

() - x :
() - y

()	()	()	
xy	y	x	
$40 \cdot 0.1x = 4x$	40	$10\% \cdot x = 0.1x$	10%
-	-	20	
$1.6y \cdot (0.9x - 20)$	$\frac{100+60}{100} \cdot y = 1.6y$	$x - 0.1x - 20 = 0.9x - 20$	

$xy = 6000$ 6,000
 $4x + 1.6y \cdot (0.9x - 20) = 7520$ 7,520

$$\begin{cases} xy = 6000 \rightarrow y = \frac{6000}{x} \\ 4x + 1.6y \cdot (0.9x - 20) = 7520 \end{cases}$$

$$4x + 1.6 \cdot \frac{6000 \cdot (0.9x - 20)}{x} = 7520$$

$$4x + \frac{9600 \cdot (0.9x - 20)}{x} = 7520 \quad / \cdot x$$

$$4x^2 + 9600 \cdot (0.9x - 20) = 7520x$$

$$4x^2 + 8640x - 192000 = 7520x$$

$$4x^2 + 1120x - 192000 = 0$$

$$\boxed{x = 120} \rightarrow y = \frac{6000}{120} \rightarrow \boxed{y = 50}$$
 ~~$x = -400$~~ $\leftarrow x > 20$

(50) 120 :

200% , 20 .

$$20 \cdot \frac{100+200}{100} \cdot 50 = 3000$$

3,000 :

. $y = -\frac{1}{3}x + 3$ BD

. (0,3) y- , B

. $0 = -\frac{1}{3}x + 3 \rightarrow 0 = -x + 9 \rightarrow x = 9 \rightarrow (9,0)$ x- , D

. $m_{BD} = -\frac{1}{3} \rightarrow m_{AC} = +3 \leftarrow m_{BD} \cdot m_{AC} = -1$

. $(\frac{0+9}{2}, \frac{3+0}{2}) = (4.5, 1.5)$:

. $y - 1.5 = 3(x - 4.5) \rightarrow y = 3x - 12$: (4.5, 1.5) , AC

. $0 = 3x - 12 \rightarrow 12 = 3x \rightarrow x = 4 \rightarrow (4,0)$ x- , C

. C(4,0) , D(9,0) , B(0,3):

. ABCD

$S_{ABCD} = 2S_{ACD} = 2 \cdot \frac{CD \cdot h_{CD}}{2} = (9 - 4) \cdot (9 - 0) = 45$

. AEF (1)

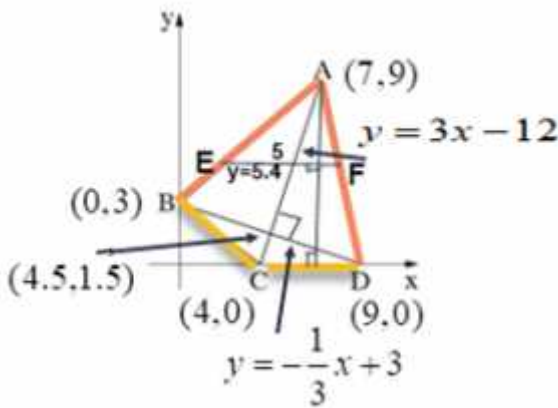
$S_{\triangle AEF} = \frac{EF \cdot h_{EF}}{2} = \frac{5 \cdot (9 - 5.4)}{2} = 9$

. 9 AEF :

. EFDCB (2)

$S_{EFDCB} = S_{ABCD} - S_{\triangle AEF} = 45 - 9 = 36$

. 36 EFDCB :



• (3,4,5,6) 2 - .

• $\frac{4}{6} = \frac{2}{3}$,

, 2 - ,

• $\frac{1}{2}$, , " "

• $\frac{2}{3} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{6}$ (1)

• $\frac{1}{6}$:

• 4 (2)

• $k = 2$, $p = \frac{1}{6}$, $n = 4$,

:

$$P_4(2) = \binom{4}{2} \cdot \left(\frac{1}{6}\right)^2 \cdot \left(1 - \frac{1}{6}\right)^{4-2} = 6 \cdot \left(\frac{1}{6}\right)^2 \cdot \left(\frac{5}{6}\right)^2 = \frac{25}{216}$$

• $\frac{25}{216}$ 2 - :

• , 36 (1) .

