

. ( " ) x-

( " )	( " )	( )		
120	x	$\frac{120}{x}$		
x	x	1		
-	-	$\frac{2}{60} = \frac{1}{30}$		
120 - x	x + 10	$\frac{120 - x}{x + 10}$		

ב

120 ק"מ

בוקר

אחר הצהריים

עצירה 2 דקות

$$\frac{120}{x} = 1 + \frac{1}{30} + \frac{120-x}{x+10}$$

$$\frac{120}{x} = \frac{31}{30} + \frac{120-x}{x+10} \quad / \cdot 30x(x+10)$$

$$3600(x+10) = 31x(x+10) + 30x(120-x)$$

$$3600x + 36000 = 31x^2 + 310x + 3600x - 30x^2$$

$$0 = x^2 + 310x - 36000$$

$$\boxed{x = 90}$$

$$\cancel{x = -400} \quad \leftarrow x > 0$$

" 90 :

" 90 9 , , .

" 10 6

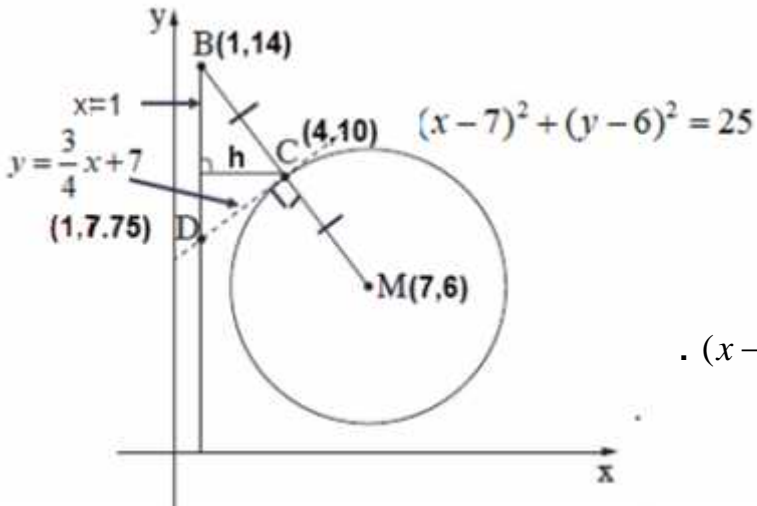
120 - 100 = " 20 , " 100

" 20 8- , :

"

.MB

,C



$$\left. \begin{aligned} x_C &= \frac{7+1}{2} = 4 \\ y_C &= \frac{6+14}{2} = 10 \end{aligned} \right\} \boxed{C(4,10)}$$

.  $R = d_{CM} = \sqrt{(4-7)^2 + (10-6)^2} = 5$

.  $(x-7)^2 + (y-6)^2 = 25$  :

.MC

.  $m_{MC} = \frac{y_C - y_M}{x_C - x_M} = \frac{10-6}{4-7} = -\frac{4}{3}$

.  $m_{mashik} = +\frac{3}{4}$  ,  $m_1 \cdot m_2 = -1$

, , BM

.C ,

$$y - 10 = \frac{3}{4}(x - 4)$$

$$y - 10 = \frac{3}{4}x - 3$$

$$\boxed{y = \frac{3}{4}x + 7}$$

.  $y = \frac{3}{4}x + 7$  C , :

.  $x = 1$  ,  $x -$  , BD .

.  $D(1, 7.75)$  ,  $y_D = \frac{3}{4} \cdot 1 + 7 = 7.75$

$$S_{\triangle BCD} = \frac{BD \cdot h_{BD}}{2} = \frac{(14 - 7.75) \cdot (4 - 1)}{2}$$

$$\boxed{S_{\triangle BCD} = 9.375}$$

.  $S_{\triangle BCD} = 9.375$  :

.( )  $\Delta BME$  -  $CD$  ,  $CD \parallel ME$  .

. , E

$$\left. \begin{aligned} x_E = x_D = 1 \\ 7.75 = \frac{y_E + 14}{2} \rightarrow 15.5 = y_E + 14 \rightarrow 1.5 = y_E \end{aligned} \right\} \boxed{E(1, 1.5)}$$

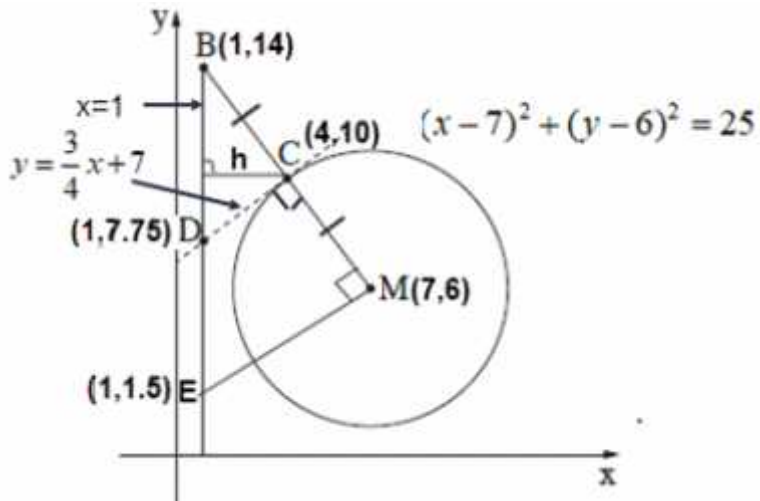
. E(1, 1.5) :

.( )  $\sphericalangle BME = \sphericalangle BCD = 90^\circ$  ,  $CD \parallel ME$  .

.  $\Delta BME$  -  $BD$  -

. D(1, 7.75) ,

.  $\Delta BME$  D , :



$3p$  ,

$- p$  .

$p + 3p = 1$

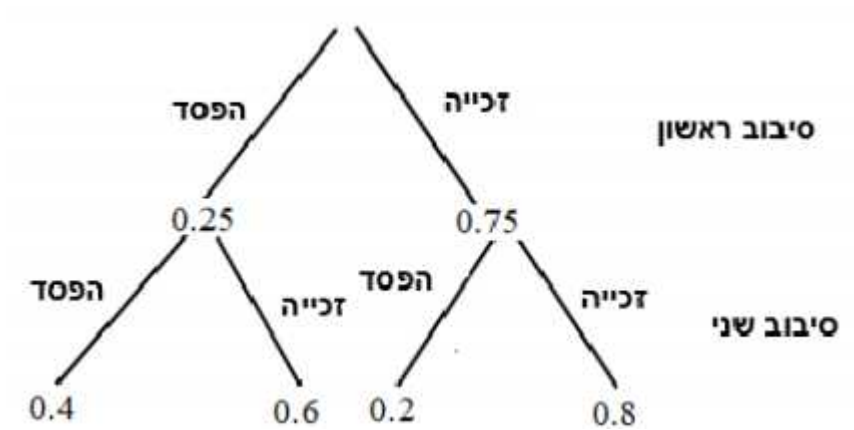
$4p = 1$

$p = 0.25 \rightarrow 3p = 0.75$

.0.75

:

(. " " " " - )



$P = 0.75 \cdot 0.2 + 0.25 \cdot 0.6 = 0.3$  : - (1)

.0.3 :

(2)

$P(\text{won 1st round} / \text{won exactly one round}) = \frac{P(\text{won 1st round} \cap \text{won exactly one round})}{P(\text{won exactly one round})} = \frac{0.75 \cdot 0.2}{0.3} = 0.5$

. 0.5 :

(1) .

$P = 0.75 \cdot 0.8 = 0.6$

. 0.6 :

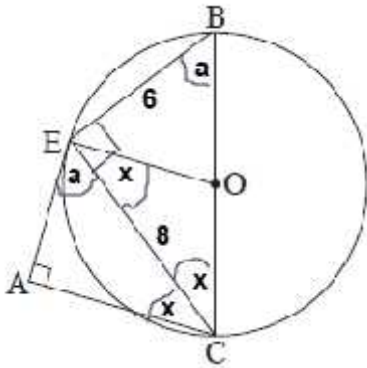
$0.6^4 = 0.1296$  : (2)

$k = 4$  ,  $p = 0.6$  ,  $n = 4$  , , ,

$P(\text{all four will win}) = P_4(4) = \binom{4}{4} \cdot 0.6^4 \cdot (1-0.6)^{4-4} = 1 \cdot 0.6^4 \cdot 0.4^0 = 0.6^4 = 0.1296$

. 0.1296 , , :

"



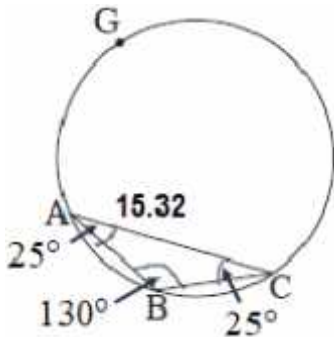
.  $\angle EAC = 90^\circ$  .4 . E - AE .3 BC .2 O .1  
 . EB = " 6 .6 (2) BC · AC = 64 .5 .

.  $\triangle EBC \sim \triangle AEC$  .  $\angle OCE = \angle ACE$  . EO || AC . : "  
 EO (2) . EC (1) .

	O	7	1
	E - AE	8	3
	$\angle OEA = 90^\circ$	9	8
	$\angle EAC = 90^\circ$	10	3
180° -	EO    AC	11	10,9
. . .			
	OE = OC	12	7
$\triangle CEO$	$\angle OCE = \angle OEC$	13	12
	$\angle ACE = \angle OEC$	14	11
	$\angle OCE = \angle ACE$	15	14,13
. . .			
	BC	16	2
	$\angle EBC = 90^\circ$	17	16
	( ) $\angle EBC = \angle OEA$	18	17,10
	( ) $\angle AEC = \angle CBE$	19	8
	$\triangle EBC \sim \triangle AEC$	20	19,18
. . .			
	$\frac{EB}{AE} = \frac{BC}{EC} = \frac{EC}{AC}$	21	20
	BC · AC = 64	22	5
	BC · AC = (EC) <sup>2</sup>	23	12
	EC = " 8	24	23,22
(1) . . .			

	EB = " 6	<b>25</b>	<b>6</b>
$\Delta EBC$	BC = " 10	<b>26</b>	<b>25 ,24 ,17</b>
	EO = " 5	<b>27</b>	<b>26 ,16 ,7</b>
<b>(2) . . .</b>			

.  $\sphericalangle ABC = 130^\circ$ ,  $AB = BC$ , " 10 : .



$\triangle ABC$

$$\frac{AC}{\sin 130^\circ} = 2R$$

$$AC = 2 \cdot 10 \sin 130^\circ$$

$$\boxed{AC = 15.32 \text{ cm}}$$

. AC = " 15.32 :

$$\sphericalangle BAC = \sphericalangle BCA = \frac{180^\circ - 130^\circ}{2} = 25^\circ, \quad \triangle ABC .$$

$$S_{\triangle ABC} = \frac{15.32^2 \sin 25^\circ \sin 25^\circ}{2 \sin 130^\circ}$$

$$\boxed{S_{\triangle ABC} = 27.36 \text{ cm}^2}$$

$\triangle ABC$

$$S_{\triangle ABC} = \frac{15.32 \cdot 8.452 \sin 25^\circ}{2}$$

$$\boxed{S_{\triangle ABC} = 27.36 \text{ cm}^2}$$

$$\frac{BC}{\sin 25^\circ} = 2R$$

$$BC = 2 \cdot 10 \sin 25^\circ$$

$$\boxed{BC = 8.452 \text{ cm}}$$

.  $S_{\triangle ABC} = "$  27.36 :

. GC = " 20 .

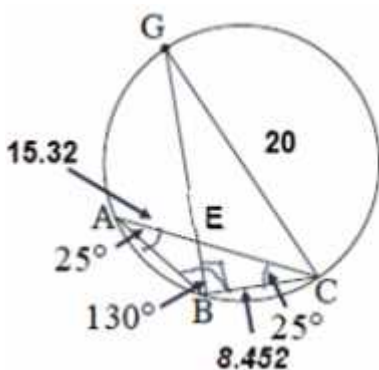
,  $\sphericalangle GBC = 90^\circ$ )  $\triangle EBC$

$$\tan 25^\circ = \frac{EB}{BC}$$

$$8.452 \cdot \tan 25^\circ = EB$$

$$\boxed{EB = 3.941 \text{ cm}}$$

. EB = " 3.941 :



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

$$x^2 + x - 2 \neq 0 \rightarrow x \neq -2, x \neq 1 \tag{1}$$

$$x \neq -2, x \neq 1 \tag{2}$$

$$x = -2 - x = 1 : y =$$

$$y \rightarrow \frac{3x^2}{x^2} = 3, \tag{2} \quad y = 3 : x =$$

$$y = 3, x = -2, x = 1 : \tag{3}$$

$$0 = 3x^2 \rightarrow x = 0 \rightarrow (0,0) - y = 0 : x \quad f(0) = \frac{3 \cdot 0^2}{0^2 + 0 - 2} = 0 \rightarrow (0,0) - x = 0 : y$$

$$(0,0) :$$

$$\tag{4-5}$$

$$f'(x) = \frac{6x(x^2 + x - 2) - 3x^2(2x + 1)}{(x^2 + x - 2)^2}$$

$$f'(x) = \frac{3x[2(x^2 + x - 2) - x(2x + 1)]}{(x^2 + x - 2)^2}$$

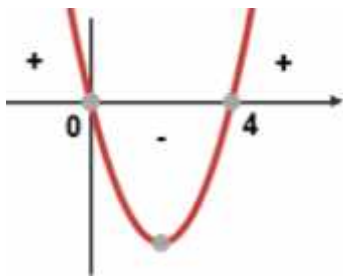
$$f'(x) = \frac{3x(2x^2 + 2x - 4 - 2x^2 - x)}{(x^2 + x - 2)^2}$$

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

$$0 = 3x(x - 4)$$

$$x = 0 \rightarrow (0,0)$$

$$x = 4 \rightarrow (4, \frac{2}{3})$$



" "

, f'(x) , ( )

.( )

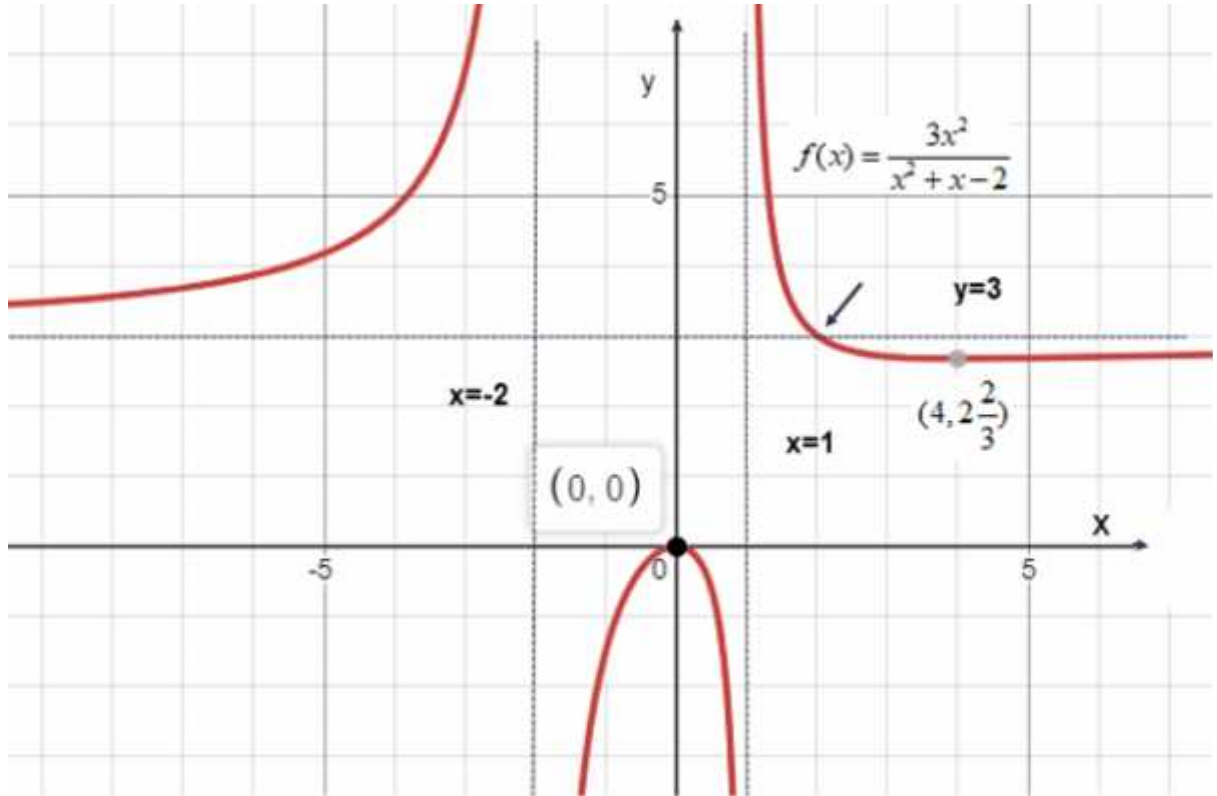
	-2		0		1		4		x
+		+		-		-		+	f'(x)
↖		↖	Max	↘		↘	Min	↖	



$(0,0)$  ,  $(4, 2\frac{2}{3})$  : (4)

$x < -2$   $-2 < x < 0$   $x > 4$  : (5)

$0 < x < 1$   $1 < x < 4$  :



$($  )  $y = 3$

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

$$3x^2 = 3(x^2 + x - 2) \quad / : 3$$

$$x^2 = x^2 + x - 2$$

$$2 = x \rightarrow \boxed{(2, 3)}$$

$(2, 3)$  , :

$g(x) = f(x) + c$

$c = f(x)$

$y = 5$   $g(x)$

$y = 3$   $f(x)$

$2$

$c = 2$  :

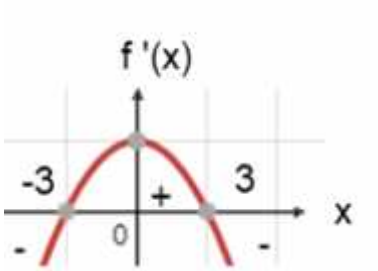
"

•  $a, x$  ,  $f(x) = -\frac{1}{3}x^3 + 9x + a$  .

•  $f(x) = a$  : ,  $x = 0$   $y$  -

•  $(0, a)$  :

• ,  $f(x)$  .



$$f'(x) = -x^2 + 9$$

$$0 = -x^2 + 9$$

$$x = 3 \rightarrow (3, a + 18)$$

$$x = -3 \rightarrow (-3, a - 18)$$

•  $f'(x)$  ,

•  $( \quad )$

	-3		3		$x$
-		+		-	$f'(x)$
↘	<b>Min</b>	↗	<b>Max</b>	↘	

•  $(-3, a - 18)$  ,  $(3, a + 18)$  :

•  $y = 0$  ,  $x$  -

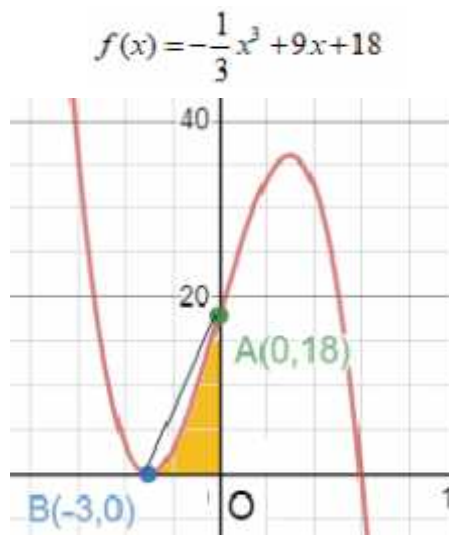
$$a - 18 = 0 \rightarrow a = 18$$

•  $a = 18$  :

$$f(x) = -\frac{1}{3}x^3 + 9x + 18$$

$a = 18$  .

•  $(-3, 0)$  ,  $(3, 36)$  :



(1)

$$S = \int_{-3}^0 \left(-\frac{1}{3}x^3 + 9x + 18 - 0\right) dx$$

$$S = \left[-\frac{x^4}{12} + \frac{9x^2}{2} + 18x\right]_{-3}^0$$

$$x=0: 0$$

$$x=-3: -20\frac{1}{4}$$

$$\boxed{S = 20\frac{1}{4}}$$

"  $20\frac{1}{4}$  :

. 1:3

$\Delta ABO$

(2)

$$S_{\Delta ABO} = \frac{OB \cdot OA}{2} = \frac{3 \cdot 18}{2}$$

$$\boxed{S_{\Delta ABO} = 27}$$

,  $\Delta ABO$

$$20\frac{1}{4} : 27 = 3 : 4 \quad (1) \quad -$$

.(1:3

) 1:3

$\Delta ABO$

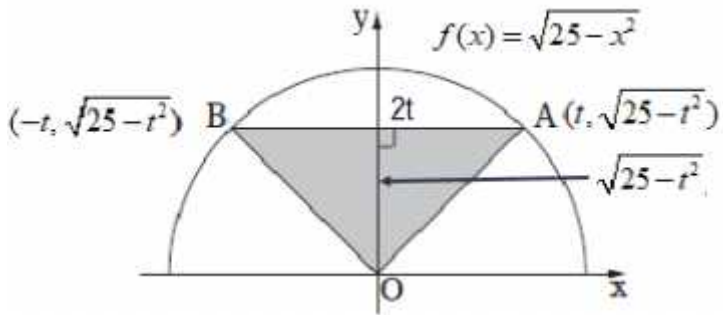
. 1:3

$\Delta ABO$

:

35481

19



$$f(x) = \sqrt{25 - x^2}$$

$$x_A = t \rightarrow \boxed{A(t, \sqrt{25 - t^2})} \quad (1)$$

. y -

$$f(-x) = \sqrt{25 - (-x)^2} = \sqrt{25 - x^2} = f(x)$$

$$\boxed{B(-t, \sqrt{25 - t^2})}$$

$$y_B = y_A$$

$$(-t, \sqrt{25 - t^2}) \quad B(-t, \sqrt{25 - t^2}) :$$

$$x_A = t \rightarrow \boxed{A(t, \sqrt{25 - t^2})} \quad (2)$$

$$x_A - x_B = t - (-t) = 2t$$

, x - , AB

$$\cdot \sqrt{25 - t^2} \quad , AB$$

y -

$$S_{\Delta ABO} = \frac{AB \cdot h_{AB}}{2} = \frac{2t \cdot \sqrt{25 - t^2}}{2}$$

$$\boxed{S_{\Delta ABO} = t \cdot \sqrt{25 - t^2}}$$

$$\cdot S_{\Delta ABO} = t \cdot \sqrt{25 - t^2} :$$

.ABO

πλ'σρν

$$S = t \cdot \sqrt{25 - t^2}$$

$$S' = \sqrt{25 - t^2} + t \cdot \frac{-2t}{2\sqrt{25 - t^2}}$$

$$S' = \frac{25 - t^2 - t^2}{\sqrt{25 - t^2}}$$

$$S' = \frac{25 - 2t^2}{\sqrt{25 - t^2}}$$

$$25 - 2t^2 = 0$$

$$t^2 = 12.5 \rightarrow t = \sqrt{12.5} \approx 3.536 \quad o.k. \quad \leftarrow 0 < t < 5$$

$$\left. \begin{array}{l} S'(3) = \frac{+}{+} > 0 \\ S'(4) = \frac{-}{+} < 0 \end{array} \right\} \boxed{t = \sqrt{12.5}, \max}$$

. ABO

,  $t = \sqrt{12.5}$  :

