

$2 \cdot 3a = 6a$

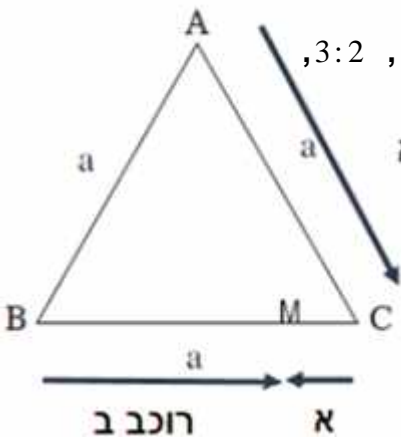
$1\frac{1}{3} \cdot 3a = 4a$

" 4

$5 \cdot 3a = 15a$

$6:4 = 3:2$

$15a \cdot \frac{2}{3} = 10a$



$\frac{2}{5} \cdot 2a = \frac{4}{5}a$

$BM:MC = 4:1$

360

6

$360 \cdot 6 - 360 \cdot 4 = 720$

720

"

$$n \quad a_{n+1} + a_n = 6n + 5 : \quad a_n$$

$$(n = n + 1) \quad a_{n+2} + a_{n+1} = 6(n + 1) + 5$$

$$a_{n+2} + a_{n+1} = 6n + 11$$

$$a_{n+2} - a_n = 6 : \quad ,$$

. 6

$$c = 6 \quad , a_{n+2} = a_n + 6 : \quad :$$

$$1, 2, 7, 8, 13, 14, \dots : \quad :$$

$$a_n$$

$$6 : 2 = 3$$

$$a_{n+1} + a_n = 6n + 5$$

$$a_2 + a_1 = 6 \cdot 1 + 5$$

$$a_1 + 3 + a_1 = 11$$

$$\boxed{a_1 = 4}$$

$$a_1 = 4 :$$

$$(n) \quad a_{n+1} \quad , \quad 2n + 1$$

$$a_n \quad , \quad a_n - n$$

$$a_{n+1} = 43$$

$$a_{n+1} - (n + 1) = 43$$

$$4 + 3(n + 1 - 1) - n - 1 = 43$$

$$2n = 40$$

$$\boxed{2n + 1 = 41}$$

$$41$$

$$(S_{2n+1} = \dots + a_{n+1} - 2d + a_{n+1} - d + a_{n+1} + a_{n+1} + d + a_{n+1} + 2d + \dots = (2n + 1)a_{n+1} : \quad )$$

$$S_{41} = 43 \cdot 41 = 1,763$$

$$1,763 \quad :$$

.1 ,0 - x .  
4x

	Y	- R	- B	
28		4x		1 - One
12	1	20 - 4x	x	0 - Zero
40	8	20		

$$.x = 3 - 9 = 3x - 20 - 4x + x + 1 = 12$$

	- Y	- R	- B	
28	7	12	9	1 - One
12	1	8	3	0 - Zero
40	8	20	12	

$$. \frac{9}{40} \quad 1 \quad :$$

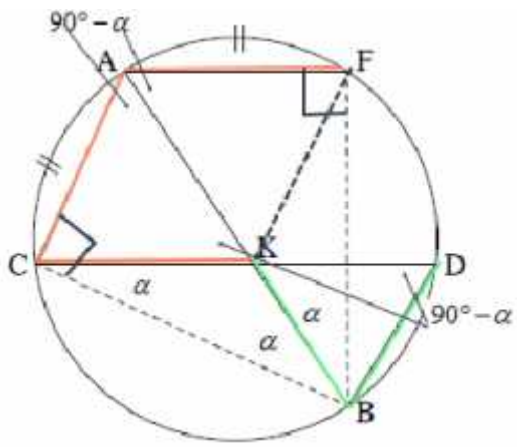
$$. p(\text{Zero} / (\text{B} \cup \text{One})) = \frac{N(\text{Zero} \cap (\text{B} \cup \text{One}))}{N(\text{B} \cup \text{One})} = \frac{3}{9+3+12+7} = \frac{3}{31}$$

$$. \frac{3}{31} \quad :$$

$$. k = 4 , p(\text{One}) = \frac{28}{40} = 0.7 , n = 5 ,$$

$$p(\text{5 points in exactly 6 rounds}) = P_5(4) \cdot P_1(1) = \binom{5}{4} \cdot 0.7^4 \cdot 0.3^1 \cdot 0.7 = 5 \cdot 0.7^4 \cdot 0.3^1 \cdot 0.7 = 0.252105$$

$$. 0.252105 \quad :$$



19

.  $\widehat{CA} = \widehat{AF}$  .3 AF || CD .2 AB .1 \_\_\_\_\_  
 . BD · AB = CD · AC .4 .  
 AFKC . BK = BD (2)  $\sphericalangle FAB = \sphericalangle CAB$  (1) . : "  
 CD (2)  $\triangle BDC \sim \triangle CAB$  (1) .

	$\widehat{CA} = \widehat{AF}$	5	3
	$\sphericalangle FBA = \sphericalangle CBA = r$	6	5
	AB	7	1
	$\sphericalangle ACB = \sphericalangle AFB = 90^\circ$	8	7
	$\sphericalangle FAB = \sphericalangle CAB = 90^\circ - r$	9	8, 6
(1) . . . .			
	AF    CD	10	2
	$\sphericalangle DKB = \sphericalangle FAK = 90^\circ - r$	11	10, 9
	$\sphericalangle CDB = \sphericalangle CAB = 90^\circ - r$	12	9
	$\sphericalangle DKB = \sphericalangle CDB$	13	12, 11
$\triangle BKD$	BK = BD	14	13
(2) . . . .			
	$\sphericalangle AKC = \sphericalangle FAK = 90^\circ - r$	15	10, 9
	$\sphericalangle CAB = \sphericalangle AKC$	16	15, 12
$\triangle ACK$	AC = CK	17	16
	AC = AF	18	5
	AF = CK	19	18, 17
	AFKC	20	19, 10
	AFKC	21	20, 18
. . . .			
	BD · AB = CD · AC	22	4
	$\frac{BD}{CD} = \frac{AC}{AB}$	23	22
	$\triangle BDC \sim \triangle CAB$	24	23, 12
(1) . . . .			
	$\sphericalangle CBD = \sphericalangle BAC = 90^\circ$	25	24, 8
	CD	26	25
(2) . . . .			

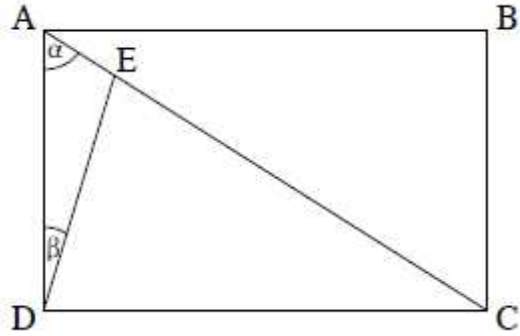
.ABCD ,

AC = 2R<sub>1</sub> , ΔACD .

ΔADC

$$\cos r = \frac{AD}{AC}$$

$$\boxed{2R_1 \cos r = AD}$$



ΔADE

$$\frac{AD}{\sin(180^\circ - (r + s))} = 2R_2$$

$$\frac{2R_1 \cos r}{\sin(r + s)} = 2R_2$$

$$\boxed{\frac{R_1}{R_2} = \frac{\sin(r + s)}{\cos r}}$$

$$\cdot \frac{R_1}{R_2} = \frac{\sin(r + s)}{\cos r} \cdot$$

. r = s : .

$$\frac{R_1}{R_2} = \frac{\sin 2r}{\cos r}$$

$$\frac{R_1}{R_2} = \frac{2 \sin r \cos r}{\cos r}$$

$$\frac{R_1}{R_2} = 2 \sin r$$

$$\boxed{\frac{R_1}{R_2} < 2} \leftarrow 0^\circ < r < 90^\circ, 0 < \sin r < 1$$

$$s = 15^\circ, r = 60^\circ$$

$$\angle EDC = 90^\circ - 15^\circ = 75^\circ \quad (1)$$

$$\angle DEC = 15^\circ + 60^\circ = 75^\circ$$

$\triangle DEC$

$$DC = EC, \quad \triangle DEC$$

:

$$\angle BCE = \angle CAD = 60^\circ \quad (2)$$

$$BC = AD = 2R_1 \cos 60^\circ = R_1$$

$\triangle ADC$

$$\sin 60^\circ = \frac{DC}{AC}$$

$$2R_1 \sin 60^\circ = DC$$

$$\boxed{DC = R_1 \sqrt{3}}$$

$$\angle EC = DC = R_1 \sqrt{3}$$

$\triangle BEC$

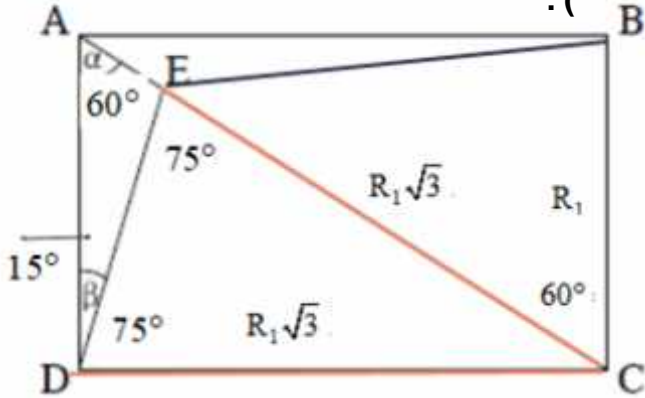
$$(BE)^2 = (EC)^2 + (BC)^2 - 2EC \cdot BC \cdot \cos \angle BCE$$

$$(BE)^2 = (R_1 \sqrt{3})^2 + R_1^2 - 2 \cdot R_1 \sqrt{3} \cdot R_1 \cdot \cos 60^\circ$$

$$(BE)^2 = 3R_1^2 + R_1^2 - R_1^2 \sqrt{3}$$

$$\boxed{(BE)^2 = (4 - \sqrt{3}) R_1^2}$$

$$(BE)^2 = (4 - \sqrt{3}) R_1^2 :$$



$-f \leq x \leq f$  ,  $f(x) = a \cos 2x + \sin^2 x$  :

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

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

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

$f(-x) = f(x)$

$(y - \quad) f(x) :$

$(-f, a)$

$f(f) = a \cos 2f + \sin^2 f = a \rightarrow (f, a)$

$f'(x) = 2a \sin 2x + 2 \sin x \cos x$

$f'(x) = -2a \sin 2x + \sin 2x$

$f'(x) = \sin 2x(-2a + 1)$

$\sin 2x = 0$

$2x = f k$

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

$(-f, a), (\frac{f}{2}, 1-a)$

$(0, a), (\frac{f}{2}, 1-a), (f, a)$

$a = 0.5$

$(-2a + 1)$

$(\quad)$

$a = 0.5$

$a = 0.5$

$(-2a + 1)$

$f''(x) = \cos 2x(-2a + 1)$

$a < 0.5$

$f''(\frac{f}{2}) = \cos(2 \cdot \frac{f}{2}) \cdot (+) = (-) \cdot (+) < 0$

$(\frac{f}{2}, 1-a)$

$(-\frac{f}{2}, 1-a)$

$(-f, a), (f, a)$

$f''(0) = -\cos(2 \cdot 0) \cdot (+) = (-) \cdot (+) < 0$

$(0, a)$

$a > 0.5$

$f''(\frac{f}{2}) = \cos(2 \cdot \frac{f}{2}) \cdot (+) = (-) \cdot (-) > 0$

$(\frac{f}{2}, 1-a)$

$(-\frac{f}{2}, 1-a)$

$(-f, a), (f, a)$

$f''(0) = \cos(2 \cdot 0) \cdot (+) = (+) \cdot (-) < 0$

$(0, a)$

• y -

$$, -2a > 1 \rightarrow a < \frac{1}{2} \quad 1-a > a$$

$$\cdot f(-\frac{f}{2}) > f(0) = f(-f) \cdot , f(\frac{f}{2}) > f(0) = f(f) \cdot \quad a < \frac{1}{2}$$

$$\cdot f(-\frac{f}{2}) < f(0) = f(-f) \cdot , f(\frac{f}{2}) < f(0) = f(f) \cdot \quad a > \frac{1}{2}$$

$$, (0, a) , (\frac{f}{2}, 1-a) , (f, a) : a < \frac{1}{2} :$$

$$\cdot (-f, a) , (-\frac{f}{2}, 1-a)$$

$$, (0, a) , (\frac{f}{2}, 1-a) , (f, a) : a > \frac{1}{2}$$

$$\cdot (-f, a) , (-\frac{f}{2}, 1-a)$$

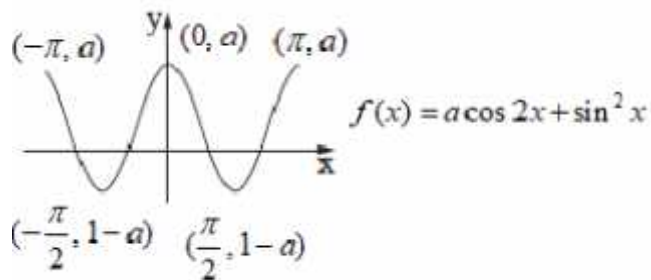
$$\cdot ( \quad ) \quad a = \frac{1}{2} : \quad \cdot$$



$$a > 1$$

$$a > \frac{1}{2}, \quad f(x) \quad (1)$$

$$x, \quad 1 - a < 0$$

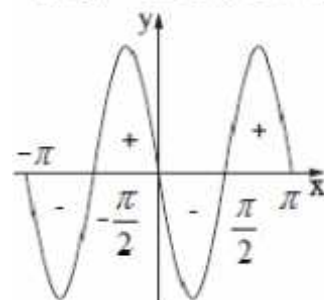


$$a > \frac{1}{2}, \quad f'(x) \quad (2)$$

$f'(x)$

$$f'(x) = \sin 2x(-2a + 1)$$

$$f'(x) = \sin 2x(-2a + 1)$$



$$\frac{f}{2} k \quad \sin 2x, \quad -$$

$$12:4=3$$

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

$$f(f) - f\left(\frac{f}{2}\right) = 3$$

$$a - (1 - a) = 3$$

$$a - 1 + a = 3$$

$$2a = 4$$

$$\boxed{a = 2}$$

$$12:2=6$$

$$a = 2$$

. ACD *efloha hse min'oni*

, CD AB

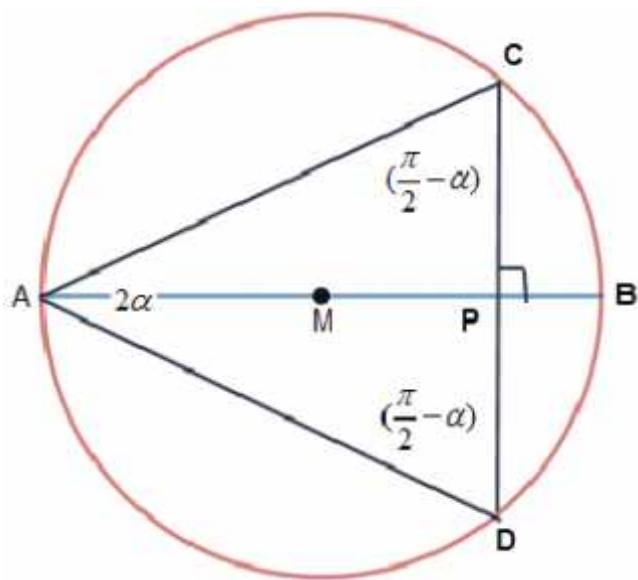
ACD

. A

P

$$\frac{f}{2} \leq 2r < f, \quad 0 < 2r < \frac{f}{2}, \quad \angle DAC = 2r$$

$$\cdot \left(\frac{f}{2} - r\right)$$



$$S_{\Delta ACD} = 2 \cdot 10^2 \sin 2r \sin \left(\frac{f}{2} - r\right) \sin \left(\frac{f}{2} - r\right)$$

$$S_{\Delta ACD} = 200 \cdot 2 \sin r \cdot \cos r \cdot \cos^2 r$$

$$S_{\Delta ACD} = 400 \sin r \cdot \cos^3 r$$

$$(S_{\Delta ACD})' = 400 [\cos r \cdot \cos^3 r + \sin r \cdot (-3 \cos^2 r \sin r)]$$

$$(S_{\Delta ACD})' = 400 (\cos^4 r - 3 \sin r \cos^2 r \sin r)$$

$$(S_{\Delta ACD})' = 400 \cos^2 r (\cos^2 r - 3 \sin^2 r)$$

$$\cos^2 r = 0 \quad r = \frac{f}{2} + fk$$

$$\cos^2 r - 3 \sin^2 r = 0$$

$$-3 \sin^2 r = -\cos^2 r \quad \because 3 \cos^2 r > 0$$

$$\tan^2 r = \frac{1}{3}$$

$$\tan r = \pm \frac{\sqrt{3}}{3}$$

$$r = \pm \frac{f}{6} + fk$$

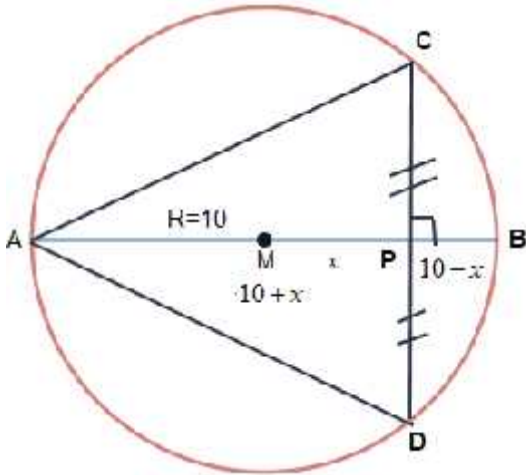
$$r = \frac{f}{6}$$

$$\left. \begin{aligned} (S_{\Delta ACD})' \left(\frac{f}{7}\right) &= 80 > 0 \\ (S_{\Delta ACD})' \left(\frac{f}{5}\right) &= -100 < 0 \end{aligned} \right\} r = \frac{f}{6}, \text{max}$$

$$S_{\Delta ACD} \left(\frac{f}{6}\right) = 400 \sin \left(\frac{f}{6}\right) \cdot \cos^3 \left(\frac{f}{6}\right) = 75\sqrt{3} :$$

$$\cdot 75\sqrt{3} \quad \text{ACD} \quad :$$

$\cdot BP = 10 - x, AP = 10 + x, MP = x$



$AP \cdot BP = CP \cdot DP$

$(10 + x)(10 - x) = (CP)^2$

$CP = \sqrt{100 - x^2}$

$CD = 2\sqrt{100 - x^2}$

$S_{\Delta ACD} = \frac{(10 + x) \cdot \cancel{2} \sqrt{100 - x^2}}{\cancel{2}}$

$(S_{\Delta ACD})' = \sqrt{100 - x^2} + \frac{(10 + x) \cdot (-2x)}{2\sqrt{100 - x^2}}$

$(S_{\Delta ACD})' = \frac{100 - x^2 - 10x - x^2}{\sqrt{100 - x^2}}$

$(S_{\Delta ACD})' = \frac{-2x^2 - 10x + 100}{\sqrt{100 - x^2}}$

$-2x^2 - 10x + 100 = 0$

$x = 5$  o.k.  $0 < x < 10$

$x = -10$  false

," "

$x = 5$

$S_{\Delta ACD}(5) = (10 + 5)\sqrt{100 - 5^2} = 75\sqrt{3}$

$75\sqrt{3}$  ACD

$$c, b, f(x) = \frac{x^2 + bx - c}{x^2 - 4}$$

$$x \neq \pm 2, x = \pm 2$$

$$x \neq \pm 2 \quad :$$

$$f(x) = f(-x), \quad f(x)$$

$$b = 0 - (bx), \quad x$$

:

$$f(-x) = f(x)$$

$$\frac{(-x)^2 + b(-x) - c}{(-x)^2 - 4} = \frac{x^2 + bx - c}{x^2 - 4}$$

$$\frac{x^2 - bx - c}{x^2 - 4} = \frac{x^2 + bx - c}{x^2 - 4}$$

$$x^2 - bx - c = x^2 + bx - c$$

$$-2bx = 0$$

$$\boxed{b = 0}$$

$$b = 0 :$$

$$f(x) = \frac{x^2 - c}{x^2 - 4} \quad b = 0$$

, x -

$$f(x)$$

$$, x \neq \pm 2$$

$$x = -2 - x = 2$$

$$x = -2 - x = 2 \quad x -$$

$$f(x) = 0 \rightarrow x^2 - c = 0 \rightarrow x = \pm\sqrt{c} \rightarrow c > 0$$

$$-2 < \pm\sqrt{c} < 2$$

$$\sqrt{c} < 2 \rightarrow c < 4 \rightarrow \boxed{0 < c < 4}$$

$$0 < c < 4 :$$

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

, y -

!!!

.( ) ,

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

$$f'(x) = \frac{2x(x^2 - 4 - x^2 + c)}{(x^2 - 4)^2}$$

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

$$x = 0 \rightarrow \left(0, \frac{c}{4}\right)$$

$$0 < c < 4 \quad , \quad c - 4$$

$$.x = 0 \quad ,$$

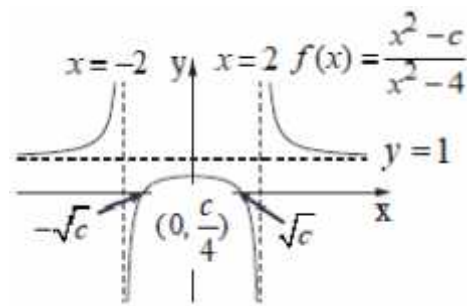
$$\left(0, \frac{c}{4}\right) \quad ,$$

$$\left(0, \frac{c}{4}\right):$$

.( ) (2)

$$.y = 1$$

$$\lim_{x \rightarrow \infty} \frac{x^2 - c}{x^2 - 4} = \lim_{x \rightarrow \infty} \frac{\frac{x^2}{x^2} - \frac{c}{x^2}}{\frac{x^2}{x^2} - \frac{4}{x^2}} = \lim_{x \rightarrow \infty} \frac{1 - 0}{1 - 0} = 1$$

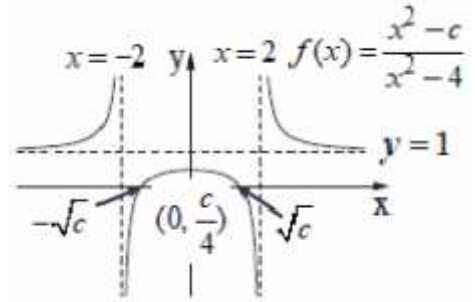
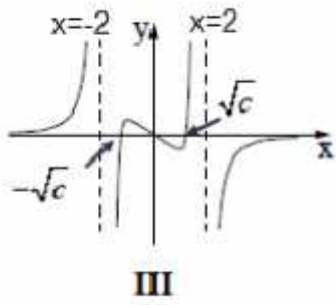


$$, y = 1$$

:

$$g(x) = f(x) \cdot f'(x)$$

$$- f(x)$$



(1)

$$x < -2, -\sqrt{c} < x < \sqrt{c}, x > 2: \quad , x - \quad , f(x) \bullet$$

$$-2 < x < -\sqrt{c}, \sqrt{c} < x < 2: \quad , x - \quad , f(x) \bullet$$

$$x < -2, -2 < x < 0: \quad , \quad , f'(x) \bullet$$

$$0 < x < 2, x > 2: \quad , \quad , f'(x) \bullet$$

$$, f'(x) - f(x) \quad , \quad g(x) = f(x) \cdot f'(x) \bullet$$

$$, f'(x) - f(x) \quad , \quad g(x) = f(x) \cdot f'(x) \bullet$$

$$, f(x) \quad \text{II - I} \quad x > 2 \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$\bullet \text{ III} \quad - \quad g(x) \quad - \quad g(x) = f(x) \cdot f'(x)$$

$$\bullet \text{ III} \quad - \quad g(x) \quad , \quad f(x) : \sqrt{c} < x < 2 \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$\bullet \text{ III} \quad - \quad g(x) \quad , \quad f(x) : 0 < x < \sqrt{c} \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$g(x) \quad , \quad f(x) : -\sqrt{c} < x < 0 \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$g(x) \quad , \quad f(x) : -2 < x < -\sqrt{c} \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$g(x) \quad , \quad f(x) : x < -2 \quad \color{red}\color{blue}\color{green}\color{yellow}\color{purple}$$

$$\bullet g(x) = f(x) \cdot f'(x) \quad \text{III} \quad :$$

$$g(-x) = f(-x) \cdot f'(-x) = f(x)(-f'(x)) = -f(x) \cdot f'(x) = -g(x) \quad \text{(2)}$$

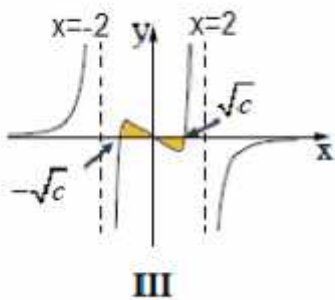
$$- \quad g(x)$$

$$S = 2 \cdot \int_{-\sqrt{c}}^0 [g(x) - 0] dx = 2 \cdot \int_{-\sqrt{c}}^0 [f(x)f'(x)] dx = 2 \cdot \left[ \frac{f^2(x)}{2} \right]_{-\sqrt{c}}^0 =$$

$$= f^2(0) - f^2(-\sqrt{c}) = \left(-\frac{c}{4}\right)^2 - (0)^2 = \boxed{\frac{c^2}{16}}$$

$$\bullet \frac{c^2}{16} \quad :$$

"



III