• 10 -

:10 - , , 6 -

• (4,6), (5,5), (5,6), (6,4), (6,5), (6,6)

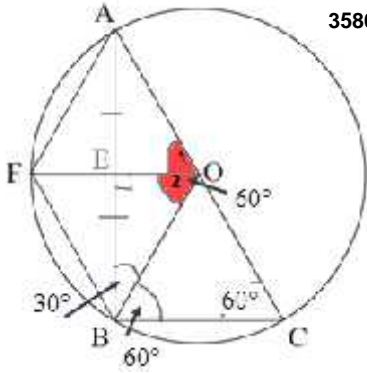
• $\frac{30}{36} = \frac{5}{6}$,10- 30 ,

• $\frac{5}{6}$,10 - , :

• $\frac{5}{6} \cdot \frac{1}{2} = \frac{5}{12}$ - " " 10- , (2)

• $\frac{5}{12}$:

"



$\angle ACB = 60^\circ$.3 . $OE \perp AB$.2

$\triangle ABC$ -

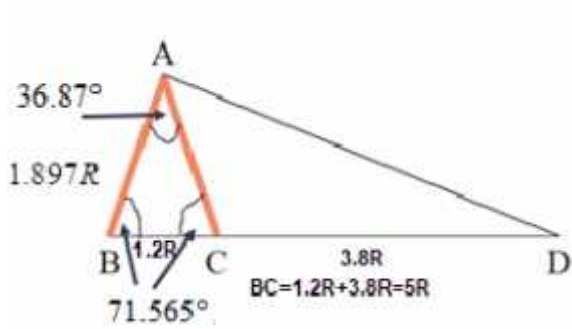
O .1

OE . : "

$\triangle AFB$.

FOCB .

	O	4	1
	AO = OC	5	4
	$\angle ABC = 90^\circ$	6	4
	$\angle AEO = \angle BEO = 90^\circ$	7	2
,	ED BC	8	6,7
	$\triangle ABC$ - OE	9	8,5
. . .			
	$\angle O_1 = \angle O_2$	10	7,4
	$\triangle AFB$	11	10
. . .			
	$\angle ACB = 60^\circ$	12	3
	OC = OB = OF	13	4
$\triangle OBC$	$\angle OBC = 60^\circ$	14	13,12
60°	$\triangle OBC$	15	14,13
"	OC = OB = BC	16	15
	$\angle O_2 = 60^\circ$	17	16,8
60°	$\triangle OFB$	18	17,713
"	OF = OB = BF	19	18
	OF = OC = BF = BC	20	19,16
	FOCB	21	20
. . .			



, () ΔABC .

. ABC (1)

: ΔABC

$$\frac{BC}{\sin \angle BAC} = 2R$$

$$\frac{1.2R}{2R} = \sin \angle BAC$$

$$\angle BAC = 36.87^\circ \leftarrow \angle BAC > 90^\circ$$

$$\angle ACB = \angle ABC = \frac{180^\circ - 36.87^\circ}{2} = 71.565^\circ ;$$

$$\angle ACB = \angle ABC = 71.565^\circ, \angle BAC = 36.87^\circ :$$

: ΔABC (2)

$$\frac{AB}{\sin 71.565^\circ} = 2R$$

$$AB = 2R \sin 71.565^\circ$$

$$\boxed{AB = 1.897R}$$

$$\therefore AB = 1.897R :$$

: ΔABD .

$$(AD)^2 = (AB)^2 + (BD)^2 - 2 \cdot AB \cdot AD \cdot \cos \angle B$$

$$(AD)^2 = (1.897R)^2 + (5R)^2 - 2 \cdot 1.897R \cdot 5R \cdot \cos 71.565^\circ$$

$$(AD)^2 = 22.6R^2$$

$$\boxed{AD = 4.754R}$$

$$\therefore AD = 4.754R :$$

, ΔACD - AE .

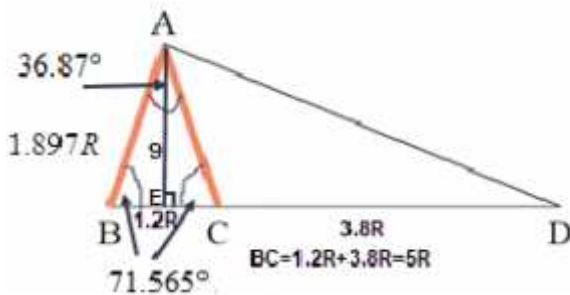
ΔABC -

$$BE = \frac{1.2R}{2} = 0.6R$$

$$\tan 71.565^\circ = \frac{AE}{BE} = \frac{9}{0.6R}$$

$$R = \frac{9}{0.6 \tan 71.565^\circ} = 5$$

$$\therefore R = 5 :$$



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

$$(x-1)^2 \neq 0 \rightarrow x-1 \neq 0 \rightarrow \boxed{x \neq 1}, \quad (1)$$

$$x \neq 1: \quad :$$

$$x \rightarrow \pm\infty \quad \frac{4x}{(x-1)^2} \rightarrow 0 \quad (2) \quad (1) \quad :$$

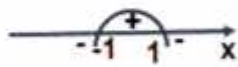
$$y = 0 + a = a$$

$$x = 1 :$$

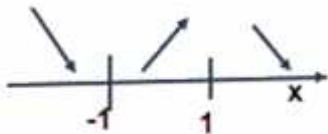
$$x = 1, y = a :$$

(3)

