

$$\cdot (a > 0) \quad B(a, 0) \quad - \quad A(-a, 0)$$

$$\cdot PA = 2PB \quad - \quad , \quad , P(s, t)$$

$$\sqrt{(s+a)^2 + (t-0)^2} = 2\sqrt{(s-a)^2 + (t-0)^2} \quad ()^2$$

$$s^2 + 2as + a^2 + t^2 = 4 \cdot (s^2 - 2as + a^2 + t^2)$$

$$-3a^2 = 3s^2 - 10as + 3t^2 \quad / : 3$$

$$-a^2 = s^2 - \frac{10}{3}as + t^2$$

$$\frac{25}{9}a^2 - a^2 = (s - \frac{5}{3}a)^2 + t^2$$

$$\frac{16}{9}a^2 = (s - \frac{5}{3}a)^2 + t^2$$

$$\cdot (a > 0) \quad \frac{4}{3}a \quad (\frac{5}{3}a, 0) \quad , (x - \frac{5}{3}a)^2 + y^2 = \frac{16}{9}a^2$$

$$\cdot |z + b| = 4$$

$$: \quad , (\quad a, b, x, y) \quad z = x + yi$$

$$|x + yi + b| = 4$$

$$|x + b + yi| = 4$$

$$\sqrt{(x+b)^2 + y^2} = 4$$

$$(x+b)^2 + y^2 = 16$$

$$\cdot 4 \quad (-b, 0)$$

$$, a = 3 \quad , \frac{4}{3}a = 4$$

$$\cdot b = -5 \quad - \quad -\frac{5}{3} \cdot 3 = b \quad - \quad , \frac{5}{3}a = -b \quad -$$

$$\cdot 4 \quad (5, 0) \quad , (x-5)^2 + y^2 = 16$$

$$\cdot b = -5, a = 3 :$$

- $y_E = y_F < 0$, $(x-5)^2 + y^2 = 16$, TNEF .
- $(x, 0)$ C - $\overline{CN} \cdot \overline{CF} = -16$ - , x - C
- $\sphericalangle NMF = 180^\circ$, N, F 4 , M(5, 0) ,

$$\overline{MN} \cdot \overline{MF} = |\overline{MN}| \cdot |\overline{MF}| \cdot \cos \sphericalangle NMF = 4 \cdot 4 \cdot \cos(180^\circ) = -16$$

$$(5, 0) \quad C$$

$$x_T = 2, y_T > 0 \quad , \quad T \quad z = 2 + iy$$

$$(2-5)^2 + y^2 = 16 \rightarrow y^2 = 7 \rightarrow y = \sqrt{7} \rightarrow T(2, \sqrt{7}) : \quad x = 2$$

$$(2, -\sqrt{7}) \quad F \quad x =$$

$$(8, \sqrt{7}) \quad N \quad x = 5$$

$$\overline{CF} = \underline{F} - \underline{C} = \underline{x} = (2-x, -\sqrt{7}) \quad , \quad \overline{CN} = \underline{N} - \underline{C} = \underline{x} = (8-x, \sqrt{7})$$

$$\overline{CN} \cdot \overline{CF} = -16$$

$$(8-x, \sqrt{7}) \cdot (2-x, -\sqrt{7}) = -16$$

$$(8-x)(2-x) - 7 = -16$$

$$16 - 10x + x^2 - 7 = -16$$

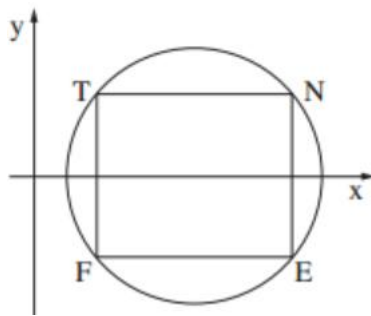
$$x^2 - 10x + 25 = 0$$

$$(x-5)^2 = 0$$

$$x = 5$$

$$(5, 0) \quad C$$

$$(5, 0) \quad C \quad :$$



• $B(1, 1, 0) - A(0, 0, 1)$ ℓ .

:

• $\ell = (0, 0, 1) + t(1, 1, -1)$, $\overline{AB} = \underline{B} - \underline{A} = \underline{x} = (1, 1, -1)$

• D f_1 ℓ

• D

• $\underline{x} = (1, 1, -1)$, $x + y - z + d = 0$ f_1

• $x + y - z = 0$ f_1 $d = 0$, f_1

• $(t, t, 1-t)$ ℓ

• $(\frac{1}{3}, \frac{1}{3}, \frac{2}{3})$ $t + t - (1-t) = 0 \rightarrow t = \frac{1}{3}$

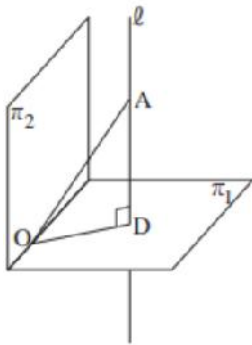
• $\frac{OD \cdot AD}{2}$ ΔOAD f_1 ℓ

$OD = \sqrt{(\frac{1}{3}-0)^2 + (\frac{1}{3}-0)^2 + (\frac{1}{3}-0)^2} = \sqrt{\frac{2}{3}}$

$AD = \sqrt{(\frac{1}{3}-0)^2 + (\frac{1}{3}-0)^2 + (\frac{2}{3}-1)^2} = \sqrt{\frac{1}{3}}$

$S_{\Delta OAD} = \frac{OD \cdot OA}{2} = \frac{\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{1}{3}}}{2} = \frac{\sqrt{2}}{6}$

• $\frac{\sqrt{2}}{6}$ ΔOAD :



$$\begin{aligned} & \cdot \quad \cdot \quad f_1 \quad \ell \quad (1) \cdot \\ & \cdot (f_2 -)f_1 \quad f_2 \quad f_1 \\ & \cdot \quad \cdot \quad \ell \\ & \cdot 90^\circ \quad : \end{aligned}$$

$$\begin{aligned} & \cdot \quad \cdot \quad f_2 \quad \ell \quad (2) \\ ,f_2 \quad \ell \quad \cdot (\quad) \end{aligned}$$

$$\underline{x} = s(1, 0, 0) + r(1, 1, -1) : \quad \ell \quad x - \quad f_2$$

$$\left. \begin{aligned} (a, b, c) (1, 0, 0) = 0 & \rightarrow a = 0 \\ (a, b, c) (1, 1, -1) = 0 & \rightarrow a + b - c = 0 \end{aligned} \right\} b = c \rightarrow a = 0, b = 1, c = 1$$

$$\cdot y + z = 0 \quad , \quad \cdot f_2$$

$$: f_2 : y + z = 0 \quad A(0, 0, 1)$$

$$d = \frac{|0+1|}{\sqrt{1^2+1^2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cdot \frac{\sqrt{2}}{2} \quad :$$

$$\cdot f_2 \quad \ell \quad f_1 \quad , \quad f_2 - f_1 \quad : \underline{\quad}$$

$(0 < k < 1) \quad AE = kAB - AB$

E .

$\Delta ABC \quad A'EC \quad \sphericalangle A'EA$

$\Delta ABC - (A'E) CE \quad AE$

$k = 0.5 - AB - CE - ,$

$k = 0.5 :$

$AE = AB : 2 = AC : 2 = 2 : 2 = 1 . \sphericalangle A'EA = 45^\circ , AC = 2$

$A'A = AE = 1 \quad \Delta A'EA$

$\Delta A'BC \quad (\dots) \Delta A'AC \cong \Delta A'AB$

$AT, A'T , BC \quad T$

$\sphericalangle A'TA - A'BC \quad ABC \quad BC$

$AT = \sqrt{3} , \quad \Delta ATB -$

$\tan \sphericalangle A'TA = \frac{A'A}{AT} = \frac{1}{\sqrt{3}} \rightarrow \sphericalangle A'TA = 30^\circ : \Delta A'TA -$

$30^\circ :$

ΔABC

$\overline{AC} = \underline{u} \quad |\underline{u}| = 2 \quad \underline{u}^2 = 4$

$\overline{AB} = \underline{v} \quad |\underline{v}| = 2 \quad \underline{v}^2 = 4$

$\overline{AA'} = \underline{w} \quad |\underline{w}| = 1 \quad \underline{w}^2 = 1$

$\underline{u} \cdot \underline{w} = \underline{v} \cdot \underline{w} = 0$

$\underline{u} \cdot \underline{v} = |\underline{u}| \cdot |\underline{v}| \cos \sphericalangle BAC = 2 \cdot 2 \cdot \cos 60^\circ = 2$

$\overline{A'F} = t\overline{A'C} + m\overline{A'B} \rightarrow \overline{A'F} = t(\overline{A'A} + \overline{AC}) + m(\overline{A'A} + \overline{AB})$

$\overline{A'F} = t(-\underline{w} + \underline{u}) + m(-\underline{w} + \underline{v})$

$\overline{A'F} = t\underline{u} + m\underline{v} + (-t - m)\underline{w}$

$\overline{AF} = \overline{AA'} + \overline{A'F}$

$\overline{AF} = t\underline{u} + m\underline{v} + (1 - t - m)\underline{w}$

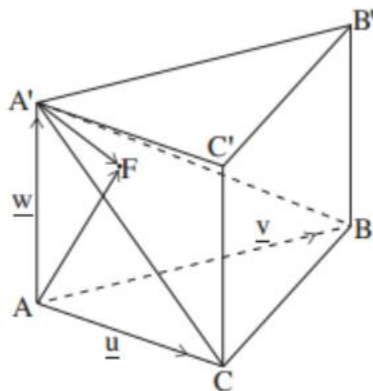
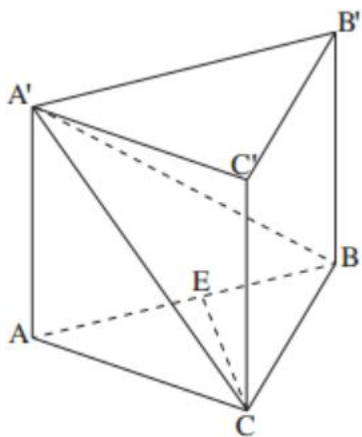
$\overline{BC} = \overline{BA} + \overline{AC}$

$\overline{BC} = \underline{u} - \underline{v}$

$\overline{AF} \cdot \overline{BC} = 0 \leftarrow \overline{AF} \perp \overline{BC}$

$t\underline{u}^2 - m\underline{v}^2 + (m - t)\underline{u}\underline{v} = 0 \rightarrow 4t - 4m + (m - t) \cdot 2 = 0$

$4t - 4m + 2m - 2t = 0 \rightarrow \boxed{t = m}$



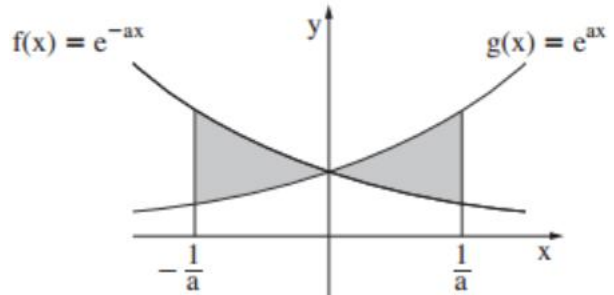
:"

$(a > 0) \quad g(x) = e^{ax}, \quad f(x) = e^{-ax}$

$x \rightarrow -\infty \quad y = 0 \quad (0,1) \quad , \quad g(x) = e^{ax} \quad (1)$

$x \rightarrow \infty \quad y = 0 \quad (0,1) \quad , \quad f(x) = e^{-ax}$

$x = -\frac{1}{a}, (a > 0) \quad x = \frac{1}{a}$



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

$x > 0 - x \leq 0 \quad g(x) \quad x < 0 - x \geq 0 \quad f(x)$

y

$$V(a) = 2f \left(\int_0^{\frac{1}{a}} (e^{ax})^2 dx - \int_0^{\frac{1}{a}} (e^{-ax})^2 dx \right) = 2f \left(\int_0^{\frac{1}{a}} (e^{2ax} - e^{-2ax}) dx \right)$$

$$V(a) = 2f \left(\frac{e^{2ax}}{2a} - \frac{e^{-2ax}}{-2a} \right) \Big|_0^{\frac{1}{a}} = 2f \left[\left(\frac{e^{2a \cdot \frac{1}{a}}}{2a} + \frac{e^{-2a \cdot \frac{1}{a}}}{2a} \right) - \left(\frac{e^{2a \cdot 0}}{2a} + \frac{e^{-2a \cdot 0}}{2a} \right) \right]$$

$$V(a) = 2f \left(\frac{e^2}{2a} + \frac{e^{-2}}{2a} \right) - \left(\frac{1}{2a} + \frac{1}{2a} \right) = f \cdot \frac{e^2 + e^{-2} - 2}{a}$$

$V(a) = f \cdot \frac{e^2 + e^{-2} - 2}{a}$

$(k > 0) \quad V(a) = k \cdot \frac{1}{a} \quad (a > 0) \quad V(a) = f \cdot \frac{e^2 + e^{-2} - 2}{a} \quad (3)$

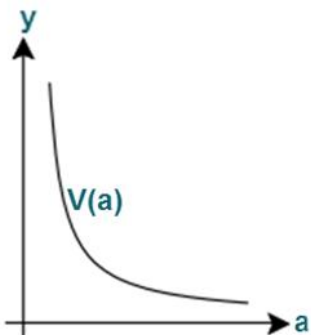
$y = 0 - x = 0$

$a > 0$

$$V'(a) = -\frac{k}{a^2}$$

$a > 0$

$$V(a) = \frac{2k}{a^3}$$



$$M_t = M_0 \cdot q^t$$

.t .q ()
 . t - M_t , - M₀
 . ' M₀ - ' M₀ 1.1.2005
 M₇ = 13,162 ' M₇ = 12,298 ' 7

$$\begin{cases} (1) & 13,162 = M_0 \cdot q_2^7 \\ (2) & 12,298 = M_0 \cdot q_1^7 \end{cases}$$

$$\frac{(1)}{(2)} \quad \frac{6581}{6149} = \frac{(q_2)^7}{q_1^7} \rightarrow \frac{q_2}{q_1} = \left(\frac{6581}{6149}\right)^{\frac{1}{7}}$$

. ' 25% - ' 1.1.2005 t

$$M_0 \cdot q_2^t = 1.25M_0 \cdot q_1^t :$$

$$q_2^t = 1.25q_1^t$$

$$\left(\frac{q_2}{q_1}\right)^t = 1.25$$

$$\left(\left(\frac{6581}{6149}\right)^{\frac{1}{7}}\right)^t = 1.25$$

$$\ln\left(\frac{6581}{6149}\right)^{\frac{1}{7}} = \ln 1.25$$

$$t \ln\left(\frac{6581}{6149}\right)^{\frac{1}{7}} = \ln 1.25$$

$$t = \frac{\ln 1.25}{\ln\left(\frac{6581}{6149}\right)^{\frac{1}{7}}}$$

$$\boxed{t \approx 23}$$

. , 23 :

$$k \neq 0, f(x) = \frac{kx}{\ln x}$$

$$\ln x - x > 0 \quad x = 1 \quad \ln x$$

$$x > 0, x \neq 1 :$$

$$f(x) = k \tag{1}$$

$$f'(x) = k \cdot \frac{\ln x - \frac{x}{x}}{\ln^2 x}$$

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

$$\ln x - 1 = 0 \rightarrow \ln x = 1 \rightarrow x = e$$

$$, x > e \quad 1 < x < e$$

$$f''(x) < 0$$

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

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

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

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

$$f(x) \quad k < 0 :$$

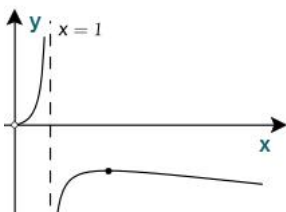
$$(e, -2), f(x) = \frac{kx}{\ln x} \leq -2 \quad x > 1 \tag{2}$$

$$k = -\frac{2}{e} \quad -2 = \frac{ke}{\ln e} :$$

$$k = -\frac{2}{e} :$$

$$f(x) = -\frac{2x}{e \ln x} \quad x = 1 \tag{3}$$

$$f(0.001) = 1.06 \cdot 10^{-4} \rightarrow 0^+, f(0.999) = 734 \rightarrow +\infty, f(999) = -106 \rightarrow -\infty$$



$$f''(x) = -\frac{2}{e} \cdot \frac{\ln x (2 - \ln x)}{x \ln^4 x}, \quad k = -\frac{2}{e}$$

$$2 - \ln x \rightarrow \ln x = 2 \rightarrow x = e^2$$

$$x = e^2 \quad f''(e) < 0, \quad f''(e^3) > 0$$

$$f(e^2) = -\frac{2e^2}{e \ln e^2} = -e$$

$$(e^2, -e)$$

: