

,  $M(-R_M, 0)$

,  $(P = 2)$ ,  $y^2 = 4x$

A

.  $Z(-2, 1)$

A, B

.  $A(\frac{t^2}{4}, t)$

.  $m_{AZ}$  -  $m = \frac{P}{y_0} = \frac{2}{t}$

$yy_0 = P(x + x_0)$

.  $t = 4, t = -2$

$t^2 - 2t - 8 = 0$        $\frac{2}{t} = \frac{4(t-1)}{t^2+8}$        $\frac{2}{t} = \frac{t-1}{\frac{t^2}{4}+2}$

B(1, -2) -

A(4, 4) -

. B(1, -2), A(4, 4) :

K(0,  $y_K$ )

, y -

(1) .

. KB

, ZB ,

. (      )  $m_{KB} = 1$        $m_{ZB} = \frac{P}{y_B} = \frac{2}{-2} = -1$

. K(0, -3) -  $y_K = -3$  -       $1 = \frac{-2 - y_K}{1 - 0}$

. K(0, -3) :

,  $M(-R_M, 0)$  , y - M (2)

, K(0, -3)

.  $R_K = KB = \sqrt{(1-0)^2 + (-2+3)^2} = \sqrt{2}$

$\sqrt{2} + R_M = \sqrt{(-R_M - 0)^2 + (0+3)^2}$

$2 + 2\sqrt{2}R_M + R_M^2 = R_M^2 + 9$

$R_M = \frac{7\sqrt{2}}{4}$

.  $(x + \frac{7\sqrt{2}}{4})^2 + y^2 = 6.125$

.  $(x + \frac{7\sqrt{2}}{4})^2 + y^2 = 6.125$  :

.ACO'

$$2x + y + 2z - 2m = 0$$

,Z=0

B

B - AC

BC'

, BC' || AO'

,"

" :

BC' BC' || AO' -

,0

BC'

BC' || AO' -

BC' - .AO'

.

-

B

$$, 2x + y + 2z - 2m = 0$$

( m, 2m, 0 )

. m

m = 0 -

$$, 2m + 2m + 0 - 2m = 0$$

,

.O' - C , A

BC'

BC' :

.O'M // O'A - ,

O'A

.BC' || AO' (1).

, O'M

.BC' // O'M -

O'M - BC' :

$$O'M - BC' \quad (2)$$

$$BC' - O'A, \quad O'M \quad BC'$$

B

$$, f : 2x + y + 2z - 2m = 0$$

BC'

$$y_B = y_C - x_B = x_A, \quad Z = 0 \quad B$$

$$y_C = 2m \quad 2x + y + 2z - 2m = 0 \quad : x_C = z_C = 0$$

$$x_A = m \quad 2x + y + 2z - 2m = 0 \quad : y_A = z_A = 0$$

$$(m, 2m, 0) \quad B$$

$$d_{B_f} = \frac{|2m + 2m + 0 - 2m|}{\sqrt{2^2 + 1^2 + 2^2}} = \frac{2m}{3}$$

$$\frac{2m}{3} \quad :$$

FB - EC'

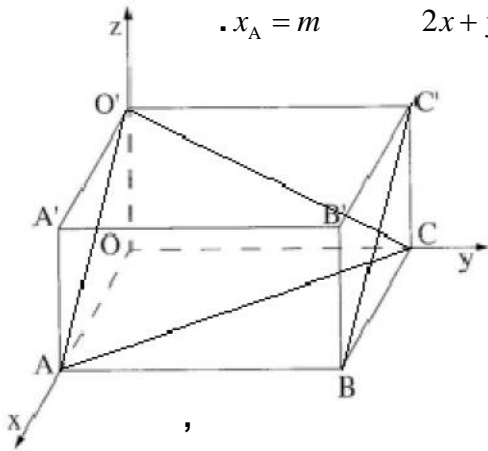
$$C'B = EF = 2\sqrt{2}, \quad EFBC'$$

$$z_C = z_{O'} = m, \quad C'(0, 2m, m) \quad z_{O'} = m \quad : x_C = y_{O'} = 0$$

$$\overline{C'B} = \underline{B} - \underline{C'} = \underline{x} = (m, 0, -m)$$

$$(m > 0) \quad m = 2 - 8 = 2m^2, \quad 2\sqrt{2} = \sqrt{m^2 + (-m)^2}$$

$$m = 2 :$$



$$|z^2 - 3i| = |z^2 - i|$$

$$z = a + bi$$

$$|z^2 - 3i| = |z^2 - i|$$

$$|(a + bi)^2 - 3i| = |(a + bi)^2 - i|$$

$$|a^2 + 2abi - b^2 - 3i| = |a^2 + 2abi - b^2 - i|$$

$$|(a^2 - b^2) + (2ab - 3)i| = |(a^2 - b^2) + (2ab - 1)i|$$

$$(a^2 - b^2)^2 + (2ab - 3)^2 = (a^2 - b^2)^2 + (2ab - 1)^2$$

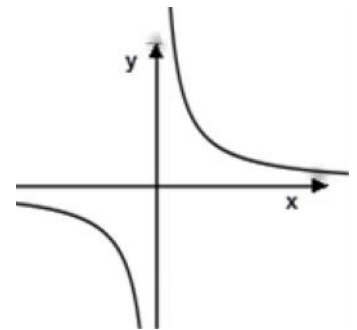
$$4a^2b^2 - 12ab + 9 = 4a^2b^2 - 4ab + 1$$

$$8 = 8ab$$

$$1 = ab$$

$$x < 0 \quad x > 0$$

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



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

$$z_1 = 1 + iy_1$$

$$z_1 = 1 + i$$

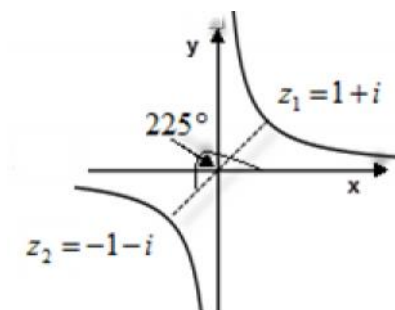
$$y = 1$$

$$x = 1$$

$$z_2$$

$$z_1$$

$$(-1, -1)$$



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

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

$$z_1 = 1 + i$$

$$z_2 = -1 - i$$

$$\tan \theta_{z_2} = \frac{-1}{-1}$$

$$\theta = 45^\circ + 180^\circ k$$

$$\theta = 225^\circ \leftarrow 3rd \text{ quadrant}$$

$$225^\circ$$

$$z_2$$

:

"

$$f(x) = \ln \frac{a+x}{a-x} \quad (a > 0) \tag{1}$$

$$\frac{a+x}{a-x} > 0 \quad / \cdot (a-x)^2 > 0$$

$$(a-x)(a+x) > 0$$

$$-a < x < a \tag{2}$$

$$f(x) = \ln(a+x) - \ln(a-x) \tag{2}$$

$$x = 0 \tag{3}$$

$$x = -a \quad x = a \tag{3}$$

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

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

$$f'(x) = \frac{2a}{(a+x)(a-x)}$$

$$a > 0 \tag{4}$$

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

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

$$f''(x) = \frac{-(a-x)^2 + (a+x)^2}{(a+x)^2 \cdot (a-x)^2}$$

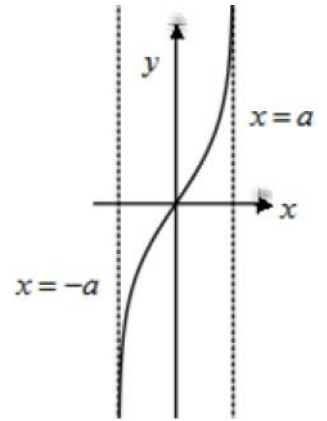
$$f''(x) = \frac{4ax}{(a+x)^2 \cdot (a-x)^2}$$

$$x = 0 \tag{4}$$

$$x = 0 \quad x > 0 \tag{4}$$

$$f(0) = \ln \frac{a+0}{a-0} = \ln 1 = 0$$

"



$f'(0) = 1$        $(0,0)$

$1$        $y = x$

$a = 2$        $1 = \frac{2a}{(a+0)(a-0)}$

$x > 0$

$x < 0$

$f(x)$

$(0,1)$

$x > 0$

$x < 0$

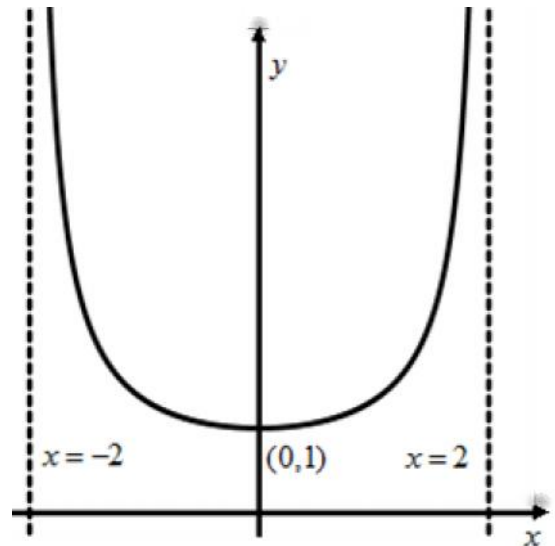
$f'(x)$

$x = -2$        $x = 2$

$-2 < x < 2$

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

:



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

$$x \neq \ln 2 \quad e^x \neq 2 \quad , e^x - 2 \neq 0 \quad (1)$$

$$x \neq \ln 2 :$$

$$x = \ln 2 \quad \pm\infty \quad \frac{4e^x \rightarrow 4\ln 2}{e^x - 2 \rightarrow 0} + 2 + 4 \quad x \rightarrow \ln 2 \quad (2)$$

$$y = 4 \quad \lim_{x \rightarrow -\infty} f(x) = -\frac{4 \cdot 0}{0 - 2} + 0 + 4 = 4 \quad 0 \quad e^x \quad x \rightarrow -\infty$$

$$y = 4 \quad , \quad x = \ln 2 :$$

(3)

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

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

$$f'(x) = e^x \cdot \frac{8 + e^{2x} - 4e^x + 4}{(e^x - 2)^2}$$

$$f'(x) = e^x \cdot \frac{e^{2x} - 4e^x + 12}{(e^x - 2)^2}$$

$$x \quad e^{2x} - 4e^x + 12$$

$$, ( \quad e^x = t \quad )$$

$$x \quad x < \ln 2 \quad x > \ln 2 \quad :$$

$$f(x) \quad (4)$$

$$f(0) = -\frac{4e^0}{e^0 - 2} + e^0 + 4 = 4 + 1 + 4 = 9 \rightarrow \boxed{(0, 9)}$$

$$0 = -\frac{4e^x}{e^x - 2} + e^x + 4$$

$$0 = -4e^x + e^{2x} - 2e^x + 4e^x - 8$$

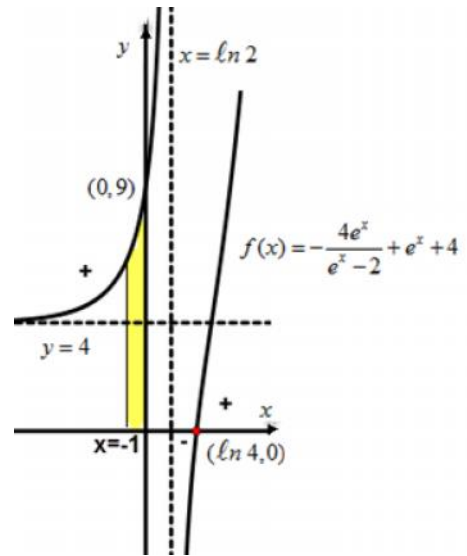
$$0 = e^{2x} - 2e^x - 8 = (e^x - 4)(e^x + 2)$$

$$x = \ln 4 \rightarrow \boxed{(\ln 4, 0)}$$

$$(0, 9) , (\ln 4, 0) : \quad f(x) \quad :$$

"

.( / , )  $f(x)$  (5)



.( ) , .

$$S = \int_{-1}^0 \left( -\frac{4e^x}{e^x - 2} + e^x + 4 - 0 \right) dx$$

$$S = \int_{-1}^0 \left( -4 \cdot \frac{1}{e^x - 2} \cdot e^x + e^x + 4 \right) dx$$

$$S = -4 \cdot \ln |e^x - 2| + e^x + 4x \Big|_{-1}^0$$

$$S = -4 \cdot \ln 1 + e^0 + 4 \cdot 0 - \left[ -4 \cdot \ln \left( 2 - \frac{1}{e} \right) + e^{-1} + 4 \cdot (-1) \right]$$

$$S = 4 \ln \left( 2 - \frac{1}{e} \right) + 5 - \frac{1}{e} \approx 6.592$$

∫  $\frac{1}{e^x - 2} = \ln(-(e^x - 2)) + c = \ln(2 - e^x) + c$  :  $x < \ln 2$  :

"  $4 \ln \left( 2 - \frac{1}{e} \right) + 5 - \frac{1}{e} \approx 6.592$  :

$x > \ln 2$  ,  $F(x) = \int f(x) dx$  .

$F'(x) = f(x)$  :

$f(x)$  / , ,  $F(x)$

(5)

$\ln 2 < x < \ln 4$   $x > \ln 4$  :  $F(x)$

.( )  $x = \ln 4$   $F(x)$   $x -$

$x = \ln 4$  :

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