סימני מונה הנגזרת (מכנה חיובי)



טבלת עלייה ירידה



$$f'(x) = \frac{4(x-1)^2 - 4x \cdot 2 \cdot (x-1) \cdot 1}{(x-1)^4}$$

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

$$\boxed{f'(x) = \frac{4(x-1)(-x-1)}{(x-1)^4}}$$

(" ")

$$x = 1$$

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

$$(-1, a - 1) :$$

$$x < -1 \quad x > 1 : \quad , \quad -1 < x < 1 : \quad : \quad (4)$$

$$y = a$$

$$y = -3$$

$$a = -3 :$$

$$f(x) = \frac{4x}{(x-1)^2} - 3$$

$$a = -3$$

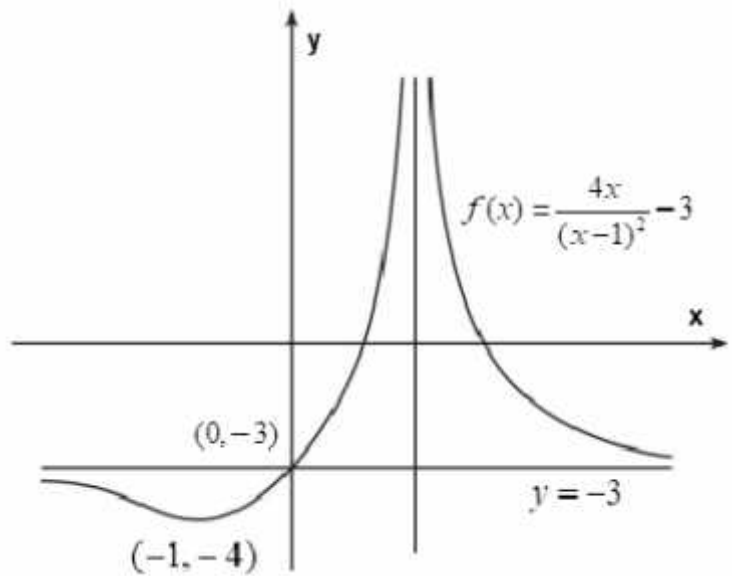
$$f(0) = \frac{4 \cdot 0}{(0-1)^2} - 3 = -3 \quad (1)$$

$(0, -3)$ y -

:

$$f(x) \quad (2)$$

$(-1, -3-1) \rightarrow (-1, -4) :$



,

$f(x)$

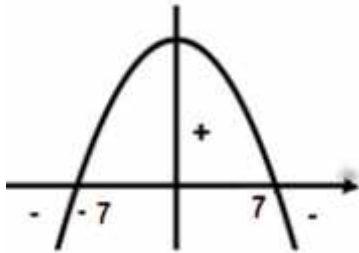
(

) $y = k$

, $(0, -3)$

. $(-1, -4)$

. $k = -4$, $k = -3$:



$$f(x) = \sqrt{49 - x^2}$$

(1)

$$49 - x^2 \geq 0$$

$$49 - x^2 = 0$$

$$x = 7, \quad x = -7$$

(" " ,)

$$-7 \leq x \leq 7 :$$

(2)

(-7, 0) , (7, 0) :

$$f'(x) = \frac{-2x}{2\sqrt{49-x^2}}$$

$$f'(x) = \frac{-x}{\sqrt{49-x^2}}$$

$$-x = 0$$

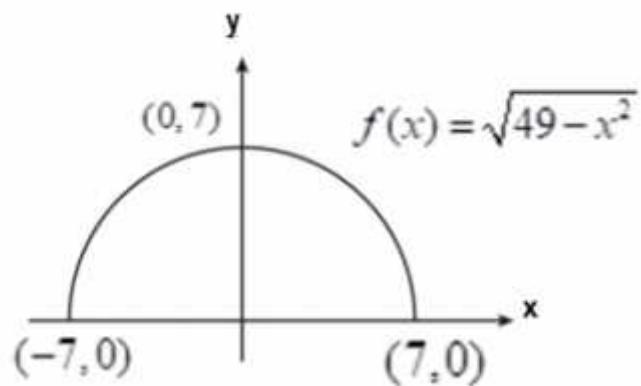
$$x = 0 \rightarrow y = \sqrt{49 - 0^2} = 7 \rightarrow (0, 7)$$

(. ,) . , ,)

x	-7		0		7
$f(x)$	0		7		0
$f'(x)$		+	0	-	
	Min	↗	Max	↘	Min

(-7, 0) , (0, 7) , (7, 0) :

(3)



$$f'(x) = \frac{-x}{\sqrt{49-x^2}}$$

$$x = \pm 7$$

()

$$x = \pm 7 \quad (1)$$

$$x = -7, x = 7 :$$

$f(x)$

$f'(x)$

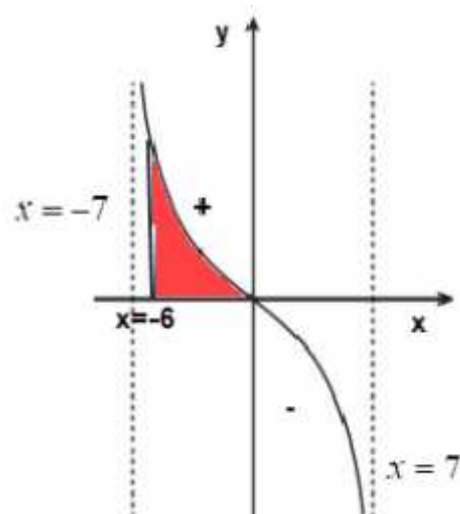
(2)

$$0 < x < 7$$

$$, -7 < x < 0$$

:

$$f'(0) = 0 \quad (3)$$



$f'(x)$

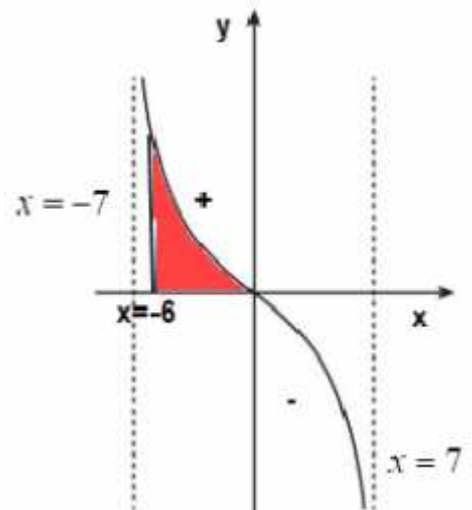
$$S = \int_{-6}^0 (f'(x) - 0) dx = f(x) \Big|_{-6}^0$$

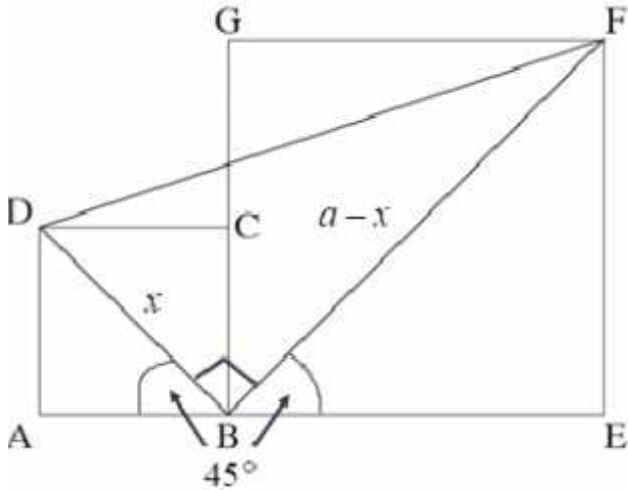
$$x=0: f(0) = 7$$

$$x=-6: f(-6) = \sqrt{49 - (-6)^2} = \sqrt{13}$$

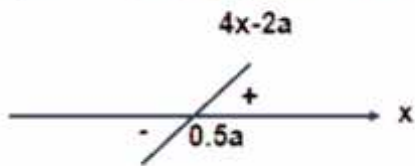
$$S = 7 - \sqrt{13} = 3.39$$

• " $7 - \sqrt{13} = 3.39$:

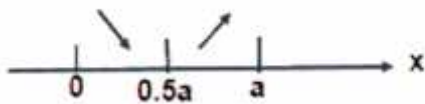




סימני הנגזרת (נקבעים ע"י המונה)



טבלת עלייה / ירידה



מינימום

. אורך הקטע DF

, $DB + BF = a$. $DB = x$

. $0 < x < a$: . $BF = a - x$

. $\angle DBC = \angle FBG = 45^\circ$

. $\angle DBF = 90^\circ$ -

. $\triangle DBF$ -

DF

$$(DF)^2 = (DB)^2 + (BF)^2$$

$$(DF)^2 = x^2 + (a-x)^2$$

$$(DF)^2 = x^2 + a^2 - 2ax + x^2$$

$$DF = \sqrt{2x^2 - 2ax + a^2}$$

$$(DF)' = \frac{4x - 2a}{2\sqrt{2x^2 - 2ax + a^2}}$$

$$0 = 4x - 2a$$

$$-4x = -2a$$

$$x = 0.5a$$

. $x = 0.5a$,

DF , $DB = 0.5a$:

. $BF = a - 0.5a = 0.5a$ - $DB = 0.5a$.

. 1

. $\frac{AB}{BE} = 1$, $DB = 0.5a$: