

$$\begin{aligned} & \cdot \frac{2x+2y}{x} = 2 + \frac{2y}{x} \\ & \cdot \frac{1}{3} \cdot (3x+3y) = x + y \end{aligned}$$

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

$$\cdot \frac{1}{4} \cdot (3x+3y) = 0.75x + 0.75y$$

$$\cdot \frac{0.75x + 0.75y}{y} = \frac{0.75x}{y} + 0.75$$

$$1.25 -$$

$$2 + \frac{2y}{x} + 1.25 = \frac{0.75x}{y} + 0.75 \quad / \quad t = \frac{x}{y}$$

1.25 -

:

$$\frac{2}{t} + 2.5 = 0.75t \quad / \cdot t > 0$$

$$0.75t^2 - 2.5t - 2 = 0$$

$$t = 4 \quad t = \frac{2}{3}$$

$$\frac{x}{y} = 4$$

$$4$$

4

:

4

3

( )

$$\cdot \frac{1}{4} \cdot 3 = 0.75 -$$

$$\cdot 3 + 0.75 = 3.75$$

3.75 -

:

$$a_6 = a_1 + 31 \quad a_4 - a_3 = 4(a_2 - a_1) \quad :$$

$$a_4 - a_3 = 4(a_2 - a_1)$$

$$a_1 q^3 - a_1 q^2 = 4(a_1 q - a_1) \quad /: a_1 \neq 0$$

$$q^2(q-1) = 4(q-1) \quad /: q-1 \neq 0$$

$$q^2 = 4$$

$$\boxed{q = 2}$$

,2

$$a_6 = a_1 + 31$$

$$a_1 q^5 = a_1 + 31$$

$$a_1 \cdot 2^5 = a_1 + 31$$

$$\boxed{a_1 = 1}$$

.1

,2

:

$$\frac{a_{n+1}}{a_n} = a_n \quad (1)$$

$$I. \quad b_n = a_n \cdot a_{n+1} :$$

$$b_{n+1} = a_{n+1} \cdot a_{n+2}$$

$$\frac{b_{n+1}}{b_n} = \frac{a_{n+1} \cdot a_{n+2}}{a_n \cdot a_{n+1}}$$

$$\frac{b_{n+1}}{b_n} = q_a \cdot q_a = q_a^2$$

$$\frac{b_{n+1}}{b_n} = 2^2 = 4$$

$$b_1 = a_1 \cdot a_2 = 1 \cdot 2 = 2$$

,1 -

$$.4 \quad I$$

$$II. \quad c_n = \frac{a_{n+1}}{a_n} + \frac{a_{n+2}}{a_{n+1}} :$$

,I

$$c_{n+1} = \frac{a_{n+2}}{a_{n+1}} + \frac{a_{n+3}}{a_{n+2}}$$

$$c_n = \frac{a_{n+1}}{a_n} + \frac{a_{n+2}}{a_{n+1}}$$

$$c_n = q_a + q_a = 2q_a = 2 \cdot 2 = 4$$

.4 -

.( )

II .(4 )

I :

$$.2730 \quad I \quad (2)$$

$$S_n^I = 2730$$

$$\frac{2 \cdot (4^n - 1)}{4 - 1} = 2730$$

$$4^n = 4096$$

$$\boxed{n = 6}$$

$$.6 \quad I \quad :$$

$$.I \quad II \quad , \quad (3)$$

$$.20 \quad 4$$

$$.20 \quad II \quad :$$

"

50 - p50 -  
 . p = p50 , n = 5  
 50 , 50 -  
 :

$$P_5(2) = P_5(1)$$

$$\binom{5}{2} \cdot p50^2 \cdot (1-p50)^{5-2} = \binom{5}{1} \cdot p50^1 \cdot (1-p50)^{5-1}$$

$$\frac{5!}{2!(5-2)!} \cdot p50^2 \cdot (1-p50)^3 = \frac{5!}{1!(5-4)!} \cdot p50 \cdot (1-p50)^4 \quad /: p50 \cdot (1-p50)^3 \neq 0$$

$$10 \cdot p50 = 5 \cdot (1-p50)$$

$$2p50 = 1 - p50$$

$$\boxed{p50 = \frac{1}{3}}$$

$$\cdot \frac{1}{3} \quad 50 - \quad :$$

$$\cdot \frac{1}{32}$$

$$\cdot \frac{1}{2} \quad , p(0)^5 = \frac{1}{32}$$

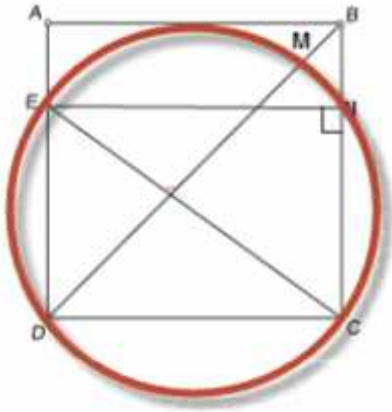
$$\cdot p(100) = 1 - \frac{1}{3} - \frac{1}{2} = \frac{1}{6} \quad 100 \quad ,$$

$$\cdot \frac{1}{6} \quad 100 \quad :$$

100 -  
 , 50 -  
 , 100 - ,

$$p(\text{didn't win 50 / won 100}) = \frac{P(\text{didn't win 50} \cap \text{won 100})}{P(\text{won 100})} = \frac{\frac{1}{6} \cdot \frac{1}{2} + \frac{1}{2} \cdot \frac{1}{6}}{\frac{1}{6} \cdot \frac{1}{2} + \frac{1}{2} \cdot \frac{1}{6} + \frac{1}{3} \cdot \frac{1}{3}} = \frac{\frac{1}{6}}{\frac{5}{18}} = \frac{3}{5}$$

$$\cdot \frac{3}{5} \quad :$$



ABCD .1

E, C, D, N, M .2

CD = EN . : "

CE - , DM .

BM · BD = AE · AD .

	ABCD	3	1
	$\sphericalangle EDC = \sphericalangle DCN = 90^\circ$	4	3
	E, C, D, N, M	5	2
DCNE	$\sphericalangle ENC = 90^\circ$	6	5
180° -	DCNE	7	6, 4
	CD = EN	8	7
. . .			
	CE	9	4
	$\sphericalangle DCM < 90^\circ$	10	4
	DM	11	10
	DM < CE	12	11, 9
. . .			
,	BM · BD = BN · BC	13	2
	BC = AD	14	3
	BN = AE	15	14, 8
	BM · BD = AE · AD	16	15, 14, 13
. . .			

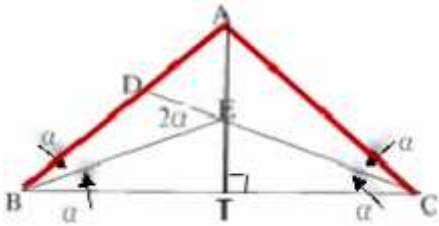
E ,  $\angle BAC > 90^\circ$  ,  $\angle ABC = \angle ACB = 2r$  ,  $(AB = AC)$   $\triangle ABC$  .

.  $\angle ECD = \angle EBC = \angle DBE = r$

.(  $\triangle EBC$  - )  $\angle DEB = 2r$   
 .( $\triangle EBC$  )  $EB = EC$

$$\frac{EC}{DE} = \frac{\sqrt{3}}{2 \sin r} :$$

$\triangle DBE$



$$\frac{EB}{\sin(180^\circ - 3r)} = \frac{DE}{\sin r}$$

$$\frac{EC}{DE} = \frac{\sin 3r}{\sin r} \leftarrow EB = EC$$

$$\frac{\sqrt{3}}{2 \sin r} = \frac{\sin 3r}{\sin r}$$

$$\frac{\sqrt{3}}{2} = \sin 3r$$

$$3r = 60^\circ + 360^\circ k \quad 3r = 120^\circ + 360^\circ k$$

$$\boxed{r = 20^\circ}$$

~~$r = 40^\circ$~~   $\rightarrow \angle BAC < 90^\circ$  false

.  $r = 20^\circ$  :

.( ,

AD) ,  $ED = r$  .

$\triangle ETC$

$$\tan 20^\circ = \frac{ET}{TC}$$

$$TC = \frac{r}{\tan 20^\circ}$$

$$\boxed{TC = 2.747r}$$

$$\boxed{BC = 5.495r} \leftarrow BT = TC$$

$\triangle ABC$

$$\frac{BC}{\sin 100^\circ} = 2R$$

$$\frac{5.495r}{2 \sin 100^\circ} = R$$

$$R = 2.79r$$

$$\boxed{\frac{R}{r} = 2.79}$$

.2.79 ,  $\triangle ABC$  - ,

:

$$. R - r = " 2 : .$$

$$. R = 2.79r :$$

:

$$R - r = 2$$

$$2.79r - r = 2$$

$$\boxed{r = 1.117 \text{ cm}}$$

$\Delta ATC$

$$\tan 40^\circ = \frac{AT}{TC}$$

$$2.747r \tan 40^\circ = AT$$

$$2.747 \cdot 1.117 \cdot \tan 40^\circ = AT$$

$$\boxed{AT = 2.575 \text{ cm}}$$

$$AE = AT - ET$$

$$AE = AT - r$$

$$AE = 2.575 - 1.117$$

$$\boxed{AE = 1.458 \text{ cm}}$$

$$. AE = " 1.458 :$$

$$\cdot \underline{b < 0},$$

$$a, b, 0 \leq x \leq \frac{2f}{3}, f(x) = a \sin^2 x + b \cos 4x$$

$$\cdot f'(\frac{f}{3}) = 0, x = \frac{f}{3}$$

$$f(x) = a \sin^2 x + b \cos 4x$$

$$f'(x) = 2a \sin x \cos x - 4b \sin 4x$$

$$0 = 2a \sin \frac{f}{3} \cos \frac{f}{3} - 4b \sin \frac{4f}{3}$$

$$0 = 2a \frac{\sqrt{3}}{2} \cdot \frac{1}{2} - 4b \cdot \left(-\frac{\sqrt{3}}{2}\right) \quad /: \frac{\sqrt{3}}{2}$$

$$0 = a + 4b$$

$$\sin 2x + \sin 4x = 0$$

$$\sin 2x = -\sin 4x$$

$$\sin 2x = \sin(-4x)$$

$$\boxed{a = -4b}$$

$$\cdot f(x) = -4b \sin^2 x + b \cos 4x : \quad a = -4b$$

$$\cdot \underline{b < 0} -$$

$$(0, b) -$$

$$\cdot \left(\frac{2f}{3}, -3.5b\right), (0, b) :$$

$$f(x) = b \cdot (-4 \sin^2 x + \cos 4x)$$

$$f'(x) = b \cdot (-8 \sin x \cos x - 4 \sin 4x)$$

$$\boxed{f'(x) = -4b \cdot (\sin 2x + \sin 4x)}$$

$$\sin 2x + \sin 4x = 0$$

$$\sin 2x = -\sin 4x$$

$$\sin 2x = \sin(-4x)$$

$$2x = -4x + 2fk \quad 2x = f + 4x + 2fk$$

$$x = \frac{f}{3}k$$

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

$$k = 0$$

$$k = 1$$

$$\boxed{\left(\frac{f}{3}, -3.5b\right)}$$

$$\boxed{\left(\frac{f}{2}, -3b\right)}$$

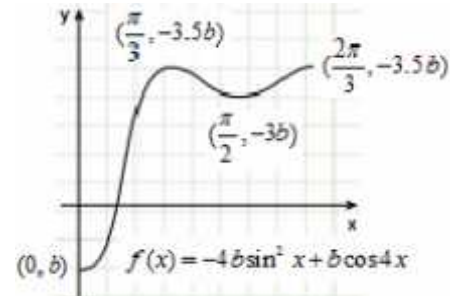


• ( $b < 0$ )

0		$\frac{f}{3}$		$\frac{f}{2}$		$\frac{2f}{3}$	$x$
$b$		$-3.5b$		$-3b$		$-3.5b$	$f(x)$
<b>Min</b>	↖	<b>Max</b>	↘	<b>Min</b>	↖	<b>Max</b>	

•  $(\frac{f}{3}, -3.5b)$   $(\frac{f}{2}, -3b)$  ,  $(\frac{2f}{3}, -3.5b)$  ,  $(0, b)$  :

•  $f(x) = -4b \sin^2 x + b \cos 4x$



•  $f'(x)$

|

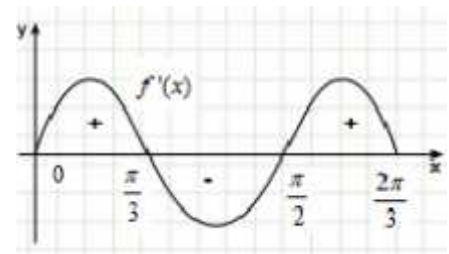
,  $f(x)$

•  $\frac{f}{3} < x < \frac{f}{2}$  :

,  $\frac{f}{2} < x < \frac{2f}{3}$   $0 < x < \frac{f}{3}$

•  $(\frac{2f}{3}, 0)$  ,  $(0, 0)$  ,  $f'(x)$

:



(1)

$$\int_{\frac{f}{2}}^{\frac{2f}{3}} f''(x) dx = f'(x) \Big|_{\frac{f}{2}}^{\frac{2f}{3}} = f'\left(\frac{2f}{3}\right) - f'\left(\frac{f}{2}\right) = 0 - 0 = 0$$

$$\int_{\frac{f}{2}}^{\frac{2f}{3}} f''(x) dx = 0 :$$

$$\frac{f}{2} < x < \frac{2f}{3}, \quad x = k \quad (2)$$

$$\left( \frac{f}{2} \leq x \leq k \right)$$

$$, S \quad x -$$

$$\left( k \leq x \leq \frac{2f}{3} \right)$$

$$, S \quad x -$$

(1)

" "

.S :

$$g(x) = \frac{2x-3}{\sqrt{x(3-x)}} \quad f(x) = \frac{1}{\sqrt{3-x}}$$

$$0 < x < 3, \quad f(x) \tag{1}$$

$$0 < x < 3, \quad g(x)$$

$$0 < x < 3 - g(x), \quad x < 3 - f(x) :$$

(2)

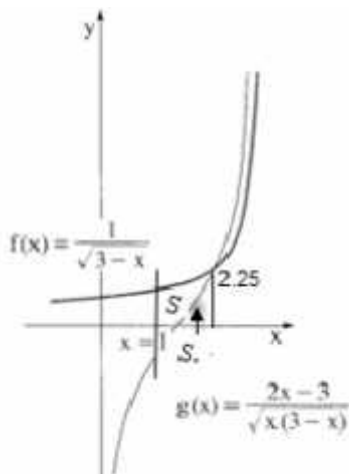
$$x \quad x=3 \quad f(x) \quad x=3$$

$$y = 0 - f(-1000) = \frac{1}{\sqrt{3-(-1000)}} = 0.03 \rightarrow 0$$

$$x=3, x=0 \quad g(x) \quad x=3, x=0$$

$$0 < x < 3 \quad g(x)$$

$$x=3, x=0, g(x), x=3, (x \rightarrow -\infty)y=0 \quad f(x) :$$



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

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

$$2x-3 = \sqrt{x} \quad / \sqrt{x} = t$$

$$2t^2 - t - 3 = 0$$

$$t = 1.5 \rightarrow \sqrt{x} = 1.5 \rightarrow \boxed{x = 2.25}$$

$$t = -1 \rightarrow \sqrt{x} = -1 \rightarrow \text{not o.k.}$$

$$x = 1.5 \quad x =$$

$$g(x) = \frac{2x-3}{\sqrt{x(3-x)}}$$

$$S_*, S_*, S_* + S$$

$$\int_{1.5}^{2.25} \frac{2x-3}{\sqrt{x(3-x)}} dx = \int_{1.5}^{2.25} -\frac{1}{\sqrt{3x-x^2}} \cdot (3-2x) dx = -2\sqrt{3x-x^2} \Big|_{1.5}^{2.25}$$

$$\int_1^{2.25} \frac{1}{\sqrt{3-x}} dx = -2\sqrt{3-x} \Big|_1^{2.25}$$

$$\left. \begin{array}{l} x = 2.25 \quad \frac{-3\sqrt{3}}{2} \\ x = 1.5 \quad -3 \end{array} \right\} S_* = 0.4019$$

$$\left. \begin{array}{l} x = 2.25 \quad -\sqrt{3} \\ x = 1 \quad -2\sqrt{2} \end{array} \right\} S_* + S = 1.096$$

$$S = 1.096 - 0.4019 = 0.694 :$$

$$" \quad 0.694 \quad :$$

$$, t(x) = \frac{2x-3}{\sqrt{x(3-x)}} + 2 \quad h(x) = \frac{1}{\sqrt{3-x}} + 2 ,$$

$$. g(x) = \frac{2x-3}{\sqrt{x(3-x)}} \quad f(x) = \frac{1}{\sqrt{3-x}}$$

$$2 \quad , \quad ,$$

.

,

$$S_2 - S_1 ,$$

$$. S_1 = S_2 :$$

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

$$x \neq -1$$

$$x = -1$$

$$x = -1$$

$$x = -1$$

$$y = \frac{1}{1} = 1$$

(1)

$$y = 1, x = -1 :$$

$$x \neq -1$$

:

אורך הקטע CD מניחות

$$\left(t, \frac{t-1}{t+1}\right)$$

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

C

$$y = 2x$$

D

D

t

$$y_D = y_C = \frac{t-1}{t+1}, x -$$

CD -

$$y = 2x$$

D

x -

$$2x_D = \frac{t-1}{t+1} \rightarrow x_D = \frac{t-1}{2(t+1)}$$

$$: x_C < x_D, x_C > x_D$$

$$CD = \left| t - \frac{t-1}{2(t+1)} \right|$$

$$CD = \left| \frac{2t(t+1) - (t-1)}{2(t+1)} \right|$$

$$CD = \left| \frac{2t^2 + 2t - t + 1}{2(t+1)} \right|$$

$$CD = \left| \frac{2t^2 + t + 1}{2(t+1)} \right|$$

$$CD = \frac{2t^2 + t + 1}{2(t+1)} : t > -1$$

$$, x = -1 ,$$

$$, x_C > x_D$$

$$CD = -\frac{2t^2 + t + 1}{2(t+1)} : t < -1$$

$$, x = -1 ,$$

$$, x_C < x_D$$

$$.t > -1 \quad (1)$$

$$CD = \frac{2t^2 + t + 1}{2(t+1)}$$

$$(CD)' = \frac{(4t+1)(t+1) - (2t^2 + t + 1)}{2(t+1)^2}$$

$$(CD)' = \frac{4t^2 + 4t + t + 1 - 2t^2 - t - 1}{2(t+1)^2}$$

$$\boxed{(CD)' = \frac{2t^2 + 4t}{2(t+1)^2}}$$

$$2t^2 + 4t = 0 \rightarrow t = 0, -2$$

$$.t = 0 \quad CD \text{ הקטע } , t > -1 \quad : \quad t = 0$$

$$.t < -1 \quad (2)$$

$$.CD = \frac{2t^2 + t + 1}{2(t+1)}$$

$$CD = -\frac{2t^2 + t + 1}{2(t+1)},$$

$$\boxed{(CD)' = \frac{-(2t^2 + 4t)}{2(t+1)^2}}$$

$$2t^2 + 4t = 0 \rightarrow t = 0, -2$$

$$.t = -2 \quad CD \text{ הקטע } , t < -1 \quad : \quad t = -2$$

$$.CD(0) = \frac{2 \cdot 0^2 + 0 + 1}{2 \cdot (0+1)} = \frac{1}{2} : \quad CD \text{ הקטע } \quad t > -1$$

$$.CD(-2) = -\frac{2 \cdot (-2)^2 + (-2) + 1}{2 \cdot (-2+1)} = 3\frac{1}{2} : \quad CD \text{ הקטע } \quad t < -1$$

$$. \frac{1}{2} \quad CD \text{ הקטע } \quad :$$