

1.

$t$  מ"ס  $d=5$   $a_1=50$  12 נ"מ  
 $S_t = \frac{t}{2} [2 \cdot 50 + 5(t-1)] = 50t + 2.5t^2 - 2.5t = 2.5t^2 + 47.5t$

$t-3$  מ"ס  $d=-4$   $a_1=90$  5 נ"מ  
 $S_{t-3} = \frac{t-3}{2} [2 \cdot 90 - 4(t-3-1)] = \frac{t-3}{2} (180 - 4t + 16) = \frac{t-3}{2} (196 - 4t) =$   
 $= (t-3)(98 - 2t) = 98t - 294 - 2t^2 + 6t = -2t^2 + 104t - 294$

סכום הפרטים של שני התארים שווה לכל הזמן:

$$1110 = 2.5t^2 + 47.5t - 2t^2 + 104t - 294$$

$$0.5t^2 + 151.5t - 1404 = 0$$

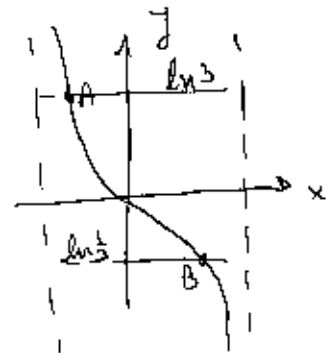
$$t = -311.5 \quad t = 9$$

2.

Ⓐ  $1+x > 0$   $PA$   $1-x > 0$   
 $x > -1$   $PA$   $x < 1$   
 $-1 < x < 1$

Ⓑ  $f(x) = \log_{\frac{1}{e}}(1+x) - \log_{\frac{1}{e}}(1-x) = \frac{\ln(1+x)}{\ln \frac{1}{e}} - \frac{\ln(1-x)}{\ln \frac{1}{e}} = -\ln(1+x) + \ln(1-x)$

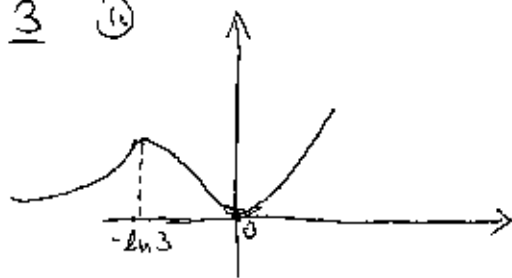
Ⓒ (1)  $-\frac{8}{3} = \frac{-1}{1-x} - \frac{1}{1+x} \quad | \cdot 3(1-x)(1+x)$   
 $-8(1-x^2) = -3(1+x) - 3(1-x)$   
 $-8 + 8x^2 = -3 - 3x - 3 + 3x$   
 $8x^2 = 2$   
 $x = \pm \frac{1}{2}$   $\rightarrow x_A = -\frac{1}{2} \quad x_B = \frac{1}{2}$



(2)  $A(\frac{1}{2}, \ln \frac{1}{2} - \ln \frac{1}{2}) \rightarrow y = \ln \frac{\frac{1}{2}}{\frac{1}{2}} = \ln 1 = 0$  :  $A = \bar{P}$   $x = \frac{1}{2}$  : הנקודה הנמוכה ביותר  
 $B(-\frac{1}{2}, \ln \frac{1}{2} - \ln \frac{1}{2}) \rightarrow y = \ln \frac{\frac{1}{2}}{\frac{1}{2}} = \ln 1 = 0$  : הנקודה הגבוהה ביותר  
 $\ln 3 - \ln \frac{1}{3} = \ln 3 + \ln(\frac{1}{3})^{-1} = \ln 3 + \ln 3 = 2 \ln 3$  : המרחק בין שתי הנקודות

Ⓓ הפונקציה איננה מתאמת את עצמה, ולכן פתרון המשוואה הוא  $x = 0$ .

3 (1)



$$\textcircled{2} f'(x) = 3e^{3x} - 2ae^{ax} + e^x$$

$$f'(0) = 0 = 3e^0 - 2ae^0 + e^0 = 3 - 2a + 1$$

$$\boxed{a=2}$$

$$\textcircled{3} \int_{-\ln 3}^0 (e^{3x} - 2e^{2x} + e^x) dx = \left. \frac{e^{3x}}{3} - \frac{2e^{2x}}{2} + e^x \right|_{-\ln 3}^0 =$$

$$= \left( \frac{1}{3} - 1 + 1 \right) - \left( \frac{1}{81} - \frac{1}{9} + \frac{1}{3} \right) = \frac{8}{81}$$

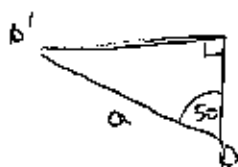
4 (1)



$$\cos 60 = \frac{A'B'}{a} \rightarrow \boxed{A'B' = a \cdot \cos 60 = \frac{1}{2}a}$$

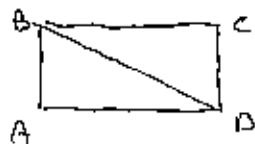
$$\sin 60 = \frac{A'D}{a} \rightarrow A'D = a \sin 60 = 0.866a$$

(2)



$$\sin 50 = \frac{B'C'}{a} \rightarrow \boxed{B'C' = a \cdot \sin 50 = 0.766a}$$

$$(3) AB = A'B' = \frac{1}{2}a \quad AD = B'C' = 0.766a$$

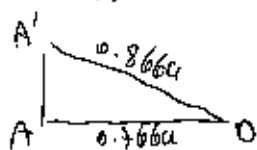


$$BD^2 = AD^2 + AB^2 = \left( \frac{1}{2}a \right)^2 + (0.766a)^2 = 0.8368a^2$$

$$\boxed{BD = 0.9148a}$$

(2)

$$V_{\text{תבנית}} = AD \cdot AB \cdot AA' = 0.766a \cdot \frac{1}{2}a \cdot 0.4a = 0.1547a^3$$



$$AA' = \sqrt{(0.866a)^2 - (0.766a)^2} \rightarrow AA' = 0.4a$$