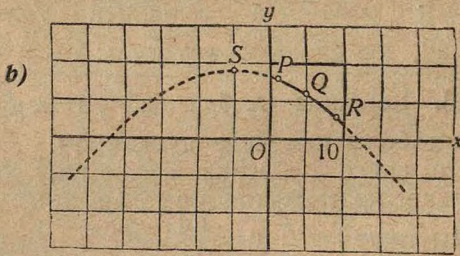
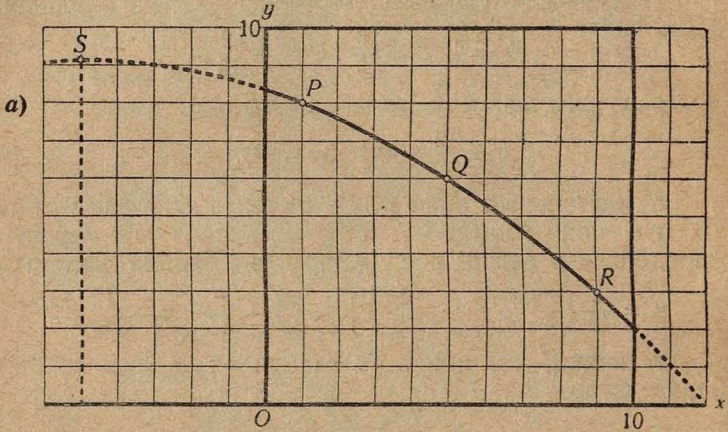
, Q R.

$$-4 - 2;$$



(1,8), 0(5,6), (9,3)

[ ( . 32 , 326)



Черт. 32

$$= \wedge (267 - 1 \quad - \quad ?)$$

$$= -(- \quad - + \quad - ?)$$

$$\begin{aligned} f + + &= 8, \\ \{ + 5 + 25 &= 6, \\ U + 9B + 81C &= 3, \end{aligned}$$

$$\begin{aligned} 4 + 24 &= -2, \\ 4 + 56 &= -3, \end{aligned}$$

$$32 = -1,$$

$$C = -\frac{1}{32},$$

$$= -\frac{5}{16},$$

$$A = \frac{.267}{32}.$$

X	
1	8
5	6
9	3
0	$\frac{267}{32} \sim 8,34$
3	$\sim 7,12$
7	$\sim 4,62$
10	$\sim 2,09$
20	$\sim -10,4$
-40	$\sim 2,2$

$$x^* + \sqrt{bx - 267} = 0$$

$$x = -5 + \sqrt{292} \sqrt{v}$$

$$\sim -5 + 17,09$$

$$*_1 \sim 22,09$$

$$*_2 \sim 12,09$$

$$= \frac{1}{32} \{292 - (*_1 - 5)2\},$$

$$\frac{292}{32} = 9 \frac{1}{8} \sim 9,12$$

$$S(-5; 9,12)$$

1. ( ) ; ( )

2. [3] — [5] — [8]

13 [4]

3. —

[1], 4. 13

N	lg	D
2	0,3010	
3	0,4771	0,1761
4	0,6021	0,1250



3,4.

= -\|

{3; 0,4771) Q (4; 0,6021),

>=0,1021+0,1250\*,

\*=3,4 : (= lg 3,4) = 0,5271.

+ 2

{2; 0,3010), Q(3; 0,4771) R{4; 0,6021).

= - 0,2048 + 0,3041\* — 0,0256\*<sup>2</sup>.

\* = 3,4

(= lg 3,4) = 0,5315.

: lg 3,4 = 0,53148.

14.

14

$$= 3 (1 + \cos^9 0) + 2 \cos 9 + \sin^2 6 - 2 \sin^3 30 \cos^4 -\|$$

$$6 = \dots$$

$$= 40^\circ$$

$$0 = 40^\circ$$

$$30 = 120^\circ$$

$$\frac{9}{2} = 20^\circ$$

$$\sin 0 = 0,643$$

$$\sin 30 = 0,866$$

$$\cos_T = 0,940$$

$$\cos 0 = 0,766$$

$$\sin^2 30 = 0,750$$

$$\cos^2 = 0,884$$

$$\sin^* 0 = 0,414$$

$$2\cos 0 = 1,532$$

$$\cos^{\frac{0}{g}} = 0,780$$

$$\cos^2 0 = 0,586$$

$$\cos^4 0 = 0,342$$

$$\cos 8 0 = 0,118$$

$$\cos^9 0 = 0,091$$

$$1 + \cos^9 0 = 1,091$$

$$3(1 + \cos^9 0) = 3,273$$

$$\sin^2 30 \cos^4 = 0,585$$

$$2 \sin^2 30 \cos^4 = 1,170$$

$$3(1 + \cos^9 6) + 2\cos G + \sin^2 0 = 5,219,$$

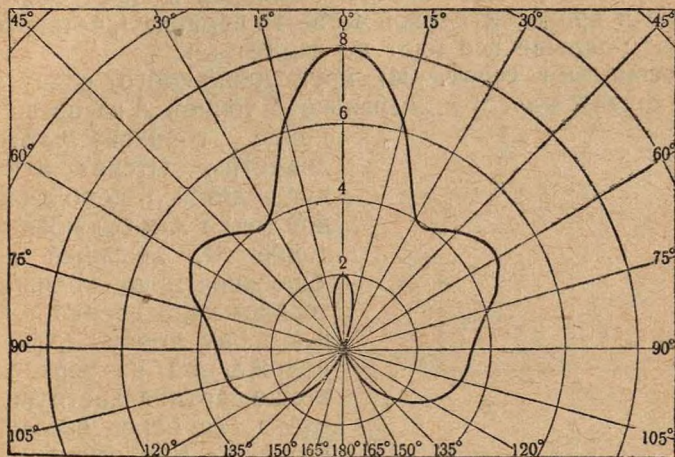
$$= 3(1 + \cos^9 6) + 2 \cos 0 + \sin^2 0 - 2 \sin^2 30 \cos^4 - g - Q = 4,049.$$

0,643	0,766	0,118	0,940	0,750
3460	6670	6670	490	870
386	536	83	846	525
26	46	7	38	60
2	4	1	0,884	0,585
0,414	0,586	0,091	4880	
	6850		707	3,273
	293	0,866	70	1,532
	46	6680	3	0,414
	3	693	0,780	5,219
	0,342	52		1,170
	2430	5		4,049
	103	0,750		
	14*			
	1			
	0,118			





( . 33).



. 33

$0=0^{\circ}, 5^{\circ}, 10^{\circ} \dots 180^{\circ}$

8,0	7,8	7,0	6,3	5,3	4,5	4,0	3,9	4,1	4,4	4,6	4,8
4,8	4,6	4,4	4,1	3,8	3,6	3,5	3,4	3,4	3,3	3,1	3,0
2,8	2,5	2,0	1,9	1,6	1,2	0,6	0,1	-0,5	-1	-1,4	-2,0

>160°,

( ), , “

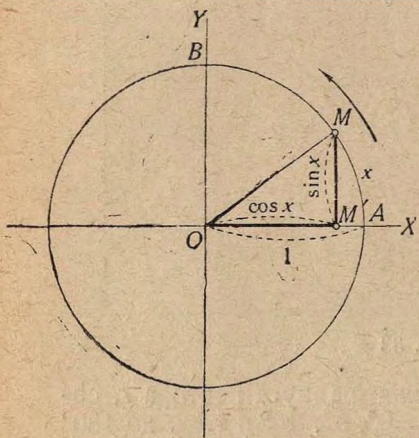
15.

( , , “ );

$$y = \sin x$$

[1]





Черт. 34

$X = \cos x$  ,  $Y = \sin x$

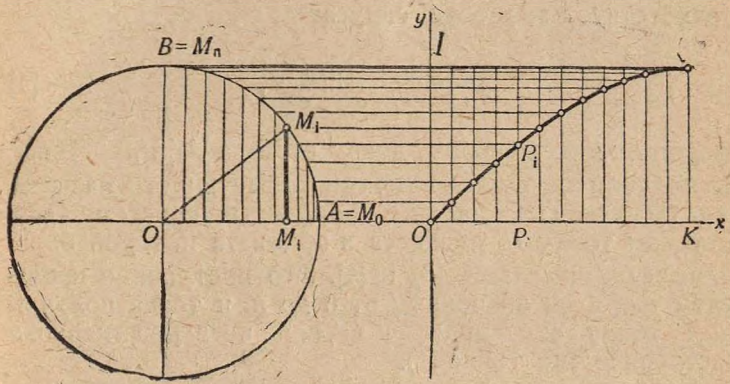
$\begin{cases} X = \cos x \\ Y = \sin x \end{cases}$  [2]

$\text{tg } x = \frac{\sin x}{\cos x}$

1 X Y

— / — !

( 35),  
[1].



Черт. 35

) , ( -  
:  
= 0, M<sub>1</sub>, M<sub>2</sub>, ..., , ... , = = .  
:  
= ' 0, \ M'<sub>2</sub>, ..., \ ..... ' = 0.  
2 / ? = 2 - 1 = 2 ;  
- 5/2 ;  
0 1 2 . . . ~ . π  
2n  
AM<sub>V</sub> 2, 3, ... , AM<sub>1</sub> . . . ,  
:  
2  
- 2' - 2' 2' ..... - 2' - 1' . \* . 2' - \*



$$x = \frac{i\pi}{2n} \tag{3}$$

$$y = \sin x = \sin \frac{i\pi}{2n}, \tag{4}$$

(,, Pj,

OXY

[3] i [4]. 0

(-|~| ,, ")

( 3,14... )<sup>1</sup>,

(<sup>^</sup>  $\frac{\pi}{2n}$ )

≡ '0, l, '2, ..., \, -... ' ≡

(' = 0, 1, 2, 3, ..., «),

35

12.

= 4 (

)

= 4

:

$i$	$\Pi \frac{i\pi}{\text{of}}$	$= \sin x = \sin \frac{1}{g}$
0	0	0
1	- =22 30'	0,383 — 0,4
2	$\frac{\text{ft}}{-4} = 45^\circ$	0,707 — 0,7
3	$\frac{3}{-} = 67^\circ 30'$	0,924 — 0,9
4	$\frac{\text{TZ}}{-} = 90^\circ$	1,000 = 1,0

0, 4, 7, 9, 10,

0 4 7 9 10  
4 3 2 1.

0, 4, 7, 9, 10, 9, 7, 4, 0,-4, —7,—9,-10,-9,-7,-4,0,  
4, 7, 9, 10, 9,....,

( . 36).

—sin

= A sin ( — ) [5]





I.

[5]

= 1, = 0,

$$y = A \sin x$$

(6)

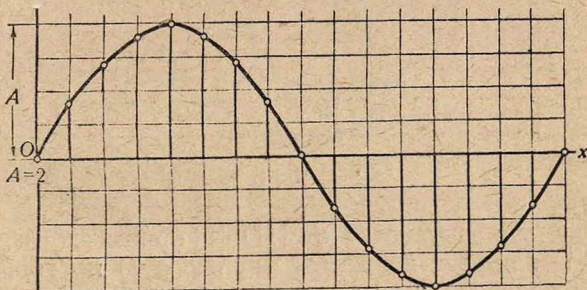
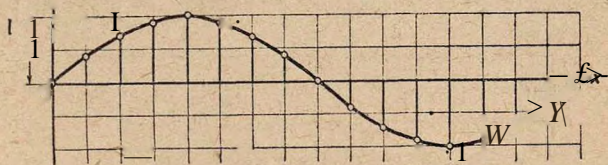
> 0.

[1]

[6],

[6]

[1] ( . 37,



. 37

= 2).

[1]

[6]

( < 4)

( > 1)

[6],

-  $\frac{TZ}{-}$  ;

[6]

0,4; 0,7; 0,9; 1,0



II.

$$[5] = -1, \quad = 0, \quad [7]$$

$$= \sin \quad ,$$

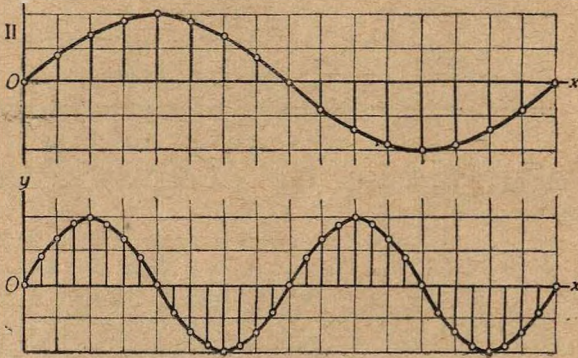
$$, \quad > 0.$$

[1] [7],

[7]

[1],

( . . . 38, =2).



Черт. 38

> 1), [1] [7] (< 4)

[1] 2, [7]

[7]

$$= \frac{2jc}{\quad};$$

[5]

$$v = A \sin\left(\frac{2\pi}{\omega} \right). \quad [5']$$

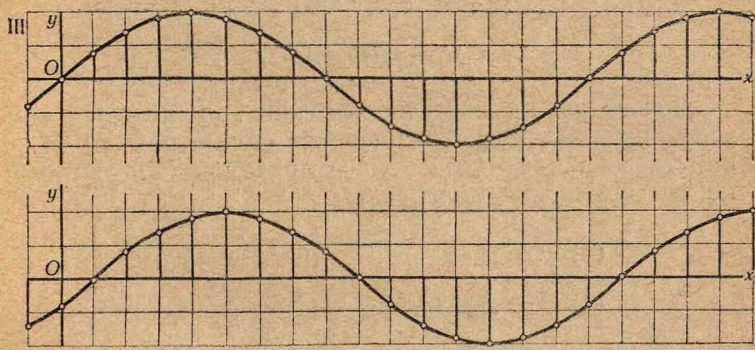
[7],

$$jp = \sin$$

$mx = kr, (k - \dots)$   
 $\sin \dots$   
 $2 - \dots$   
 $+ \frac{2kn}{m} \dots$   
 $2kit, \dots$   
 $(-1)$

III.

$[5] - 1, - 1,$   
 $= (-)$  [8]  
 $[1] [8],$   
 $[8]$   
 $[1],$   
 $(\dots 39, = \frac{\pi}{8}).$



Черт. 39

$(8)$  [1]  
 $( < 0, )$   
 $[8],$



= ,

;

11.

$$\sin(\pi - x) = \sin x$$

(  
)

$$\sin\left(x + \frac{\pi}{2}\right) = \cos x$$

(  
).

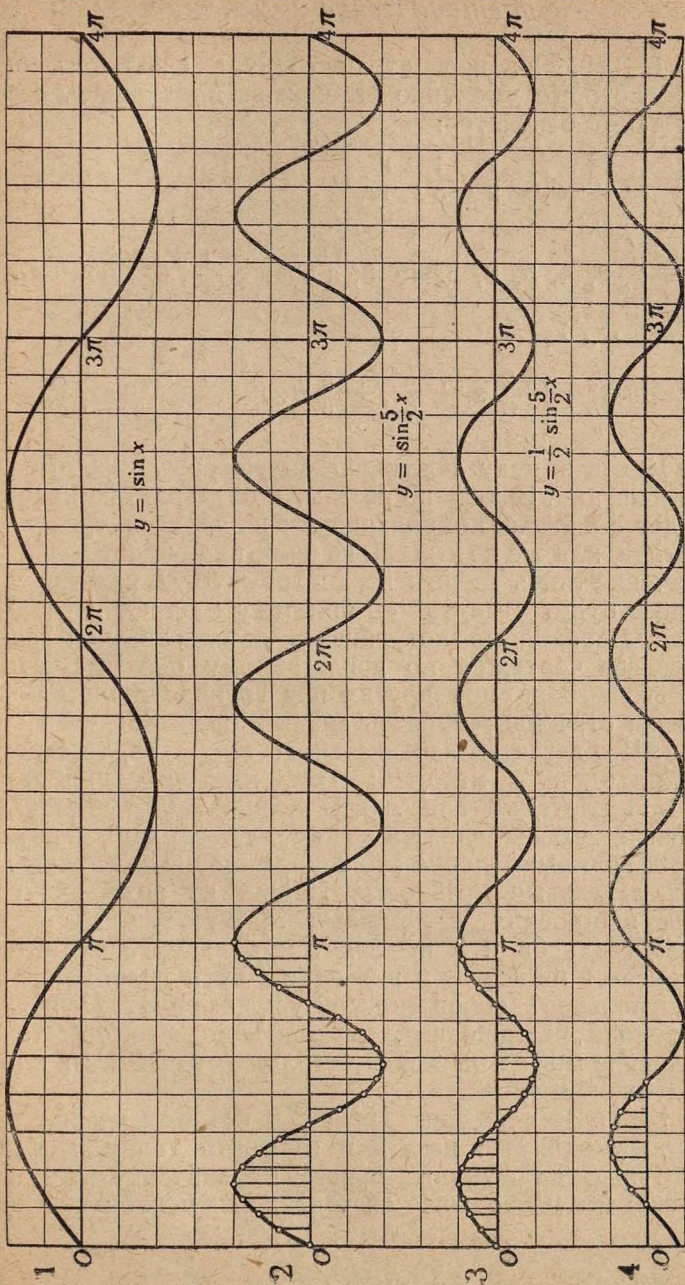
$$\left(\begin{matrix} \sin \\ \cos \end{matrix}\right), \left(\begin{matrix} \cos \\ -\sin \end{matrix}\right),$$

15

- (1)  $y = \sin x$ , (2)  $y = \sin x$ ,  
 (3)  $y = A \sin x$ , (4)  $y = A \sin\left(x - \frac{\pi}{6}\right)$ .

$$\frac{1}{2}, \quad \frac{5}{2}, \quad c = \frac{\pi}{6}$$

$$y = \frac{1}{2} \sin \frac{5}{2} \left(x - \frac{\pi}{6}\right)$$



1)  $\frac{1}{2} \sin \frac{5}{2} x$   
 2)  $\frac{1}{2} \sin \frac{5}{2} x$





4

4.

6.

cos -j-i sin :

$$v(x) = b \sin \left( \omega t - \frac{\pi}{2} \right) = a \cos \left( \omega t - \frac{\pi}{2} \right)$$

$$A \sin \left( \omega t - \frac{\pi}{2} \right) = a \cos \left( \omega t - \frac{\pi}{2} \right)$$

$$A = b, \quad \phi = 1, \quad \theta = 0, \quad b \sin \left( \omega t - \frac{\pi}{2} \right)$$

$$f(x) = u(x) - v(x) = a \cos \omega t + b \sin \omega t$$

2

$$a \cos \omega t - b \sin \omega t$$

81 (-)

$$a \cos \omega t - b \sin \omega t$$

$$\sqrt{a^2 + b^2}$$



x

cos -f- b sift :—

$$\sim \Psi^* + \left\{ \frac{a}{\sqrt{a^2 + b^2}} \cos x + \frac{b}{\sqrt{a^2 + b^2}} \sin x \right\} \quad [14]$$

$$\frac{a}{\sqrt{a^2 - b^2}} *$$

y^rqiyr

$$(\sim \frac{a^2}{\dots}) + (\dots) = 1 \quad [2]$$

$$\begin{cases} \sin = \frac{a}{\sqrt{a^2 + b^2}} * \\ \cos = \frac{b}{\sqrt{a^2 + b^2}} \end{cases} \quad [3]$$

[2]

$$\frac{a^2}{\dots} \sim \frac{b^2}{\dots}$$

$$X^2 - \{ \dots \} = 1$$

AM,

(1,0).

[3],

$$\text{tg}^* = \frac{a}{\dots} \quad [ ]$$

[3].

(0 < < 2 ),

[1],

“:

$$\begin{aligned}
 a \cos x - b \sin x &= \sqrt{a^2 - b^2} (\sin c \cos x - \cos c \sin x) = \\
 &= \sqrt{a^2 - b^2} (\sin(x - c)) = \\
 &= \sqrt{a^2 - b^2} \sin(x - c).
 \end{aligned}$$

$$A \sin(x - c),$$

$$A = \sqrt{a^2 - b^2} > 0, \tag{4}$$

$$\tag{3}$$

[4]

( )

:

16

10°),

$$\begin{aligned}
 ( ) &= a \cos x, \\
 v(x) &= b \sin x.
 \end{aligned}$$

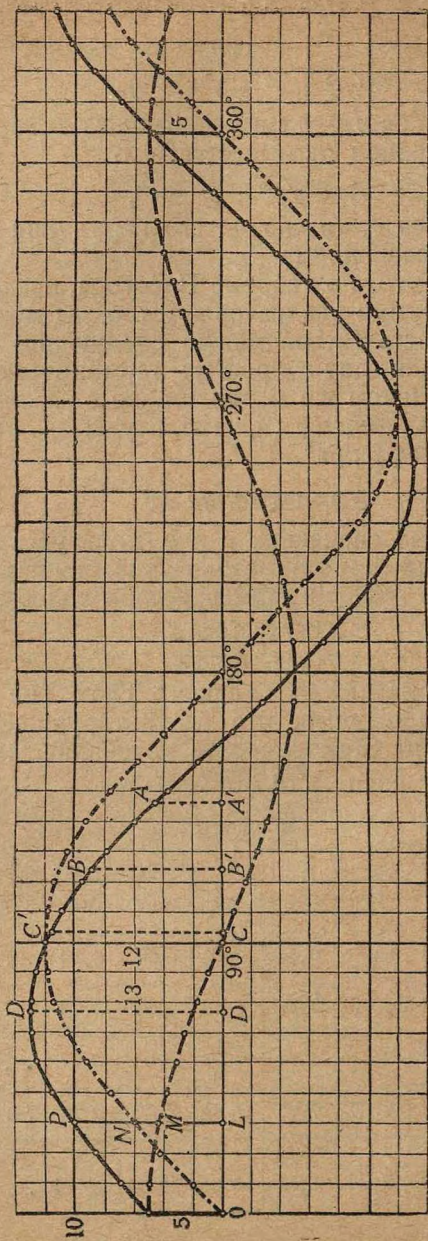
( 10°)

$$\sqrt{a^2 - b^2}$$

= 5, 6 = 12

X	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°	180°
COS X	1,00	0,98	0,94	0,87	0,77	0,64					-1,00
a cos	5,00	4,90	4,70	4,35	3,85	3,20	...				-5,00
sin	0,00	0,17	0,34	0,50	0,64	0,77	...				0,00
sin	0,00	2,04	4,08	6,00	7,68	9,24					0,00
a cos + b sin x	5,00	6,94	8,78	10,35	11,53	12,44	...				-5,00





1.

“ ” “ ”

2.

$$2 \sin \left( \frac{x}{2} \right) - j 2 \sin \left( \frac{x}{2} \right) = A \sin \left( \frac{x}{2} \right)$$

$$\begin{aligned}
 & A_1 \sin \left( \frac{x}{2} \right) - j 2 \sin \left( \frac{x}{2} \right) = \\
 & = \sqrt{1} (\sin x \cos \frac{x}{2} - \cos x \sin \frac{x}{2}) - \\
 & \quad - \frac{2}{2} (\sin \frac{x}{2} \cos \frac{x}{2} - \cos \frac{x}{2} \sin \frac{x}{2}) = \\
 & = - (A_j \sin \frac{x}{2} - \frac{2}{2} \sin \frac{x}{2}) \cos \frac{x}{2} - \\
 & \quad - \frac{2}{2} (\cos \frac{x}{2} - \frac{2}{2} \cos \frac{x}{2}) \sin \frac{x}{2} = a \cos x - b \sin x, \\
 & = - (\sin \frac{x}{2} - \frac{2}{2} \sin \frac{x}{2}), b = \frac{2}{2} \cos \frac{x}{2} - \frac{2}{2} \cos \frac{x}{2}.
 \end{aligned}$$

3.

*b*

16

$$(5^2 - 12^2 = 13^2)$$

4.

LN



( . 41), ,  $MP=LM$ ;

5. , , , , , ,  $D'D$  ( . 41)  
4:7:9:10.

: 1)

; 2)

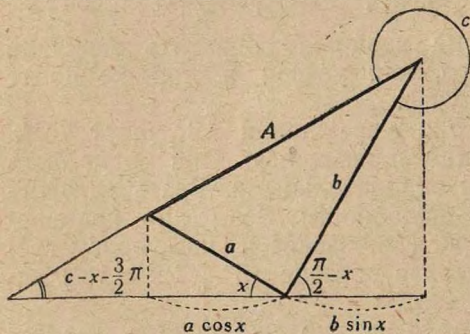
( . ) .

6.

(42—43

),

3—4



7.

. 42

8.

17.

f(x) < ( 0),

f( ?:+ ")-f(\*)•

M'(x-j-o), )

"(-j-3( , ), ...
,, ( - 2 , ),...

( , )
y=f(x)\

"(-f-2 , ),
( - , )
1.

1
: f( 2+>) = f( + ); [1] - - > ;
: + 2 ) ;
f(\* + 3(i>)=f(x+ 2 );...
: f( )=f( - ) J( ),
...=f(-\*: - 2 >) = f( - ) = f( ) = f( + ) = f( + 2 ) = ...





$$f(x) = A \sin\left(\frac{2\pi}{\omega} x\right)$$

$$\begin{aligned} f(x) &= A \sin\left(\frac{2\pi}{\omega} x\right) \\ &= A \sin\left(\frac{2\pi}{\omega} x\right) \end{aligned}$$

$$\begin{aligned} &\sin^2 x + \cos^2 x = 1 \\ &\sin^2 x - \cos^2 x = -\cos 2x \\ &\sin 2x = 2 \sin x \cos x \\ &\cos 2x = \cos^2 x - \sin^2 x \end{aligned}$$

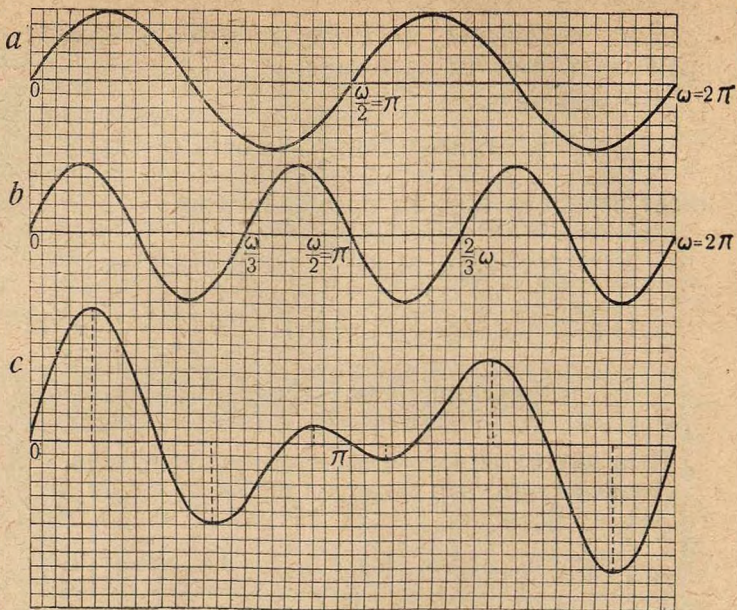
16,

$$A \sin\left(\frac{2\pi}{\omega} x\right) \quad \text{§ 16, 4].}$$

$$\begin{aligned} f(x) &= z u(x) - v(x), \\ f(x) &= (z + v) - v(x) \end{aligned}$$

$$\sin\left(\frac{2\pi}{\omega} x\right) = \sin\left(\frac{2\pi}{\omega} x\right)$$





Черт. 44

"  
ω

11

44,

$\frac{\omega}{3}$   
)

..., , 2, 3( ...;

$$f(x) = \sin(2^2 \frac{\pi x}{\omega}) - f \sin\left(\frac{2\pi x}{\omega}\right) \quad [2]$$

" ( , " )

?

$\omega = 2\pi r$ ;

$$f(x) = \sin 2 - f - \sin \quad [3]$$





= )

$$\sin 2x - \sin 3x = 0,$$

$$\sin 2x - \sin 3x$$

$$f(x) = \sin 2x - \sin 3x = 2 \sin 4x \cos 4x. [4]$$

f(x)

11;

$$\sin 2x - \sin 3x = 0$$

$$\sin \frac{5}{2} = 0 \quad [5]$$

$$\cos \frac{5}{2} = 0. \quad [6]$$

[5]

$$\frac{5}{2}x = \frac{k\pi}{5}, \quad (k = \frac{2}{5}k\pi), \quad ]$$

[6]

$$\frac{X}{2} + k\pi, = \pm 2kn \quad (k = \dots). \quad [8]$$

[5]

$$X_j = \frac{2}{2} = \dots, \frac{4}{3} = \dots, \frac{6}{6} = \dots, \frac{8}{6} = \dots,$$

[6] —

( ) 44).

17

( ) = A sin ( - a ), v ( ) = sin ( - ) .

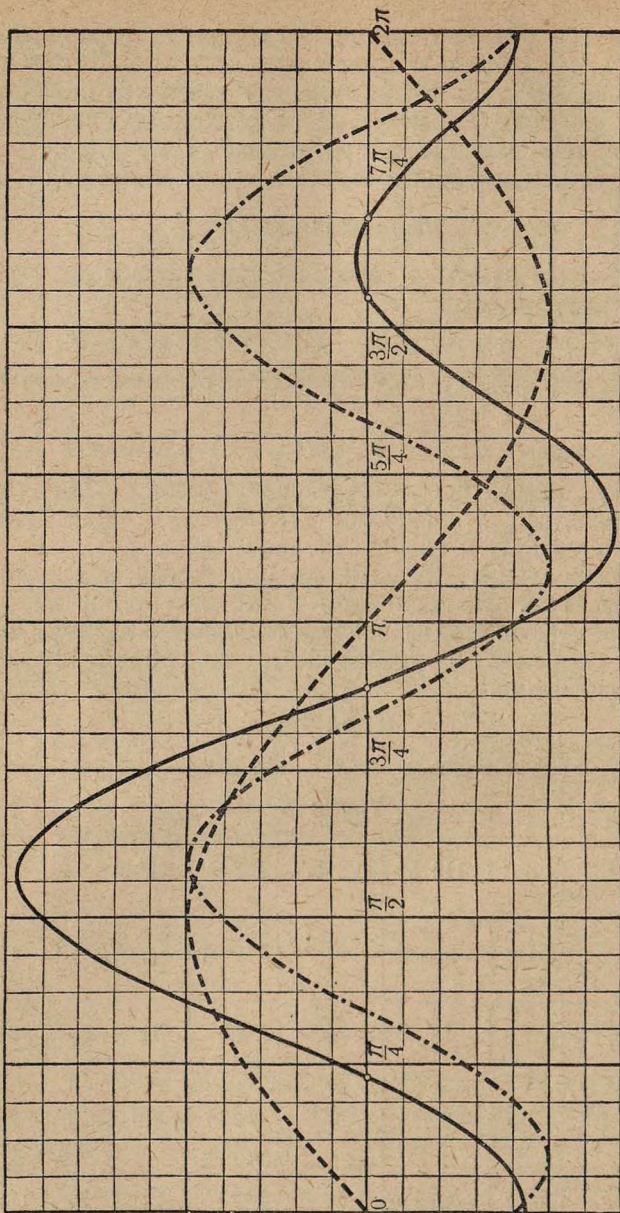
f(x) = a ( ) - v(x) - A sin ( - ) sin n(x - b).

y = f(x) f(x) — . 45,

( ) = sin ; v(x) = sin 2 ( - π )

x	0°	11° 15'	22° 30'	33° 45'	45		
( - ) π		-97° 30'	-75°	-52° 30'			15°
sin	0	19	38	56	71	83	92
sin 2 ( - π )	-87	-99	-97	-79	-50	-13	26
f(x)	- 7	-80	-59	-23	21	70	118





						135°	...
$\pi$		60°		105°		150°	...
sin :	98	100	98	92	83	71	56
sin 2 (*-J)	61	87	99	97	79	50	13
fix)	159	187	197	189	162	121	69

$$\sin x - \sin 2 \left( x - \frac{\pi}{3} \right) = 0.$$

$$\sin x - \sin 2 \left( x - \frac{\pi}{3} \right) = 2 \sin a \left( \frac{3}{2} - \frac{\pi}{3} \right) \cos \left( \frac{x}{2} - \frac{\pi}{3} \right).$$

$$1) \sin \left( \frac{3}{2} - \frac{\pi}{3} \right) = 0,$$

$$2) \cos \left( \frac{x}{2} - \frac{\pi}{3} \right) = 0,$$

$$\frac{3}{2} - \frac{\pi}{3} = k\pi,$$

$$\frac{x}{2} - \frac{\pi}{3} = \frac{\pi}{2} + k\pi$$

$$\frac{3}{2} - \frac{\pi}{3} = k\pi,$$

$$\frac{x}{2} - \frac{\pi}{3} = \frac{\pi}{2} + k\pi$$

$$X = \frac{3}{2} - \frac{\pi}{3} + k\pi;$$

$$x = \frac{5}{3} + \pi + 2k\pi$$

$$\frac{3}{2} - \frac{\pi}{3} = k\pi, \quad \frac{3}{2} - \frac{\pi}{3} = k\pi \quad \frac{3}{2} - \frac{\pi}{3} = k\pi$$

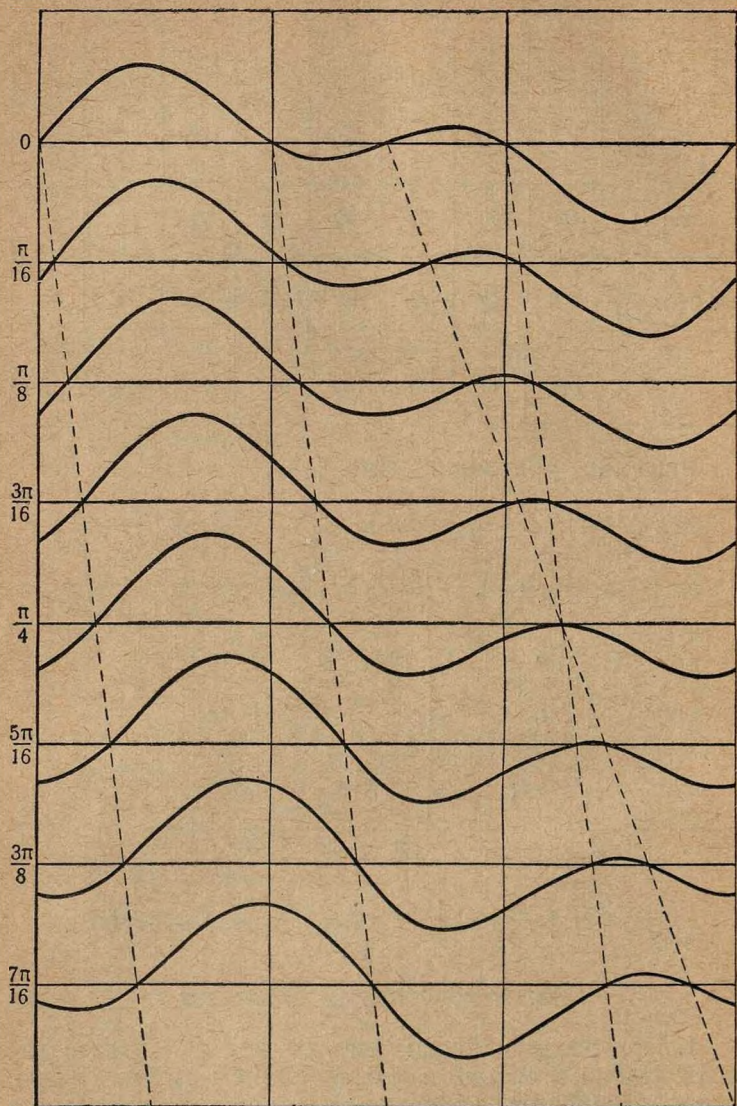
$$* = 4 * + - = \mathbb{Y} < \wedge 280^\circ > \wedge = 4 * (= 300^\wedge).$$

1.

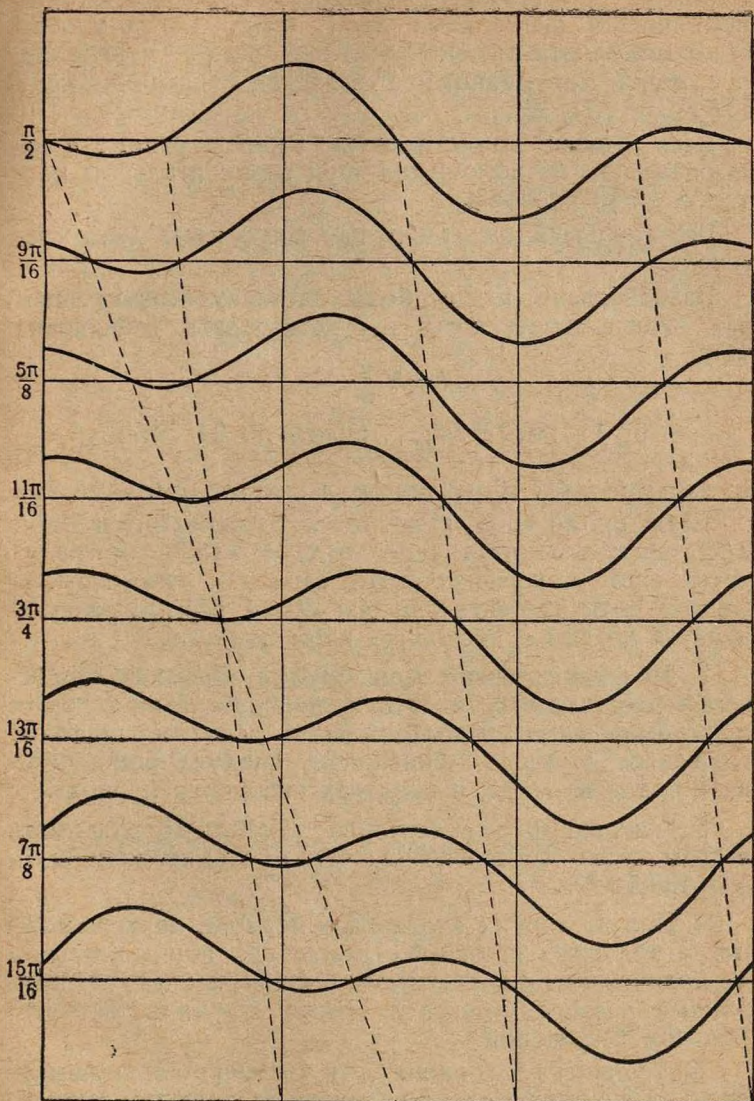
$$f(x) = 0$$

$$= 1.$$





Черт. 46a



Черт. 466



$$= 1, \quad = 2. \\ ,, \quad 32 \quad 0$$

2\*: 32, . . 11° 15'.

=16

1=5

$$= 0 \quad b$$

$$b = k \frac{\pi}{16},$$

т. е.

0°; 11° 15'; 22° 30';... 34 °45';

16

( . . . 46).

$$u(x) = s \sqrt{nx}$$

16

$$= , \quad ( ) = - \sin \quad ;$$

16-

2.

$$= 1, \quad \ll 3 \quad = 2, \quad = 3,$$

48

3.

( . . . 5).

16

4.

32

; ( 48

( )

5.

(

).

" " ; " "

( ) . t

:

= sin [t - ] ( > 0). [1]

sin (t - ) - 1

-[- 1, ( ^ -

^ = ^ ,

< .

1,

= 0 -

t' = t - ,

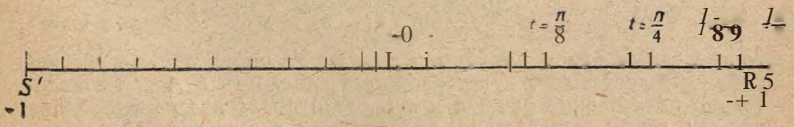
t = a

[1]

x = sin t.

[2]

47.





$$t=0$$

$$t = -\frac{\pi}{2}$$

5,

=||

$$\wedge 0 \frac{\pi}{2}$$

$$\wedge 0, \frac{\pi}{8}, \left(\frac{\pi}{8}, \wedge, \left(\frac{\pi}{4}, \frac{3}{8v}\right), \right)$$

$$(\wedge^3, \frac{\pi}{2}) \gg >$$

. 133,

$$t = \wedge, \frac{\pi}{4}, -jj$$

: 0,4; 0,7; 0,9.

5

05,

$$\left( \right)$$

S'

$$-1;$$

$$[2] \left( \right)$$

$$\wedge = -)$$

$$t = -$$

4

I.

$$(-, )$$

$$\begin{cases} fx = A \sin m(\dots) \\ y = \sin(t - b) \end{cases}$$

I<sup>j\*</sup>

$$(\dots, >, m) \dots$$

$$: = = \backslash$$

$$\begin{cases} jx = \sin m(t - \dots) \\ \backslash = \sin(t - b) \end{cases}$$

41

[3]:

[4]

[3].

$$t' = t - b,$$

$$t = b.$$

$$\begin{cases} x = \sin(t - b), \\ y = \sin nt \end{cases} \quad (5)$$

$$I \bullet *! <!, \quad \ll 1,$$

Q,

$$= +1, j > +1.$$

$$\begin{aligned} & \frac{(I)}{2} \sim \frac{1}{2} \\ & = 4 \cdot 1, \quad = -1; \\ & = +1 \quad = -1, \end{aligned}$$

$$\frac{\pi}{h}$$

$$= 1 = 1;$$

$$\begin{cases} 1 = \sin(t - a), \\ \quad = \sin t. \end{cases} \quad [6]$$

( . . . 48).

I.  $a = 0$ .

$$\begin{cases} \quad = \sin t, \\ \quad = \sin t \end{cases} \quad [7]$$

=

t

: (1,1)









(-1, -1),

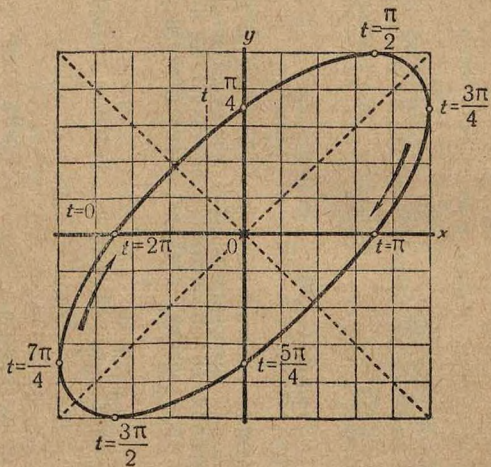
11. — .

$$[6] \quad :$$

$$\begin{cases} \quad = -\sin t, \\ \quad = \sin t. \end{cases} \quad [8]$$



 <p>I <math>a=0</math></p>	 <p>II <math>a=\pi</math></p>
 <p>V <math>a = \frac{\pi}{4}</math></p>	 <p>VII <math>a = \frac{5\pi}{4}</math></p>
 <p>III <math>a = \frac{\pi}{2}</math></p>	 <p>IV <math>a = \frac{3\pi}{2}</math></p>
 <p>VI <math>a = \frac{3\pi}{4}</math></p>	 <p>VIII <math>a = \frac{7\pi}{4}</math></p>





$$(-1, 1) \quad (1, \frac{1}{2}),$$

$$\text{III. } = 2^n \quad \text{IV. } = \dots^3$$

$$= -\frac{3}{2} \quad [6]$$

$$\begin{cases} x = \cos t, \\ y = \sin t. \end{cases} \quad \text{rq. 191}$$

$$\sqrt{x^2 + y^2} = 1,$$

$$\frac{y}{x} = \tan t, \quad t$$

$$[9] \quad \dots$$

$$= > \quad [6]$$

$$\begin{cases} x = -\cos t, \\ y = \sin t. \end{cases} \quad [10]$$

$$(\dots), >$$

$$\text{V. } a = -j.$$

$$\begin{cases} x = \frac{\sin t - \cos t}{\sqrt{2}}, \\ y = \sin t. \end{cases} \quad [ ]$$

$t$	$x$	
0	$-\frac{1}{\sqrt{2}}$	0
	$\frac{1}{\sqrt{2}}$	0
$\sim 2$	$\frac{1}{\sqrt{2}}$	1.4
$\frac{3}{2} 71$	$\sim \frac{1}{\sqrt{2}}$	-1

$t$	:	
$\frac{1}{4}$	0	$\frac{1}{7?}$
$\frac{3}{4}$	1	$\frac{1}{\sqrt{2}}$
$\frac{5}{4}$	0	$\frac{1}{\sim \sqrt{2}}$
$\frac{7}{4}$	-1	$\frac{1}{\sim \sqrt{2}}$

(.49).

[11],

$$2\bar{+}^* = \frac{1}{2}. \quad [12]$$

VI. =  $\overset{3}{\wedge}$ , VII. =  $\overset{5}{-}jit$ , VIII.  $a = -\overset{7}{\wedge}iz$ .

$$\left( \begin{array}{l} t \\ = 0 \end{array} \right) a = it, \quad [6],$$

Q.

[3]):

$$\begin{cases} = \cos \\ y = \sin St^l \end{cases} \quad [13]$$

1)

$$\sin 3l = ,$$

$$3t = , t = \wedge .$$

1

$$: = 5, = 3$$

[5],

$\frac{3}{-}$



2) 3)

$$\sin 3^\wedge = -\{-1 \sin 3\text{f} = -1,$$

$$= -|+2, \quad t = \frac{\pi}{6} + \frac{2}{3} k\pi$$

$$3^\wedge = jn \pm 2kn, \quad t = Z - \frac{1}{2} \text{ }^\wedge kn.$$

$$t \cdot \frac{k\pi}{6}$$

$$t \cdot \frac{10}{10}$$

t

-g-

$$\frac{k\pi}{10^\circ}$$

t

:

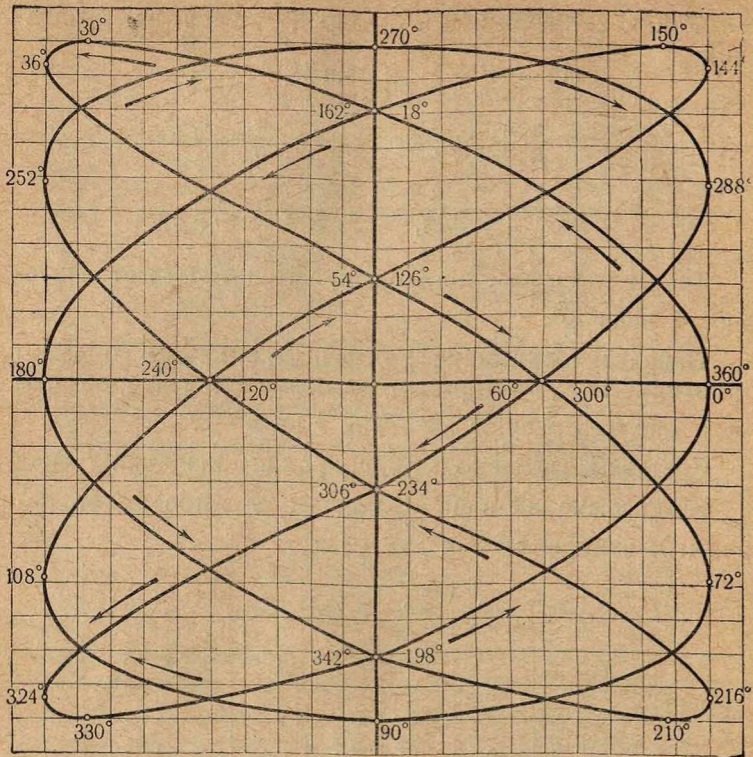
t	0°	60°	90°	120°	150°	... 360°
X	100-87	50	0	-50	87	...   100
	0	1	0	-1	0	...   0

t	0°	18°	36°	54°	72°	90°	... 360°
X	1	0	-1	0	1	0	... 1
	0	81	95	31	-59	-100	... 0

Q

$$t ( \quad );$$

t.



. 50

,  
t,

( . 50 )

22.

18

$$\begin{aligned} ( &= \sin m(t - ), \\ \backslash &= \sin(\neq b). \end{aligned}$$



$$W < 1, \quad | \dots | < 1.$$

$$\begin{cases} x = \cos t, \\ y = \sin 3t. \end{cases}$$

( . . . . . 50 . . . . . 165.)

1.

$$= = 1, \quad -0.$$

48,  
50.

$$1) \begin{cases} x = \sin(t-a), \\ y = \sin t, \end{cases}$$

$$\begin{aligned} & \frac{2}{6}, \frac{5}{6}, \dots, \frac{3}{8}\pi; \\ & \frac{5}{8}\pi; \frac{7}{8}, \frac{5}{12}, \dots, \frac{7}{12}, \frac{11}{12} \end{aligned}$$

$$a = 15^\circ; 22\frac{1}{2}^\circ; 30^\circ; 60^\circ; 67\frac{1}{2}^\circ; 75^\circ; \\ 105^\circ; 112\frac{1}{2}^\circ; 120^\circ; 150^\circ; 157\frac{1}{2}^\circ; 165^\circ;$$

$$2) \begin{cases} lx = \sin 2(t - a) \\ y = \sin t \end{cases}$$

$$a = \frac{3}{4}\pi; \frac{\pi}{3}; \frac{2}{3}\pi; \frac{\pi}{6}; \frac{5}{6}\pi$$

и

$$\begin{cases} 3c = \sin 3[t - a] \\ y = \sin t \end{cases}$$

$$-\frac{7C}{a} \sim \frac{\pi}{2}, \frac{3}{4}, \pi, \frac{2}{9}, \frac{2}{4}$$

3) [A: = sin mt, jx = sin mt, (x = cos mt, jx = cos mt,  
 \y = sin nt, l\_y = cos nt, \y = i sin nt, l\_y = cos nt

:

$$a) \begin{matrix} m=3 \\ n=2 \end{matrix}, \quad b) \begin{matrix} m=4 \\ n=3 \end{matrix}, \quad c) \begin{matrix} m=5 \\ n=2 \end{matrix}$$

$$12-f-10-j-4.3 = 34 \quad )$$

2.

1)

$$150^\circ; 300^\circ, 450^\circ, 600^\circ \dots 1800^\circ$$

2)

$$Q \quad ( \quad ),$$

t ,





$$\text{ch}_{<.*} = 7 \frac{1}{(\ll' + \mathfrak{f}^*)},$$

2:

$$\text{ch}_2 x = \frac{2^*}{\sqrt{2}} \frac{2^{\sim}}{\sqrt{2}} \quad [2]$$

$$= 2 \quad = 2^{\sim}.$$

$$= 2 \sqrt{2};$$

$$y = \text{ch}_2 x,$$

2, . . .

$$\left( \frac{-2}{51} \right);$$

$$- 1;$$

$$\sqrt{2}^{\sim} = \sqrt{2} \sim 1,41,$$

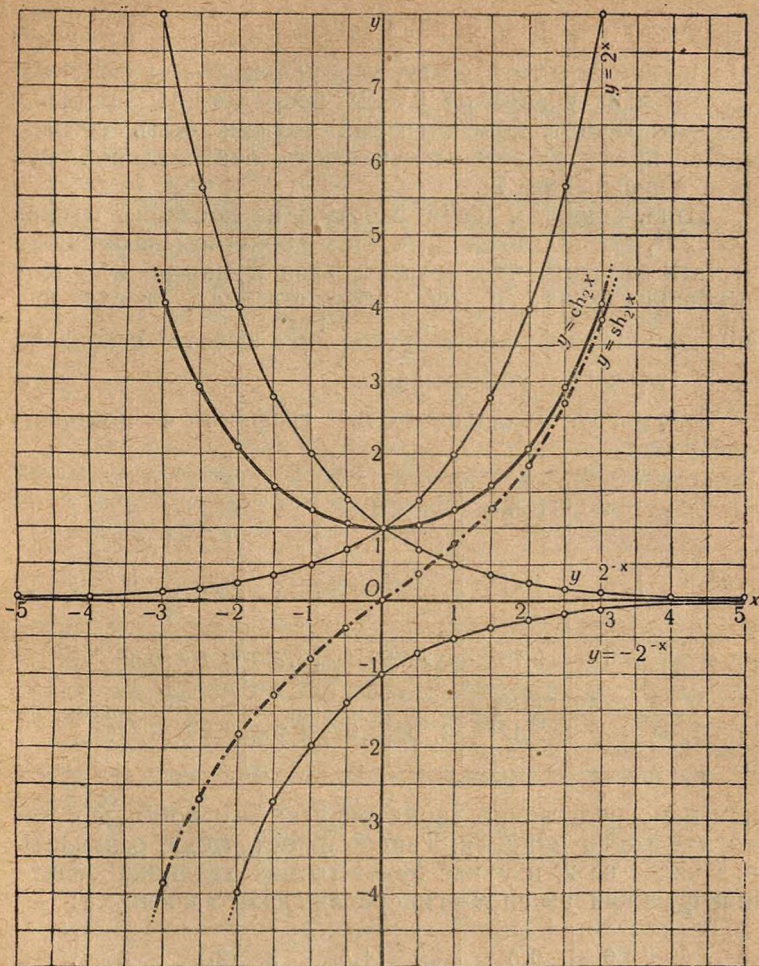
$$\frac{3}{2^2} = 2\sqrt{2} - 2,82;$$

$$\frac{5}{2^2} = 2\sqrt{2} \sim -5,64; \dots$$

$$\frac{1}{2^2} = \frac{\sqrt{2}}{2} = 0,70;$$

$$\frac{9}{2^2} = \frac{1}{2} = 0,35; \dots$$





= 2 .

„

„

,

— 0 —

— 2 ~

$-1, = 1$        $- 2^{-1} = \dots$   
 $= 2$   
 $2 > 1,$   
 $\frac{1}{2} < 1,$   
 $2^{-x} = \left(\frac{1}{2}\right)^x$

$x$	0	0,5	1	1,5	2	2,5	3	...
$2^x$	1	1,414	2	2,828	4	5,656	8	...
$2^{-x}$	1	0,707	0,500	0,354	0,250	0,177	0,125	...
$2^x + 2^{-x}$	2	2,121	2,500	3,182	4,250	5,833	8,125	...

$$y = \operatorname{ch}_2 x$$

$x$	0	0,5	1	1,5	2	2,5	3	...
$\operatorname{ch}_2 x$	1	1,060	1,250	1,591	2,125	2,916	4,062	...



$$\operatorname{sh}_a x = \frac{a^x - a^{-x}}{2} \quad (\ll \gg!) \bullet \quad [3]$$

$$\operatorname{sh}_2 x = \pm \frac{2^x - 2^{-x}}{2} \quad \text{t}^4)$$

$= -2$        $= -2 \sim$       "      "       $= -2 \sim$   
 $= 2 \sim$  ;  
 $= -2 \sim$        $-2$

X	0	0,5	1	1,5	2	2,5	3	...
2	1	1,414	2	2,828	4	5,656	8	...
2	1	0,707	0,500	0,354	0,250	0,177	0,125	...
2 - 2 ~ ~	0	0,707	1,500	2,474	3,750	5,479	7,875	...
sh <sub>2</sub> x	0	0,354	0,750	1,237	1,875	2,740	3,938	...

$$\sin^{-1}(\cos a) = \frac{\pi}{2} - a$$

$$\begin{aligned} \cos(-a) &= \cos a \\ \sin(-a) &= -\sin a \end{aligned} \quad [1]$$

$$\begin{aligned} \operatorname{ch}_a(-A) &= \operatorname{ch}_e A \\ [3] \end{aligned}$$

$$\operatorname{sh}_a(-A) = -\operatorname{sh}_e A$$

$$\cos^2 a + \sin^2 a = 1. \quad [5]$$

$$\operatorname{ch}^2 A - \operatorname{sh}^2 A = 1. \quad [6]$$

\* To-



$$\begin{aligned} \operatorname{ch}_a^2 x - \operatorname{sh}_a^2 x &= \left( \frac{a^x + a^{-x}}{2} \right)^2 - \left( \frac{a^x - a^{-x}}{2} \right)^2 = \\ &= \left( \frac{a^x + a^{-x}}{2} + \frac{a^x - a^{-x}}{2} \right) \left( \frac{a^x + a^{-x}}{2} - \frac{a^x - a^{-x}}{2} \right) = a^x \cdot a^{-x} = 1. \end{aligned}$$

(,, cos\* ") :

$$\cos(x + y) = \cos x \cos y - \sin x \sin y. \quad [7]$$

$$\operatorname{ch}_a(x + y) = \operatorname{ch}_a x \operatorname{ch}_a y + \operatorname{sh}_a x \operatorname{sh}_a y. \quad [8]$$

$$\operatorname{ch}_a x \operatorname{sh}_a y + \operatorname{sh}_a x \operatorname{ch}_a y = \frac{e^{ax} + e^{-ax}}{2} \frac{e^{ay} - e^{-ay}}{2} + \frac{e^{ax} - e^{-ax}}{2} \frac{e^{ay} + e^{-ay}}{2} = \operatorname{ch}_a(x+y)$$

$$\operatorname{ch}_a x \operatorname{sh}_a x$$

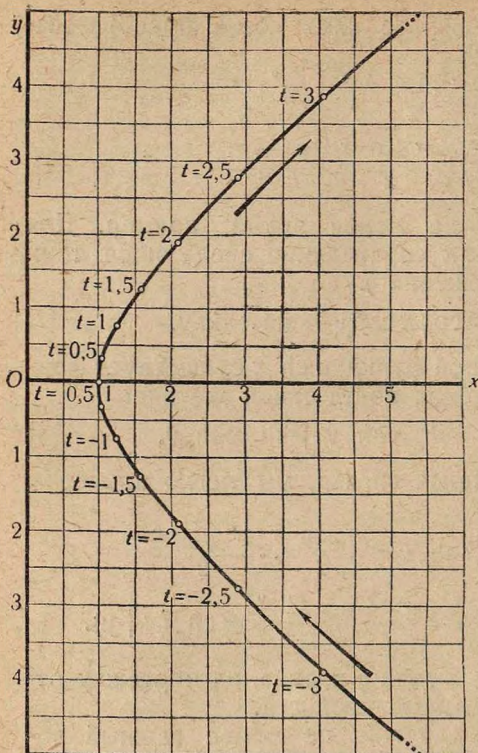
$$\cos^* \sin x$$

$$\begin{aligned} jx &= \operatorname{cost}, \\ \lfloor y &= \sin t \end{aligned} \quad [9]$$

$$\cos^2 t - \sin^2 t = 1,$$

$$1 - j^2 = 1.$$

$$\begin{cases} \bullet x = \operatorname{ch} J, \\ = \operatorname{sh} j \end{cases} \quad [10]$$



[10]

$$\text{ch}^2 - \text{sh}^2 = 1,$$

$$2 \text{sh}^2 = 1$$

[10]

.52

19

1)

$$\text{ch } J = \frac{e^{+at} + e^{-at}}{2}, \quad \text{sh } at = \frac{e^{at} - e^{-at}}{2}.$$

2)

( , ),  
t,

$$\text{pc} = \text{ch } at,$$

$$\text{ly} = \text{sM}$$

[12]



$t$ .

$a \approx 2,09$ .

„ 51 52:  
" =2,  
<7=2,09.

$\lg a = 0,3202$ .

:

$t$	0	0,5	1	1,5	2	2,5	...
$\langle \lg a \rangle$	0,0000	0,1601	0,3202	0,4803	0,6403	0,8005	...
$at$	1,00	1,45	2,09	3,04	4,37	6,32	...
$-H_{gi_0a}$	0,0000	1,8399	1,6798	1,5197	1,3596	,1995	...
$a^{-t}$	1,00	0,69	0,48	0,33	0,23	0,16	...
$a^t + a^{-t}$	2,00	2,14	2,57	3,38	4,60	6,48	...
$x = \operatorname{ch}_a t$	1,00	1,07	1,28	1,68	2,30	3,24	...
$at - a^{-t}$	0,00	0,76	1,61	2,71	4,14	6,16	...
$-s M$	0,00	0,38	0,80	1,35	2,07	3,08	...

1.

\*

$$= \lim_{n \rightarrow \infty} \left( 1 + \frac{1}{n} \right)^n = 2,71828... \quad [13]$$

$$\lg_e x = \text{I}g x.$$

$\text{ch}_a x$

$\text{sh}_c x,$

$$\begin{aligned} \text{ch}_x &= \text{ch} = \frac{e^x + e^{-x}}{2}, \\ \text{sh}_x &= \text{sh} = \frac{e^x - e^{-x}}{2}. \end{aligned}$$

2.

$$\begin{cases} \cos x = \text{Ch}_e; X, \\ \sin x = -i \text{sh} x. \end{cases} \quad [14]$$

$$\begin{cases} \text{ch} = \cos(ix), \\ \text{sh} x = -i \sin(ix). \end{cases} \quad [15]$$

3.



4.  $\left( \frac{2}{3} < \frac{1}{3} \right)$ , [12]

20.

$$= \sin \dots [1]$$

$$= 3,14\dots$$

[1],  $= \sin \dots [2]$

[2]  $\frac{3}{3}$

$$= ku (k - \dots)$$

$$x = k \frac{\pi}{3} \wedge \dots, 05k,$$

[1]

$$- ku (k - \dots)$$

$$x = \sqrt{2}j$$

11





$$2. \quad y = \sin u; \quad [4]$$

15 [1])

*		$\sin *$	$* - f - \sin$
0	0	0	0
1		0	1
2	2	0	2
...	...	...	...
( $\frac{1}{2}$ )		0	
$\frac{1}{2}$	$\frac{1}{2}$	1	$\frac{3}{2} \sim 1,5$
$\frac{3}{2}$	$3$	-1	$4 = 0,5$
$\frac{1}{4}$	$*$	1	-0,96
		$7f \sim 0,71$	
...	...	...	...

[3]

$* = 0,83,$

$* = 0,83 = 0,83 \cdot 180^\circ = 149,4^\circ = 149^\circ 24',$

$\sin * = 0,51,$

$* - f - \sin * = 1,34.$

4

$0 < * < 4 >$

X	.	sin	sin
0	0	0,0	0
$\frac{1}{8}$	10	0,4	$\frac{1}{+}$
<del>4</del> $\frac{1}{8}$	10	0,7	$4^{+0,7}$
<del>3</del> $\frac{3}{8}$	<del>8</del> <sup>3</sup> *	0,9	$4^{+0,9}$
$\frac{1}{2}$	10 ~2~	1,0	$4^{+1,0}$

54 ( ) 546 ( ) .

[3]:  
 $x = \frac{1}{y}, \frac{3}{2}, \frac{5}{y}$  [1],

$$= -j \sin ; \quad [4]$$

( ) ( )

[4] —

1  
 $\sin \wedge, |\sin \wedge \wedge ($

$$f(x) = \dots + \sin$$

$$f(x-h) - f(x) = [(x-h) - \sin(x-h)] - [x - \sin x] =$$

$$= -A + [\sin(x+h) - \sin x] = h + 2 \sin \frac{h}{2} \cos \left(x + \frac{h}{2}\right) >$$

$$\geq h - \left| 2 \sin \frac{h}{2} \cos \left(x + \frac{h}{2}\right) \right| > 0.$$

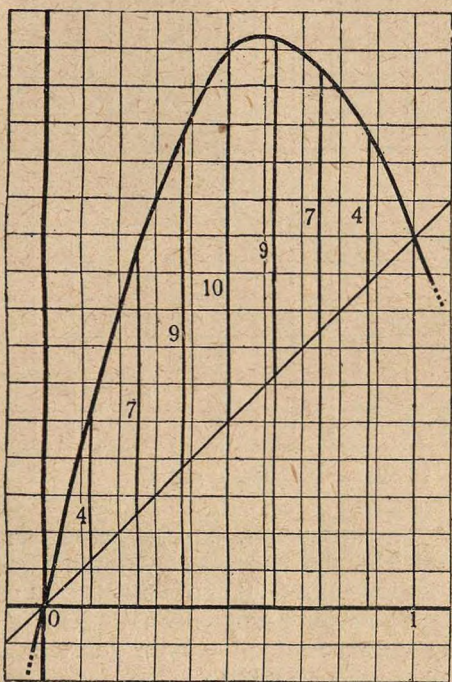


?

[3] [4]

[3]

2 2,



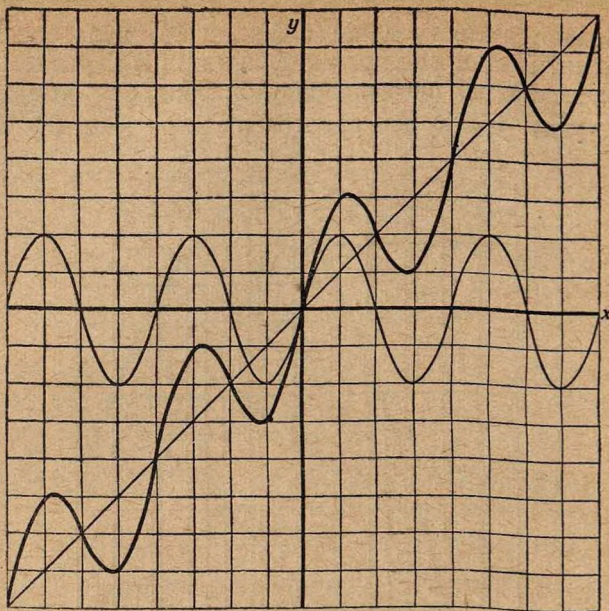
Черт. 54a

” “

”

$$\left| \sin T \right| < \frac{A}{2}, \quad \left| \cos \left( \frac{A}{2} - \frac{M}{2} \right) \right| \leq 1,$$

$$= 2 \sin \left| \frac{h}{2} \right| \cdot \left| \cos \left( x + \frac{A}{2} \right) \right| < 2 \cdot \frac{A}{2} \cdot 1 = A.$$



Черт. 54b

" / ( : ) = : +- sin : ( .  
15). —

$$f(x) = x - |\sin nx|$$

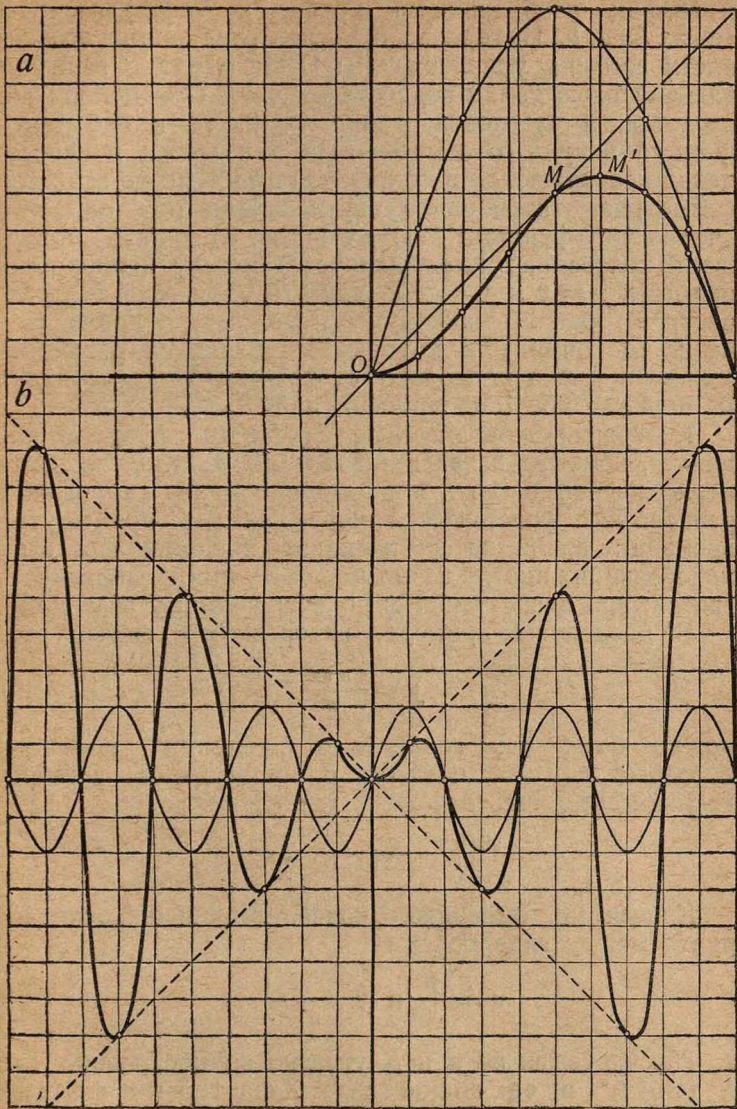
[3] [4];

— sin [5]

X	; sin	: sin
0	0	0,0
$\frac{1}{8}$	"	0,4
$\frac{1}{4}$	7"	0,7
$\frac{3}{8}$	$\frac{3}{8}$ "	0,9
$\frac{1}{2}$	~2~	1,0
...	...	...

" " 11,  
" " 11  
j/ = sinjuc.  
= 0,83  
= 0,83 • sin 0,83 ~  
' ~ 0,83'0,51 -0,42.  
4  
:





Черт. 55

55 , . ( ) -  
 [5]: 1)  $x = k \{k - \}$  ;  
 $: = 0, \sin$  ;  
 ; 2)

„ " "  $f(x) = x \sin$  ); 3) „ -  
 „ ( „ ) -  
 " ?); = - ( „ -

$\sin \frac{1}{55} +$  , -  
 55 ( . ) . [5],

„ ( „ )  
 ): „ ( ) .

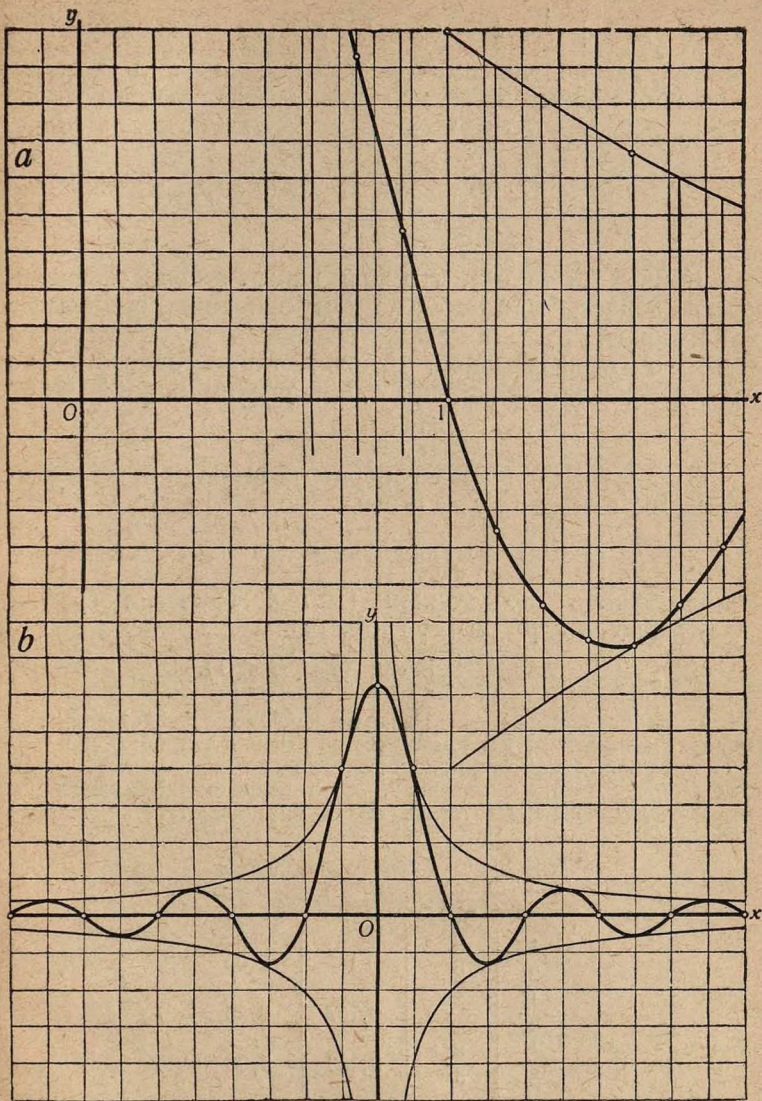
$y = \frac{\sin \pi x}{x} = [6]$   
 $= \sin \frac{1}{x} , c_j$  „

$\frac{\sin TZX}{x} = \sin Ttx \frac{1}{x}$   
 „ [6], „ „

$= -\frac{1}{x} = -\frac{1}{x}$   
 4 „ 56 & „

[6]: 1)  $x = k \{k - \}$  , 0);  
 2) ( )





Черт. 56

$$x = k \cdot \frac{1}{2} \quad (k \text{ — } \dots)$$

3)

$$f(x) = \frac{\sin \Delta x}{x}$$

=0,

$$\lim_{x \rightarrow 0} f(x) = \text{ic}^1.$$

[6]

$$\lim_{x \rightarrow 0} f(x) = 0.$$

20

$$f(x) = \frac{\sin \pi x}{x}$$

$$= \sin \pi x \quad (0 < x < 1).$$

[7]

1

; =0.

X		sin	$\frac{\sin}{X}$
$\frac{1}{2}$	u	1	2,00
$\frac{1}{4}$		0,707	2,83
$\frac{1}{8}$	u	0,383	3,06
...	...	...	...

$$\frac{\sin \pi x}{x}$$

=3,14...



$$= 0,72; \quad = 0,85,$$

$$= 0,72 - (0,85) * \sin$$

:	$\lg A + x \lg B$	
-2	0,0015 = 1,9985	0,996
-1	0,0721 = 1,9279	0,85
0	0,1427 = 1,8573	0,72
1	0,2133 = 1,7867	0,61
2	0,2839 = 1,7161	0,52
3	0,3545 = 1,6455	0,44
4	0,4257 = 1,5749	0,38
5	0,4957 = 1,5043	0,32
6	0,5663 = 1,4337	0,27
...	...	...

1.

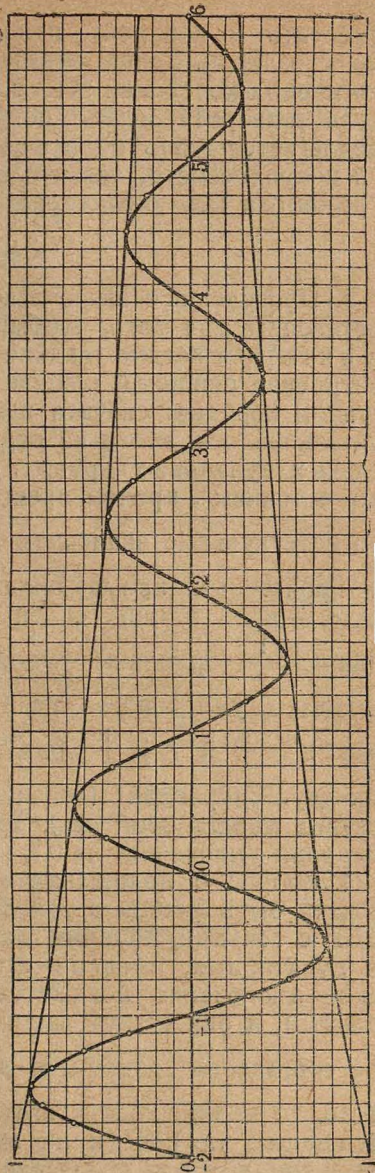
$$0,6 < < 0,8;$$

$$0,7 < < 0,9.$$

2.

$$: 1 = 8$$

$$: 1 = 10$$



.57

( ) . sin , 4 16 , , -

$$-2 < < 6.$$

3.

$$9 = \pm$$

„ 4 ( „ ) .  
 + - ( 1/4 0,7 ) ;

$$\# ( \frac{1}{8} \quad 0,4) \quad n + \frac{3}{g} \quad - \quad 3$$

( 0,9).

$$n \pm \frac{1}{g} \quad n \pm \frac{3}{8}$$

„ ( ;

$$0,7, \quad 0,4 \quad 0,9$$

4.

$$( \quad , \quad = -^{\wedge} \quad )$$

: „1)

( )



? 2)

( )  
? 3)

? 4)

\*1

$$| | = | \sin | < ^$$

5.

" ; ") " —

21.

4

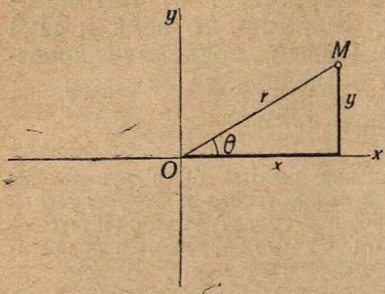
—  
1

$$f(x) = \sin Ttjc;$$

$$f'(x) = AB^x (\lg fi. \sin -) - \cos ),$$

$$- 4-) = - / -\bar{1}_s 4- < 0,$$

$$x = -j-^1 f(x)$$



Черт. 58

$$\begin{cases} x = r \cos \theta, \\ y = r \sin \theta. \end{cases} \quad [1]$$

$$\begin{cases} x = r \cos \theta, \\ y = r \sin \theta. \end{cases} \quad [2]$$

[2].

1)

2)

[2]

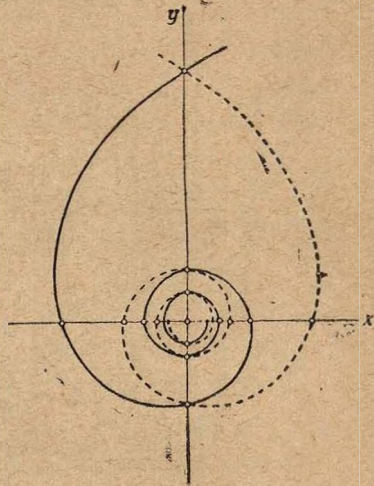


0-}..\*),

23 [1])

$$r = \frac{\pi}{2\theta}$$

2	$\frac{13}{24}$	$\Gamma_4$	2
$\frac{3}{2}^*$	$\frac{15}{34}$	—	$\frac{2}{3}$
2	" 17 "	—	$\frac{2}{5}$
$\frac{5}{2}^{\text{**}}$	$\frac{1 \dots}{5}$	...	$\frac{2}{7}$
.....			



Черт. 59

59.

6=0

6-0

$$\sin 8 = \frac{\sin \theta}{9} \rightarrow \dots$$

0

( )

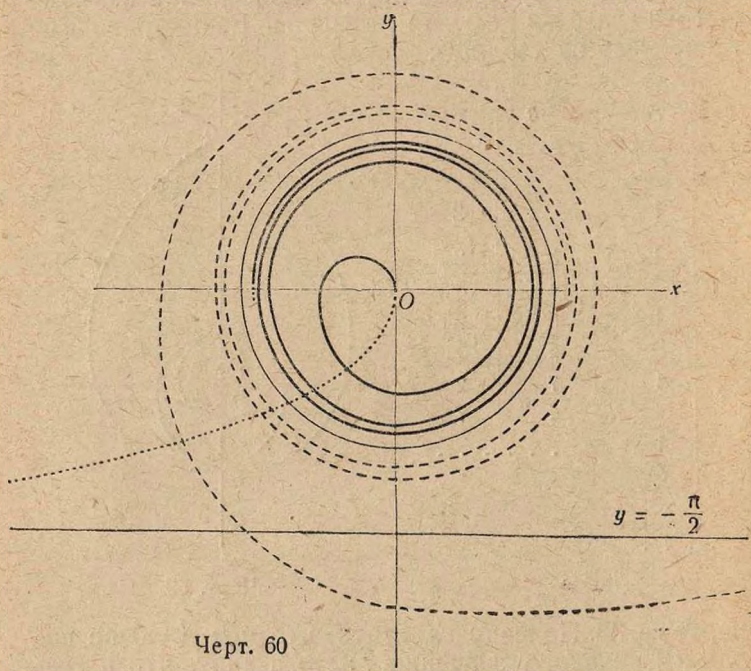
$$= \sim \frac{\pi}{2}$$

9

$$r = 1 - \frac{\pi}{2\theta}$$

60\

6 →



Черт. 60

-1.

0,



$$0 < \theta < \frac{\pi}{2}$$

$$0 \rightarrow 0, \theta > 0,$$

$$= \sin \theta = \sin \theta \frac{\sin \theta}{\sin \theta} = 2 \sin \theta \cos \theta = \sin 2\theta,$$

( )

$$= \pi$$

$$6 \theta = \pi$$

$$9 \theta = 0, \theta < 0,$$

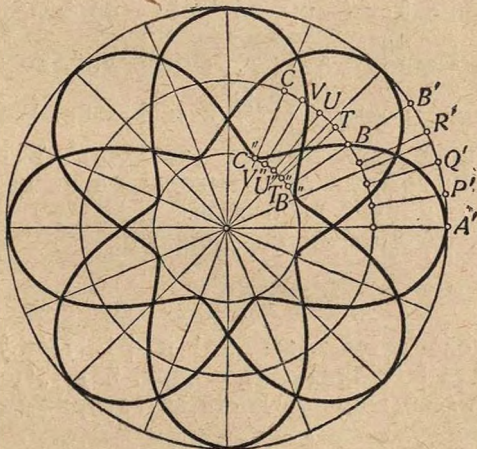
$$= -2\pi,$$

$$= 2 + \cos \theta$$

$$\cos \theta$$

$$\frac{-1}{1} = -1,$$

( . 61)



.61

$$= 2, \theta = 0$$

$$= 3$$

)  
2

$$\frac{8}{3} \theta = \frac{\pi}{2},$$

$$\dots 6 = \dots \left( \frac{1}{6} \right).$$

RR',

QQ',  
RR', QQ'

0; 4; 7; 9 10

$$\left( \dots = 2 \dots 15 \right) = 3;$$

0

$$\frac{3}{4}g - \frac{6}{4}g,$$

$$UU'', VV'' = 2$$

$$\left( \dots = 1 \right) -$$

6=0

$$\frac{3}{4} - \frac{6}{4};$$

$$6 = \frac{3}{4} - \frac{6}{4} \dots$$

$$= \frac{21}{4} \quad 6 =$$

8

3

$$= \cos \frac{6}{g}.$$

$$-1 \quad -j-1. \quad 6=0 \quad (62).$$

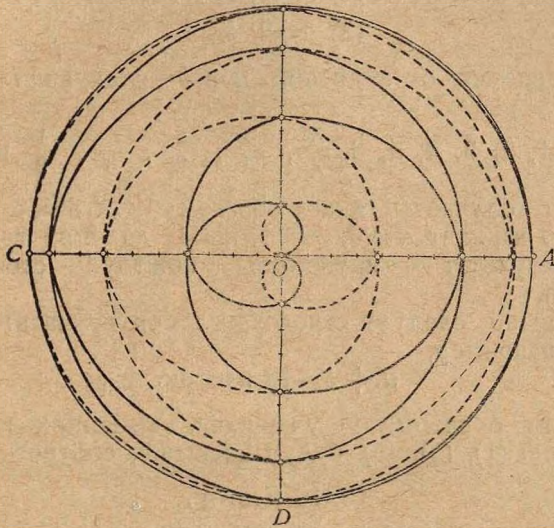
$$0 \dots$$

$$6=0, \quad 2, \quad 4,$$

$$10, 9, 7, 4 \quad 0$$



(, , 8 , , 11) — , , ,  
 OD, , , OD  
 71, 55, 38, 20 0 , 0 = 4 100, 98, 92, 83,  
 0 = 8  
 :



. 62

$$Q = 16$$

21

11

$$= -b \cos$$

$$= -\frac{8}{62} ( = 0, -1, m = \frac{1}{8} ) .$$

1.

- (1) = , =\b,
- (2) =1, =1,
- (3) =2, =1

$$= 1, 2, 4, 2^3 > \frac{4}{2} * \frac{5}{2} \sim \frac{5}{2} \wedge 1 \quad \frac{1}{3} *$$

$$; \quad = 0, b = 1, =1, \quad 12 \times 3 = 36$$

$$- \& = 10$$

(1), (2), (3),

$$1 = 10$$

$$1 = 5$$

$$1 = 3 - \wedge -$$

+ )

36

63 64.

2.



3. ( " 4 " ) " 8  
 9. (2),

$$\begin{cases} x = r \cos \theta, \\ y = r \sin \theta, \end{cases} \quad \begin{cases} dx = \cos \theta dr - r \sin \theta d\theta, \\ dy = \sin \theta dr + r \cos \theta d\theta, \end{cases}$$

$$\begin{cases} dx = \cos \theta dr - r \sin \theta d\theta \\ dy = \sin \theta dr + r \cos \theta d\theta \end{cases}$$


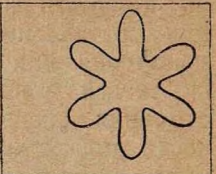
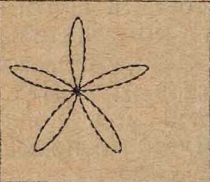
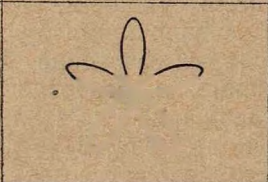

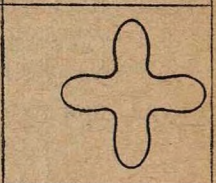
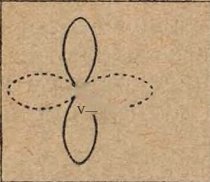
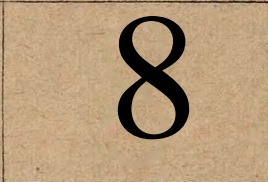
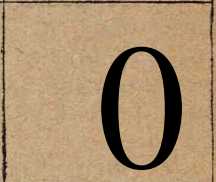
$m = 1$   
 4.  $m = \frac{1}{2}$

5.

" ( " 2-3 )

1)  $r = \cos^3 \theta$ .

$r = \cos^3 \theta - 3 \cos \theta \sin^2 \theta$ ;

II m			
II 5			
II 5 S			
II 5			
II 5			
II 5			
	$1-9 \cdot 0 = \circ$	$1-1 \cdot 1 = \circ$	$1-9 \cdot 1 = \circ$



$m = \frac{1}{3}$			
$m = \frac{1}{2}$			
$m = \frac{2}{3}$			
$m = \frac{2}{2}$			
$m = \frac{4}{3}$			
$m = \frac{3}{2}$			
$a=0, b=1$		$a=1, b=1$	$a=2, b=1$

$$* = (\cos \theta)^8 - 3r \cos \theta - (\sin \theta)^2;$$

$$(\cos \theta - \sin \theta)^2 = 3 - 2;$$

$$(\cos \theta - \sin \theta)^2 = (3 - 2).$$

4.

$$2) = 2 + \cos \theta.$$

$$\cos^5 \theta = \cos^6 \theta - 10 \cos^3 \theta \sin^2 \theta + 5 \cos \theta \sin^4 \theta = \frac{\theta}{2}$$

$$= \cos^6 \theta - 10 \cos^3 \theta \sin^2 \theta + 5 \cos \theta \sin^4 \theta.$$

$$\cos \theta = \frac{1 + \cos 2\theta}{2} = \frac{1 + \cos 2\theta}{2} = \frac{1 + \cos 2\theta}{2};$$

$$\cos^5 \theta - 6 = j'' - \frac{1 + \cos \theta}{2} (4 \cos^2 \theta - 2 \cos \theta - 1).$$

$$- 2 = \frac{1 + \cos \theta}{2} (4 \cos^2 \theta - 2 \cos \theta - 1).$$

$$2 ( - 2)^2 = (1 + \cos \theta) (4 \cos^2 \theta - 2 \cos \theta - 1)^2,$$

$$2 (r - 2)^2 r^5 = (r - r \cos \theta) (4r^2 \cos^2 \theta - 2r^2 \cos \theta - r^2)^2,$$

$$2 (j/x^2 + - 2) * (x^2 + )^2 =$$

$$= (V * "f^2 + x) [Ax^2 - 2xj/x^2 - (-y^2 - (x^2 + )^2)].$$

:

$$(*2+ 5 \{2 ( 2 + 2 ) + 7\}^2 =$$

$$= (8 ( 2 + y^2 f - 5 ( 2 4 - *) ( 2 - 2 ) + 16 4 )^2.$$

14.

6.

[2] [3].



;

?

x<sub>p</sub>

2

$$\begin{aligned}
 &= \\
 \sqrt{x} &= x_1^2 = W = 4, \\
 x_3 &= x_2^2 = (X^1)^2 = 8, \\
 &4 = \dots = \dots = 16, \\
 &\dots \\
 * \ll 4 &= (* \sim 1)^* = 2'' \cdot 1 \\
 &\dots
 \end{aligned}$$

$$x \sim \frac{1}{1+x}$$

$$\begin{aligned}
 1-2 &= \frac{1}{1-} = \frac{1}{1 + \frac{1}{1+x}}, \\
 * &= \frac{1}{1+^2} = \frac{1}{1 + \frac{1}{1 + \frac{1}{1-}}}
 \end{aligned}$$

1 " " "

= 2'' " "

( )

$$| = 2 ,$$

$$v > 2^l - 1 = 2^{l-1} - 1$$

$$,, = 2^l \sim | = 2^{2^l} ( \dots )$$

$X_i = \lg$

$** = \lg JCj = \lg \lg X,$

$$X_i = \lg^{-1} = \lg \lg \dots \lg ( \dots \lg )$$

$f ( )$

$/ ( )$

1).

2, 3

$$X_i = f(x) = ( ),$$

$$X_2 = / ( ) = / ( / ( * ) ) = ( ),$$

$$X_3 = / ( X_2 ) = / ( / ( / ( ) ) ) = / ( ( ) ),$$

$$X_i = f / ( - ) = / ( ( \dots / ( ) ) \dots ) = ( ).$$

1.

$$x_1 = / ( * ) = \lg$$



$f(x)$

«-

$f(x)$

$x_v$

2, 3, ...

$f(x)$  ( . 65).

$f(x) =$

$= ($

11

) —

$X_j$

0:

Q

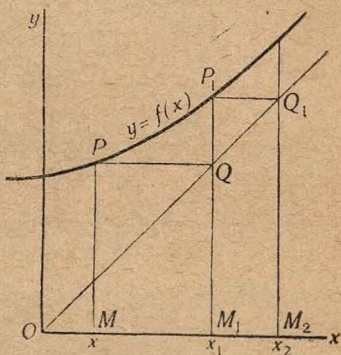
Q

Q

Q

0).

0



Черт. 65

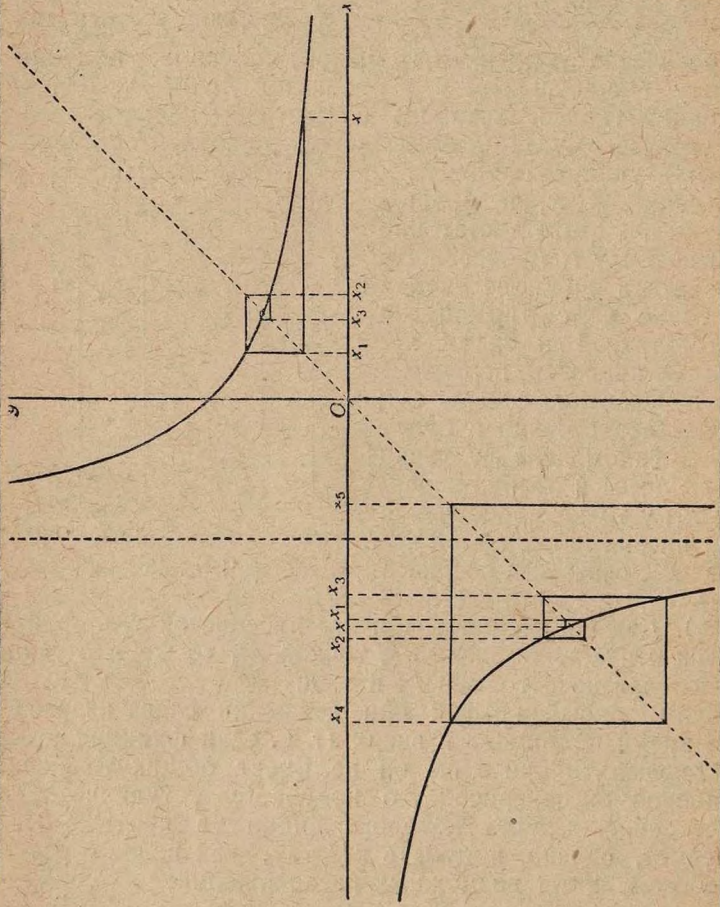
65.

$$f(x) = \frac{1}{1+x}$$

66

—1)

iter —





"

$$= \frac{1}{1+x}$$

=

$$\sqrt{1-x} = 0.$$

( )

$$= \frac{-1 + \sqrt{5}}{2}$$

$$\frac{1^{\sqrt{5}} - 1}{2}$$

( > -1 ),

X, \*1 - \*2..... , ... ,

:

$$x_1 = \frac{1}{1+}$$

$$x_2 = \frac{1}{1+}$$

...

$$x_n = \frac{1}{1+}$$

~\*

$$x_n \approx 0.62$$

[1]

$$: < -1,$$

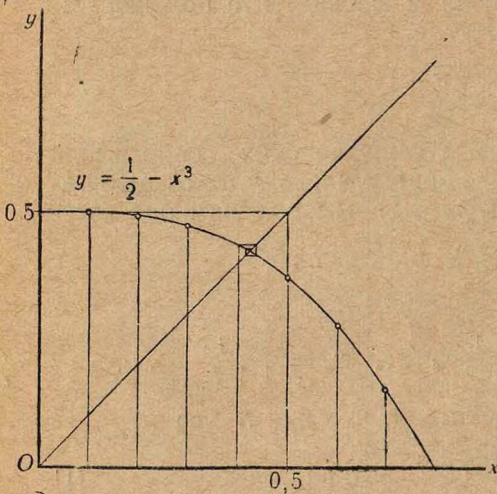
$$\wedge > -1;$$

[1]

,  $\pm \sqrt{2} - \sqrt{3} \dots$ ) \*\*•

( )

$$x^2 - j - x - 1 = ,$$



Черт. 67

Намечаю график функции  $f(x) = \frac{1}{2} - x^3$  (черт. 67), мы

$x, x_1, x_2, \dots, x_n, \dots$

Пусть требуется найти положительный корень уравнения

$$x^3 + x - \frac{1}{2} = 0.$$

Придадим ему вид

$$x = \frac{1}{2} - x^3,$$

мы видим, что искомый корень есть пересечение кривой

$$y = \frac{1}{2} - x^3$$

с основной биссектрисой  $y = x$ .

<к >



(, " )

0,4,

= 0,4

= 0,5,  
0,4 < 0,5.

$$X_n + i \frac{1}{2} \quad (n = 1, 2, 3, \dots)$$

( ):

	1	2	3	4	5	6	7	8	...
	0,400	0,436	0,417	0,427	0,421	0,425	0,423	0,424	...
$x_n^3$	0,064	, 8	0,073	0,079	0,075	0,077	0,076	0,076	...
$\frac{1}{2} - x_n^3$	0,436	0,417	0,427	0,421	0,425	0,423	0,424	0,424	...

0,424.

— sin

= sinx.

$\sqrt{> 1} ( \quad \sqrt{< 1} )$ .

$$x^a + b \sin x \quad (a = \frac{n}{m}, b = \dots, |b| < 1)$$

$b (|\alpha| < 1)$

$f(x) = a - b \sin x$

$x, x_1, x_2, \dots$

$x = a - b \sin^*$

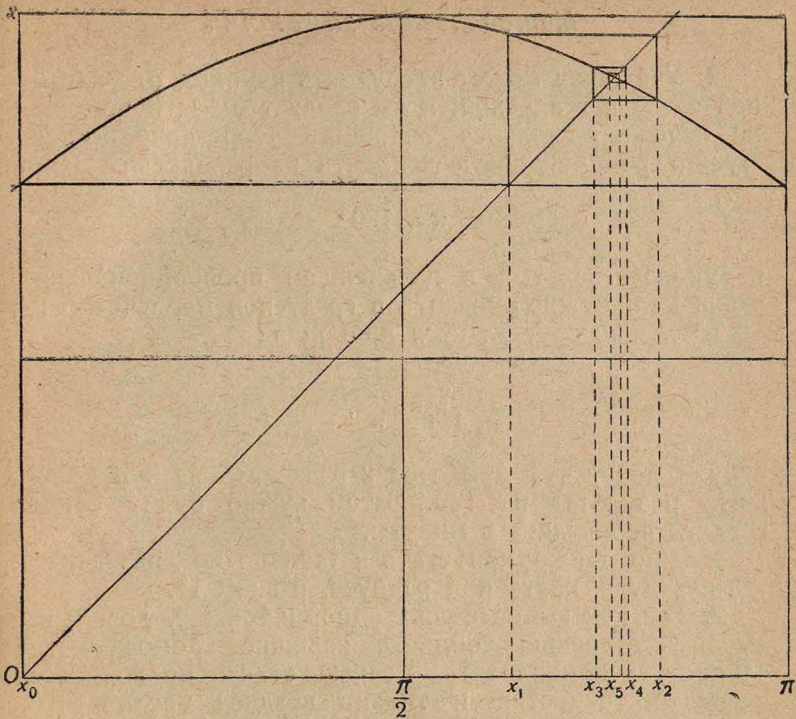
$= 2; \sin^* = 0,7$

(.68)

$\sin^* = 2,447\dots$
-----------------------

	1	2	3	4	5	6	7
$x_n$	2	2,634	2,340	2,503	2,421	2,459	2,440
	115°	151°	134°	143°	139°	141°	140°
sin	0,906	0,485	0,719	0,602	0,656	0,629	0,643
0,7 sin	0,634	0,340	0,503	0,421	0,459	0,440	0,450





Черт. 68

8	9	10	11	12
2,450	2,44651	2,44824	2,44745	2,44792
140°22'	140°11'	140°ie'	140°13'	
0,63787	0,64034	0,63922	0,63989	
0,44651	0,44824	0,44745	0,44792	

1.

$$-180^\circ$$

2,

$$\frac{2}{180}$$

$$180. \quad 2$$

” 2.

1“.

3.

$b$

$$\backslash \quad \backslash < \quad \backslash .$$

4.

$\backslash \quad \backslash .$



$$: 1 = 10$$

$$68) \quad , \quad : = 32$$

4

5,

1)

$$1 \quad 2, \dots, \dots = / ( )$$

- 1).
- 2)

3)

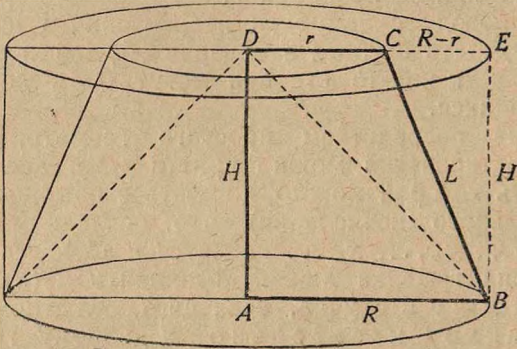
2.

1

2

ABCD ( . 69)

DC  
AD,



Черт. 69

DC — , AD —  
AB — R, DC — , AD == , BC = L.

$$BE = AD = ,$$

$$= DE - DC = - DC = R - ,$$

$$L = \sqrt{(\quad)^2 + \quad}$$

5

$$S = n \{ R + \quad \} L,$$



$$S = 7r(\#-f r)/((?-r)2-f\#^2). \quad [1]$$

R

R-

$$\leq r \leq R$$

ABD;  $r=R$ ,

ABED.

69,  
S

0 R.

$$= 0,$$

$r - R$

R:

69,

R:

$$= 0$$

$$\overline{nR/R'' - j-/r^2};$$

2V.RH.

[1],

$$Ri/Rt + H^n RH.$$

[2]

( )

$$\frac{R}{W} \gg H$$

$$\frac{R}{V} \sim 0,57 \dots R$$

$$S = \dots \quad [4]$$

$$f(r) = ( + ) Y i R - r f + H^* \quad [51]$$

= 0,

$$f(0) = 7 [?] \sqrt{2 + 2};$$

$r = R,$

$$f(R) = 2nRH.$$

$$\langle \rangle \quad [2']$$

$$\begin{matrix} f(0) > f(?), \\ f(?) < f(?), \end{matrix} \quad ? \quad 0$$

$$f(0) = f(?)^1,$$

$$(0 < \langle ? \rangle) \quad f(?)$$

$$\frac{R}{3}$$



R

5  
R,

0,3#

R.

: 0; 0,1 R-, 0,2/?;  
5

0' R;

5  
S

$$R = 3, \quad -2.$$

$$5 = f(\ ) = (3 + ) (3 - )^3 + 4 = (3 - j/13 - 6r + r^2) \dots 218.$$

S

0 3

$$= 0 \quad = 0,9; \\ = 0,9 \quad = 2,1$$

$$= 2,1 \quad = 3$$

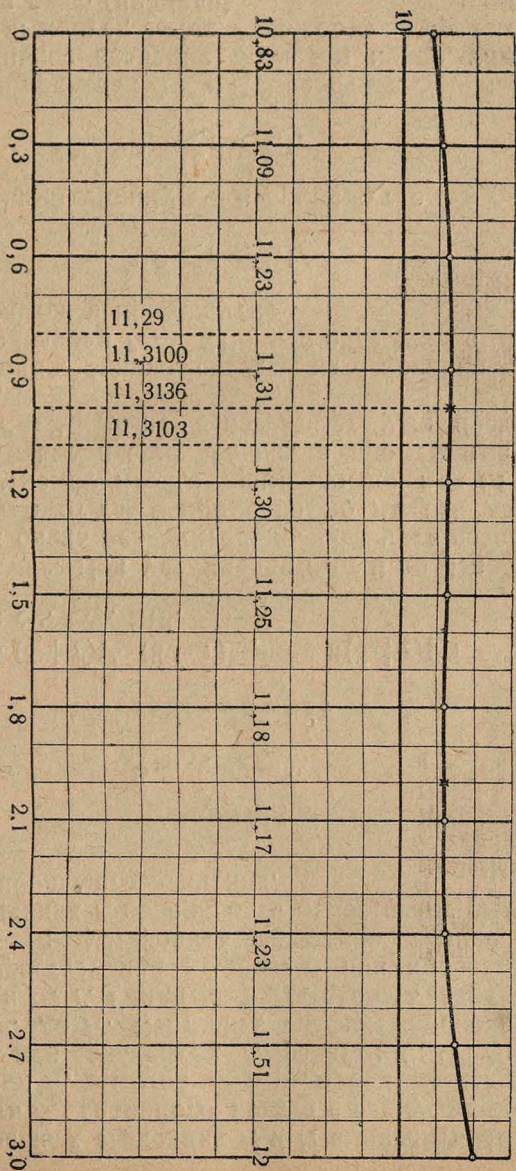
( . 219),

$$0,9 < < 1,1,$$

$$1,9 < < 2,1.$$

$$0 < < 13 \quad S$$

$$= 0 ( \quad ); \\ = 3 ( \quad ).$$



Чепр. 70



	0	0,3	0,6	0,9	1,2
$3 +$		3,3	3,6	3,9	4,2
$13 - 6 - + 2$	13	11,29	9,76	8,41	7,24
$\sqrt{13 - 6 - 4 - 2}$	3,61	3,36	3,12	2,90	2,69
$(3 + ) / 13 - 6 - + / - 2$	10,83	11,09	11,23	11,31	11,30

	1,5	1,8	2,1	2,4	2,7	3,0
$3 +$	4,5	4,8	5,1	5,4	5,7	6,0
$13 - 6 + 2$	6,25	5,44	4,81	4,32	4,09	4,00
$\sqrt{13 - - t - 2}$	2,50	2,33	2,19	2,08	2,02	2,00
$(3 + ) / 13 - 6 + 2$	11,25	11,18	11,17	11,23	11,51	12,00

	0,8	1	1,1	1	1,1	0,9
$3 +$	3,8	4	4,1	4	4,1	3,9
$13 - 6 + 2$	8,84	8	7,61	8	7,61	8,41
$\sqrt{13 - 6 + - 2}$	2,97	2,83	2,76	2,8284	2,7586	2,9000
$(3 + / -) / 13 - 6 + 2$	11,29	11,32	32	11,3136	11,3103	11,3100

( — ) .

1.

2.

72,

R

$$; = \overline{R}$$

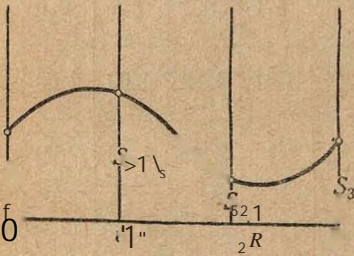
$$* = 4 < \sim 0.71 \frac{1}{-}$$

S,

0

R

;



.71

$$= 0, \quad 2, \quad R,$$

$$S_2 < S_3 \quad ( \quad .71 )$$

$$: S_0, S_1, S_2, S_3, S_4$$

R

72

: OP,

).

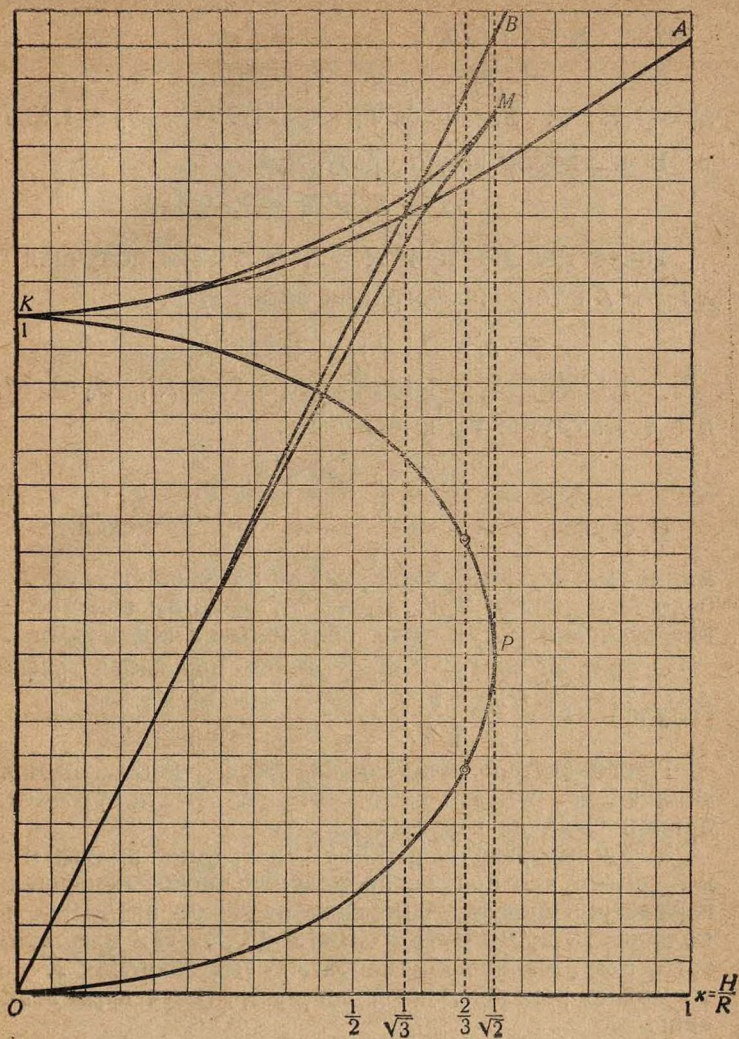
$$\frac{r \setminus \setminus 2 S_0}{R' R' k R 2' k R^*}, \quad \frac{S_j}{>} \quad \frac{S_2 S_3}{\pi R^2}$$

$$R - 3, \quad - 2, \quad -$$

$$= - \frac{2}{-}$$

$$72 ( \quad )$$





Черт. 72

$$\frac{r_1}{R} \sim 0,33; \quad \frac{r_2}{R} \sim 0,67;$$

$$\frac{S_0}{\pi R^2} \sim 1,19; \quad \frac{S_1}{\pi R^2} \sim 1,26; \quad \frac{S_2}{\pi R^2} \sim 1,24; \quad \frac{S_3}{\pi R^2} \sim 1,33,$$

$$j = 0,33/?; \quad 2 = 0,67/?;$$

$$S_0 \sim 1,19n/?^2; \quad S_1 = 1,26*/?^2; \quad S_2 = 1,24^{TM}/?*; \quad S_3 = 1,33*/?^2$$

$$S_0 < S_3 < S_1 < S_2$$

$$/? = 2, \quad = 1$$

$$:= -\frac{1}{g},$$

$$r_j = 0,14/?; \quad , -0,86/?;$$

$$S_0 = 1,12ic/?^2; \quad S_j \sim 1,14 :/?^2; \quad S_s \sim 0,96 /?^2; \quad S_3 = */?^2,$$

$$S_2 < S_3 < S_0 < S_1$$

$$; \quad = - \frac{1}{V^*} \sim -0,71$$

0 /?

S

S<sub>0</sub>

S<sub>3</sub>

11

$$\left( x = \frac{H}{R} = x \frac{1}{\sqrt{2}} \right) =$$

72.

3.

72,

$$0,5 < * < 0,7.$$

/?

	1	3	4	5	5	7	6	7	7	7	8	9	9	8	9
R	2	5	7	8	9	10	11	11	12	13	13	13	14	15	16



$$4. \quad = -2, R = 3$$

$$1 = 1, \quad 2 = 2.$$

$$(4)' = (3+)'((3-)'1+41 = \\ = 128 - (-1)^2 (11 - 2 - 2). \quad [6]$$

$$, 0 < < 2,$$

$$2 + 2 < 2-2 + 2^2 = 8,$$

$$11 - 2 - r^2 > 11 - 8 > 0;$$

$$(-1)^2 > ,$$

$$< < 2,$$

$$(-1) (11 - 2 - 2) >$$

$$\left(\frac{S}{\pi}\right)^2 < 128.$$

$$= 1$$

$$(4 = \wedge$$

$$\left(\frac{S}{\pi}\right)^2$$

$$= 1;$$

S.

$$- - 2$$

$$(4)^2 = (3 + ) * \{(3- )^2 + 4\} = \\ = 125 + (r-2)^2(V^2+4r-2), \quad [7]$$

$$1 < > < 3$$

$$2 + 4 - 2 > 1^2 + 4 - 1 - 2 = 3 > 0.$$

5.

23

24.

1)  
 $\left( \frac{\quad}{\quad} \right);$   
 2)  
 $\frac{\quad}{\quad}$

„ 0 . . . 1 .

Q, Q ; PQ  
 Q

---

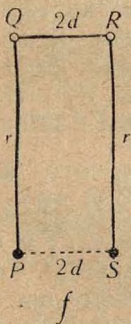
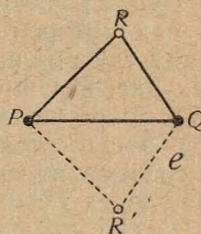
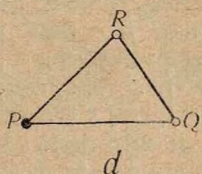
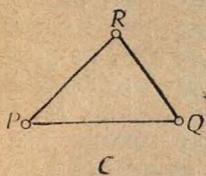
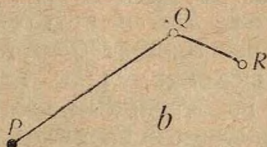
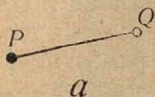
1 .



$PQ, QR$  ( $PQ \wedge > QR$ ).

Q

R,



.73

$PQ - QR$   $PQ \{- QR$

$PQ, QR$   $RP,$

Q R,

( .73 ),

( . 73d),

( . Tie:  
PQR, , ,  
PQR'). , Q, R S,

5 73/, PQ=r, RS=r, PS=2d QR=2d,

( ) 73g.

, Q, R 6',  
S,  
PQ, QR RS ( , ,  
PS).

, PQ = RS ( ).

( . 74)  
0^ = /?, A1A2 = -2d A2C2 = -R,

2  
(-/, 0) (+/, 0).

2 R 2 2l. 2'

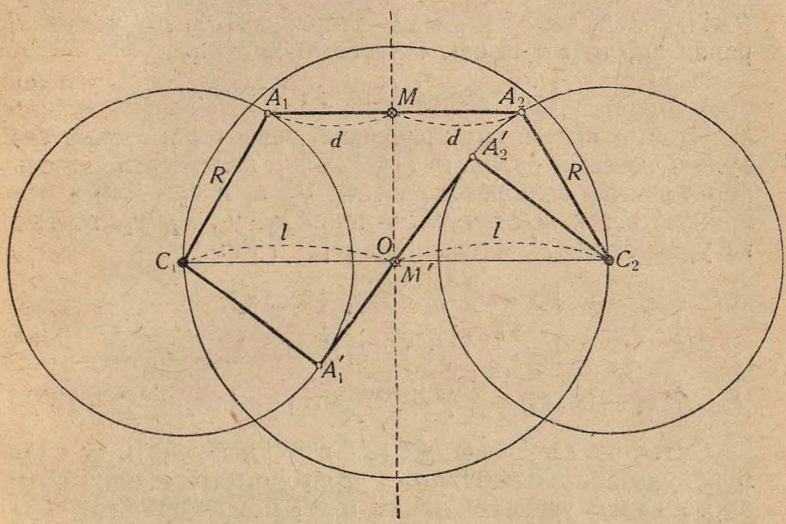
2 (/ - /?) ( l^R) 0 ( (-[-/?),  
A1A2 = 2d IsSzR),

2 (/ - ) < 2d < 2 (/ + /?),  
d, I, R

/ - ~~R~~ d ~~l~~ - R.



( " " " " ):



Черт. 74

2:

$$2(l^2 - R^2)$$

$$2(0^2 - R^2); \quad , \quad 2 < 2 \quad )$$

( . 74):

$$\begin{cases} x_1 = R \cos \alpha - l, & \begin{cases} x_2 = R \cos \alpha + l, \\ y_2 = R \sin \alpha. \end{cases} \end{cases} \quad [1]$$

( , ) ,





$$\begin{aligned}
 & [6'] \quad [4], \quad : \\
 & \{R^8 + l^2 - d^2 - (x^2 + y^2)\}^2 (x^2 + y^2) = \\
 & = 4R^4 \sin^2 \alpha \cos^2 \alpha; \\
 & \qquad \qquad \qquad [2''] \qquad \qquad [5]
 \end{aligned}$$

$$\begin{aligned}
 & 4 / (R^2 - x^2 - y^2) = \\
 & = 4R^4 \sin^2 \alpha \cos^2 \alpha.
 \end{aligned}$$

$$\{R^2 - l^2 - d^2 - (x^2 + y^2)\}^2 (x^2 + y^2) = 4R^4 y^2 (R^2 - x^2 - y^2). \quad [7]$$

$\dot{R}, I, d, \dots$

$$R^2 - l^2 - d^2 - (x^2 + y^2) > 0, \quad \dots \quad 0 < R^2,$$

$$l^2 - d^2 = R^2.$$

$$= 0 \qquad \qquad = 0,$$

$$\begin{cases}
 \dot{R} = \cos \alpha, \\
 \dot{l} = \sin \alpha.
 \end{cases}$$

[7]

$$(R^2 + l^2 - d^2 - (x^2 + y^2))^2 = 4R^4 \sin^2 \alpha \cos^2 \alpha \cdot (R^2 - x^2 - y^2);$$

$\sin \alpha,$

$$\sin \alpha = \frac{(R^2 - x^2 - y^2) + (l^2 - d^2)}{2R^2}.$$

[8]



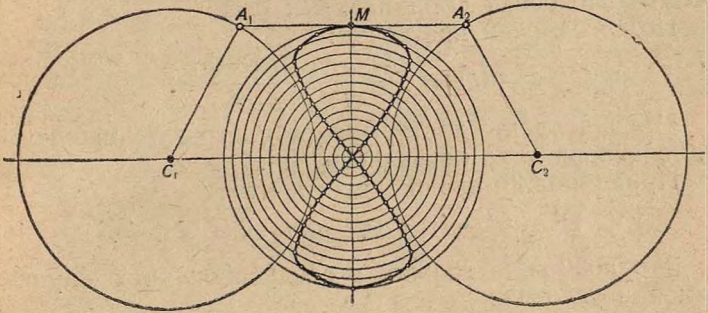


[8],

$R, d /$

$R = 8, d = 6, / = 10; \pm \sin O$

$$= \frac{128 - 2}{20/64 - 2'}$$



.76

$8^2 - 1^3 < 2 < 8^2 - 4^2,$

$< 1/48 \sim 6,93.$

	0,0	0,5	1,0	1,5	...	6,0	6,5	6,75	<i>I</i> is? V
$1/2$	0,00	0,25	1,00	2,25	...	36,00	42,25	45,56	48
$64 - 2$	64,00	63,75	63,00	61,75	...	28,00	21,75	18,44	16
$V \sqrt{64 - 2}$	8,00	7,98	7,94	7,86	...	5,29	4,66	4,29	4
$20 / \sqrt{4 - 2}$	160	160	159	157	...	105	93	86	80
$128 - 2$	128	128	127	126	...	92	86	82	80
$\sin 0$	0,80	0,80	0,80	0,80	...	0,87	0,92	0,96	1
$V^{\wedge} \text{rsin} fl$	0,00	0,40	1,0,80	1,20	...	5,22	5,68	6,47	6,93

1.

$$[8],$$

$$(-) \quad 9 \quad -2 \quad \pi \leq \theta \leq +\frac{\pi}{2}.$$

$$[9] = \frac{(Rt-r^*) + (\&-<\#)}{/ \cdot * \_ *}.$$

[9].

$$(d \quad R^2 \_ \_ )2 \quad 0, \quad RK \setminus d \_ l. \quad [HI$$

$$? < / \quad R \wedge l \_ d,$$

$$d > I \quad R \wedge C d \_ l.$$

[9] [11]

[“,

).

$$R^2 \_ (< * \_ /) \gg > ,$$

$$tf^2 \_ (rf + /)^2 < ,$$

$$\sqrt{d \_ l} < R < C d + l.$$

[12]

[9],

$$0 < < , \quad \_$$

[13]

$$7 = / \quad \_ \_ \_ (< * \_ /)^* < / ?;$$

[14]

$$\_ \_ \_ r \sim R \quad \_ \_ d \_ l, \quad \_ < R \quad d \wedge l \_$$



$$R^* - (d+l)^2 > 0, \quad R^{\wedge} > d - l,$$

[9],

$$\dots < \dots \quad [15]$$

$$6 \quad \dots = s/R^* - (d+l)^* > 0. \quad [16]$$

$$\dots < (\dots),$$

$$\dots \text{tf}(\dots), \quad d < 7, \quad d = l \quad \begin{matrix} -f-1,0 \\ d^{\wedge} > l. \end{matrix} \quad [13],$$

$$\textcircled{R}(0) = \frac{R^{4.4-2} \dots}{2RI},$$

$$\text{tp}(0) \wedge 0 \dots \\ ] \quad d^2 \dots l^{\wedge} R \dots \\ (\dots)$$

[15],

$$\dots = 1.$$

$$\dots < (\dots)$$

$$?'(r) = \text{if } (R^a - r^2)^{\frac{3}{2}} - r \{r^2 - (/?^2 + \wedge - /^2)\}. \quad [17]$$

$$2 \dots < 0,$$

$$d^2 + R^2 \wedge l \quad [18]$$

'6'

$$[8], \quad \sin 0$$

$$\sqrt{R^2 - 2}$$

" ( . 243).

$\langle ' ( ) \rangle > 0$ ,

$\langle ' ( ) \rangle$

[18],

$d \setminus R \ll$

[12],

$$0 < \langle \rangle$$

$$0$$

$$\frac{R^2 + l^2 - d^2}{2Rl}$$

( )

1,

1 ( ? < / )

$$?^2 + 2 > l^2$$

[19]

$$\sqrt{R^2 + d^2}$$

[20]

' ( )

$$\langle ' = \frac{1}{g} (R^* - r^2) \sim Y_r (r - p) [r - f p]$$

[21]

$$\langle ' = \frac{1}{g} (R^* - r^2) \sim Y_r (r - p) [r - f p]$$

> 0

[20]

[14]

$$d = l \quad d^{\wedge} > l$$

( )

$d, l, U$



I.  $d < l$ .

( )  $d + R \leq l$ ;

$< + >^* \cdot r f^* + \#^2 < l^2$ ;

( )  $* - | / * \sqrt{2}, R < d + l$ ;

( )  $R = d + l$ ;

( $\ll$ )  $R > d + l$ .

II.  $d = l$ .

(?)  $R < d + l$ ;

(n)  $/? = < / + /$ ;

(0)  $\&rf + /$ .

III.  $d > l$ .

(x)  $R + l \leq d$ ;

(A)  $/? - / > <^*, d_2 > / a - p / ? 2$ .

00  $rf^3 = l^2 + tf^3$ ;

(v)  $n^2 < \sqrt{2}^2 + \sqrt{2}^2 + R < d + l$ ;

(0)  $R = d + l$

(it)  $R > d + l$ .

( . 77).

j I.  $d < l$ .

( )

( )

tp ( )

$0 < < -$

(0) 1.

0

0

0

$$\sin \theta = \frac{R^2 + l^2 - d^2}{2Rl}$$

$$\operatorname{tg} \theta_0 = \frac{R^2 - l^2 - d^2}{l[(R + ip - \sqrt{2})l - (R - l)^2]} \quad \left( 0 < \theta_0 < \frac{\pi}{2} \right),$$

$$\frac{\pi}{2}$$

( \* )

$$d^2 - R^2 = l^2$$

$$\operatorname{tg}^0 0 = \frac{R}{> \_ *}$$

( ). ( )  $0 < <$   
 $< (0)$   
 $\textcircled{R} ( )$   
 1.  $0 \_$

$\delta_0 \ 0!$

$$\sin^{\circ} = \frac{\sqrt{l^2 - d^2}}{l}, \quad \operatorname{tg} \theta_1 = \frac{\sqrt{l^2 - d^2}}{d},$$

$\frac{\pi}{2}$

(5).

$\delta_0 \ \frac{\pi}{2}:$   
 ( )  $< ( )$   
 1 ( ),  $r \leq r \leq \rho$   
 1.  $< <$

$$\boxed{H.d = I.}$$

[7]

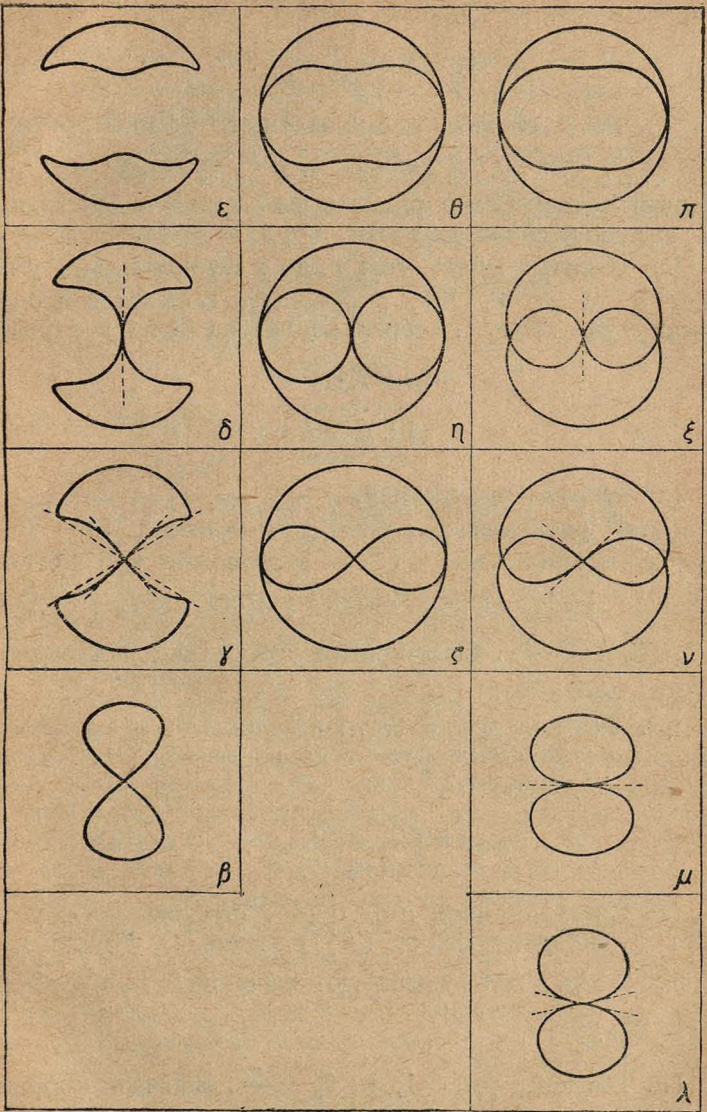
$$(2 + 2 - 2) \{ (2 + 2)^2 - 2 \cdot 2 - (2 - 4/2) \} = 0, [7]$$

$$\begin{aligned} & \text{---} R \text{''} 1 \\ & (2 + 2)^2 = 2 \cdot 2 + (2 - 4/2)^2 \end{aligned}$$

(£).  $0 \ r \ \text{---} R \ < ( )$   
 (0),

1,





$\pm 0$ ,

$< 0 < -5 \frac{1}{2}$

$$\frac{R}{j\omega A l^2 - R^*}$$

(.)

$< f(0)$

1,  $\phi_0$

$\sim \frac{\pi}{2}$

(G)

1 0

$\pm R x$

$< ()$

$$\overline{R^2 - 4l^2}$$

III.  $d > L$

(/)

(X)

0  
-1)

$< ()$   
 $< (0)$

(-1)

0

$8_0 \wedge \dots \wedge <$

$< 8_0 < ) - \frac{\pi}{y}$

(.)

(.)

$(0) = 0$

$6_0 = 10$

$$= RV \frac{2l}{v l + \dots}$$

(v)

0  
( $< )$

$< ()$

$\wedge -1$

0

$6_0 (\wedge < 0 < \frac{\pi}{2})$

- 2

(s)

$\odot(0) = 1$

$0 = \wedge$

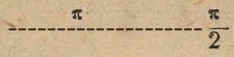
$$= 2 l(R - l)$$



(.)

1 — 1, 9

( )



2.

78.

dO

$$d - R = U d + l = R \quad l + R = d,$$

$$d^2 + R^* = P$$

$$l^2 + R^2 = d^2$$

X, v

1.

8, £, 6, . ?

I

d, R

I

l= 10.

l=10

d=6

R=8,

d=6, R=8,

[3\*

(5.

77 ),

1

"

"

d=3, R=4, l=2.

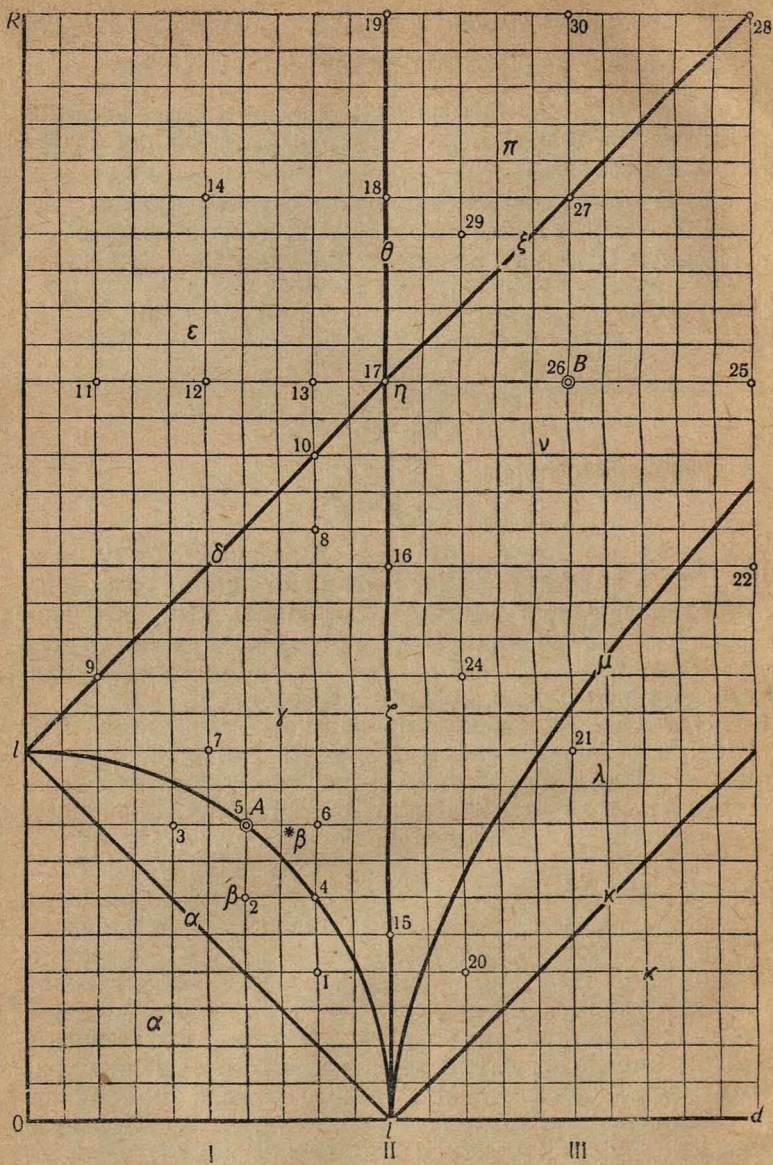
l=2

(3,4)

5,

v:

v.



Черт. 78



3.

$d, R, I,$

$d, R, I$

1\*

$d, R, I^1:$

5

£

ζ

\*1

- |            |          |           |            |           |           |
|------------|----------|-----------|------------|-----------|-----------|
| 1) 4,2,5   | 6) 4,4,5 | 9) 1,6,5  | 11) 1,10,5 | 15) 2,1,2 | 17) 1,2,1 |
| 2) 3,3,5   | 7) 1,2,2 | 10) 4,9,5 | 12) 1,4,2  | 16) 2,3,2 |           |
| 3) 2,4,5   | 8) 4,8,5 |           | 13) 4,10,5 |           |           |
| 4) * 4,3,5 |          |           | 14) 1,5,2  |           |           |
| ) * 3,4,5  |          |           |            |           |           |

0

V-

v

5

it

- |           |           |             |           |           |            |
|-----------|-----------|-------------|-----------|-----------|------------|
| 18) 2,5,2 | 20) 6,2,5 | 23) 13,12,5 | 24) 6,6,5 | 27) 3,5,2 | 29) 6,12,5 |
| 19) 1,3,1 | 21) 3,2,2 |             | 25) 2,2,1 | 28) 2,3,1 | 30) 3,6,2  |
|           | 22) 4,3,2 |             | 26) 3,4,2 |           | 31) 4,7,2  |

4.

i

„

1<sup>u</sup> (

- 1) —
- 2) —

) ( , 6 ) , :

( , (3, , 3 ) .

$d < l.$

5.

( )

( .

R, —  
" 78;

I.

fs

23 31.

G

$$y = r \sin \theta \quad (231)$$

6.

''

''

( 74)

$2d$

$L_x$

(

$R$ ),

$z_2$

$Z_2$  (

$z_2$

$R$ );

;

$z_2$

$L_v$





$$f(x) = \frac{1^2 4 +}{+}$$

( )

2.

$$f(x) = Ax + \frac{B}{x} \quad (A > 0, B > 0)$$

от  $\sqrt{\frac{B}{A}}$  до  $\infty$ ,

$$+4 = \frac{2}{\sqrt{\frac{B}{A}}} + \left( \sqrt{\frac{B}{A}} \right)^2$$

- $( ) v ( )$  ,  
 $( ) v ( )$  -  
 1.  $( ) ( ) 4 - ( ) - ( )$  -  
 2 2'.  $( ) ( )$  ,  
 3.  $( ) v ( )$   
 $( ) - v ( )$  -  
 4.  $( ) v ( )$   
 $u(x) - v(x)$  -  
 4'.  $( ) v ( )$  -  
 $(x) - v ( )$  -  
 5 5'.  $( ) - ( ) ; ( ) -$   
 $2( )$  , ifl  $( )$  ,  
 6.  $( ) - ( )$   
 7.  $( )$   
 $( ) \frac{1}{( )}$  -  
 $( ) \frac{1}{u(x)}$  -  
 $( )$  ,  
 $( ) \frac{1}{( )}$  ,  
 8.  $( ) - ( )$  ,  $( )$  -  
 $( )$  .

« 0.

$$/ = \frac{I^2 + \dots}{2 - \sqrt{-bx-4}}$$

[1]



$$\frac{1(am - 1) + (-cl)I1}{2 + \wedge + \wedge} \sim S + a^1 f(x) > [2]$$

$$1 \dot{W} = \frac{mjX-1-}{x^2 + \quad + q}$$

$$= am - \quad , \quad \quad -cl, \quad = \sim \frac{b}{a} q = \frac{1}{a} \quad [3]$$

$$[1] \quad [2] \quad f(\quad),$$

$$j(\quad).$$

$$nil - \quad - 1 \quad 0. \quad [ ]$$

$$h(\bullet*) = \frac{m_1}{f-\bullet*} \quad [4]$$

$$f_2(x) = \frac{2 + \quad -f-q}{x - \alpha} = \frac{(\quad)}{x - \alpha} \quad [5]$$

$$\langle * \rangle (\quad) = X^3 + px - q, S = \frac{n_1}{m_1} \quad \gg (\langle \rangle) = \quad + \quad + ? \quad 0^1.$$

$$[4] \quad , \quad , \quad -$$

$$/_2(\quad), \quad j(\quad) \quad , \quad , \quad /_2(\quad),$$

$$(\quad) \quad , \quad 2 \quad 7).$$

$$\langle (\quad) \quad /_2(\quad).$$

$$\langle \langle 0 < 0. \quad [ , ]$$

$$) = \quad - \quad > = \sqrt{\quad} < (\wedge) > 0,$$

$$) = (\quad + 2) + (\quad) - \wedge - \dots \quad [6]$$

$$- \quad (\quad . 1), \quad , \quad - \frac{\beta^2}{x - \alpha \wedge \wedge}$$

$$(\quad . 2 \quad 7); \quad - \frac{\beta^2}{x - \alpha}$$

$$1 \quad f(x) = 0 \quad , \quad f(x) \quad , \quad -$$

( . 6);

( . 1 3)

$$h(x) = (x + 2) - f(x) \frac{1}{x - a}$$

( ) > 0.

[I. ]

$$\langle \cdot \rangle = 1, \langle \cdot \rangle > 0,$$

$f(x)$

$$(x) = (x + 2 + \cdot 2) - \left( \sqrt{x - a} - \sqrt{\frac{\beta}{x - a}} \right)^2 \quad (JC) \quad [7]$$

$$(\cdot) \sim (4 \cdot 2 - \dots) \left( \sqrt{x - a} - \sqrt{\frac{\beta}{x - a}} \right)^2 \quad (< \wedge). \quad [8]$$

$$a < \wedge j t < \wedge \infty.$$

— a —

( . 1),

— a

( . 8);

$$\frac{\beta}{x - a}$$

( . 7 2),

$$-\frac{\beta}{\sqrt{x - a}}$$

( . 6),

$$\frac{\beta}{x - a}$$

( . 3).

$$\left( \sqrt{x - a} - \sqrt{\frac{\beta}{x - a}} \right)^2$$

$$\sqrt{x - a} - \sqrt{\frac{\beta}{x - a}} > 0,$$

$$\sqrt{x - a} -$$

$$\dots > a - j -$$

$$-\frac{\beta}{x - a} < 0, \dots$$

< + ( . 5).

$$\left( \sqrt{x - a} - \sqrt{\frac{\beta}{x - a}} \right)^2$$

< < a +

+ { ! < \* <

$f_2(x)$  ( . 1).

[7],

[8],

f(x)

$$f(x)$$

f(x),

= )

$$mi = am - bl$$

: < a —

$$x > \alpha + \beta$$

f(x)



$$a - \beta < x < a + \beta \quad (1)$$

$$-f - + .$$

$$f(x) = \begin{vmatrix} -cl & -am \\ cm - bn & an - cl \end{vmatrix}; (am - )^2;$$

$$( - am )^3 - 2( - cl ) + (cm - bn) =$$

$$\begin{vmatrix} 1 & -2 \\ I & \end{vmatrix} = 0; \quad (2)$$

$$\frac{R}{\begin{vmatrix} a & b \\ I & \end{vmatrix}^2}, \quad R = \begin{vmatrix} I & 0 \\ 0 & I \\ 0 & 0 \end{vmatrix}$$

$$[f(x)] \cdot (x) R$$

$$[ - ( - ) ] [ - ( + ) ] = 0,$$

$$X \gg -2 + ( ^2 - ^3 ) = 0,$$

[9].

$$f(x);$$

$$( ) = ? \quad [4] = \pm$$

[2]

$$= f(x)$$

$$\left( \begin{array}{c} 1' \\ \{J\} \end{array} \right) = -$$

	$R < 0$	$R > 0$
$\rightarrow 0$	1	$= -$ , $= -$ , (,, ")
$< 0$	1	$= -$ , $= -$ , (,, ")

:

$$\pm - \left| \begin{array}{c} 1-2 \\ I \\ b \end{array} \right|^* = 0,$$

$$R = \begin{vmatrix} I & I \\ & b \end{vmatrix}$$

$$r = \begin{vmatrix} I \\ & \end{vmatrix}$$

$$\wedge = - = am - = 0, \wedge \quad [I']$$

$$\wedge \sim \frac{n_1}{q' +}$$

$$= 0, = 0 \quad [I'']$$

$f( )$

$$= 0, 6 \ 0 \quad [III]$$

$f(x)$

$1/2( )$ ;

$$= 0, \ 6=0, \quad [1- ]$$



$f(x)$ 

[I''], [I'''], [II] [III]

1.

$$/ = \frac{2 - 1}{* - 2 - 3}$$

$$R = \begin{vmatrix} 0 & 2-1 & 0 \\ 0 & 02 & -1 \\ 1-2-3 & 0 & 0 \\ 0 & 1-2 & -3 \end{vmatrix} = -15 < 0; \sim - \begin{vmatrix} 0 & 2 \\ 1-2 \end{vmatrix} = -2 < 0.$$

3, -1)

 $f(x)$  (

$$f(x) = \frac{2}{-1 + \left(x - \frac{1}{2}\right) - \frac{\frac{15}{4}}{x - \frac{1}{2}}}$$

2.

$$f(x) = \frac{2}{* + 1}$$

$$R = \begin{vmatrix} 0 & 2 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{vmatrix} = 4 > 0; = \begin{vmatrix} 0 & 2 \\ 1 & 0 \end{vmatrix} = -2 < 0.$$

$$\begin{vmatrix} 1-2 & * \\ 020 & \\ 101 & \end{vmatrix} = 0, \dots 2-1-0.$$

$$/(*) = \frac{2}{x + \frac{1}{x}} = \begin{cases} \frac{2}{24 - \left(\sqrt{-\frac{1}{x}}\right)^2} & ( \wedge > 0, \\ & ( : ) < 1; \\ & = -1), \\ -\frac{2}{2 + \left(\sqrt{-x - \frac{1}{-x}}\right)^2} & ( \wedge < 0, \\ & ( ( ) > -1; \\ & = -1), \end{cases}$$

3.

$$\sqrt{W} = \frac{2 + \sqrt{4 + 1}}{2}$$

$$R = \begin{vmatrix} 1 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 \\ 1 & -1 & 1 & 0 \\ 0 & 1 & -1 & 1 \end{vmatrix} = 4 > 0; \quad = \begin{vmatrix} 1 & 1 \\ 1 & -1 \end{vmatrix} = -2 < 0.$$

2,

$$\begin{vmatrix} 1 & 2 \\ 1 & 1 \\ 1 & -1 \end{vmatrix} = 0, \dots \quad 2 - 1 = 0.$$

$$f(x) = 1 + \frac{2}{x^3 - x + 1} = \begin{cases} 1 + \frac{2}{1 + \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2} \quad (* > 0), \\ 1 - \frac{2}{3 + \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2} \quad (* < 0). \end{cases}$$

4.

$$\sqrt{W} = \frac{2 + \sqrt{4 + 1}}{2}$$

$$R = \begin{vmatrix} 1 & 4 & 1 & 0 \\ 0 & 1 & 4 & 1 \\ 1 & -2 & 1 & 0 \\ 0 & 1 & -2 & 1 \end{vmatrix} = 36 > 0; \quad = \begin{vmatrix} 1 & 4 \\ 1 & -2 \end{vmatrix} = -6 < 0.$$

$$\begin{vmatrix} 1 & 2 \\ 1 & 4 \\ 1 & -2 \end{vmatrix} = 0, \quad 2 - 1 = 0.$$

= 1

= -1.

$$f(x) = 1 + \frac{6x}{2x^2 + 1} = \begin{cases} 1 + \frac{6}{\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2} \quad (> 0), \\ 1 - \frac{6}{4 + \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2} \quad (< 0). \end{cases}$$



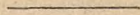
			1	2	*
1		IX,	,	+ 2	-
2	(		,		
	)		,		
		IX,		2 +	1
*3		IX,			-
.4		IX,		+	-
.5		1 2		+ +	4
.6		1 2		+	1,(22 I)
*7		IX,		+2	(15 I)
8		IX,		+	(17 I)
9	(	IX,		+	4,8
	)				

			1	*	
*•10		IX,	,	+ —	
11		1 4	,	2 + 1	
•12		1 4	,	+ (9 I)	
13		Xi	,	+ —	
*14		Xi	,		
•15		2	,		
•16			,	2 + —	
•17		2	,	+ 15	
*•18		X* 2	,	+ 15	
*•19		X—XI	,	2 + 15	
•20		X-XI	,	2 + 8	
*21		X-XI	,	2 + 15	
				+ 23 1 15,	



*22		X—XI	,	-	
* 2 3		X—XI	,	.	+ 2
*24		X—XI	,	.	+
				-	(19 I)
				-	
				-	
				-	
				.	2+
					21

<sup>1</sup> — — — — —  
 „ — { — — — — — : , — — — — —  
 s. „ — — — — — [I] ( . „ — — — — —  
 „ ( \* ) , — — — — —  
 ( • ) , — — — — —  
 ( , — — — — —  
 ). — — — — —



	.....	3
1.	.....	8
2.	( ..... )	-
	.....	24
3.	.....	39
4.	.....	45
5.	.....	53
6.	.....	<b>61</b>
7.	.....	72
8.	.....	83
9.	( ..... )	90
10.	.....	97
11.	.....	101
12.	.....	111
13.	.....	118
14.	.....	126
15.	.....	129
16.	.....	<b>141</b>
17.	.....	147
18.	.....	159
19.	.....	169
20.	.....	179
21.	.....	191
22.	.....	203
23.	.....	<b>214</b>



24. .... 224

$$f(x) = \frac{2 + \quad +}{-(-) \quad -(-)} \dots 243$$

251

09625.

22/ 1948 .

.13,29.

.16.

10000. .84 X 8 1/2 .

6 .50 . .438.

13-

"

"

.. 30.