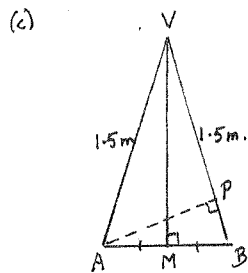


Solutions manual – Mathematical Studies (SL)

13. (b)  $\cos \alpha = \frac{0.25\sqrt{3}}{1.5}$   
 $\therefore \alpha \approx 73^\circ 13'$

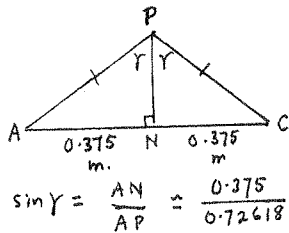
Angle leg makes with ground  
 is  $73^\circ 13'$



In  $\Delta VMB$ ,  $\cos \beta = \frac{0.375}{1.5} = 0.25$

In  $\Delta APB$ ,  $AP = 0.75 \sin \beta$   
 $\approx 0.72618$

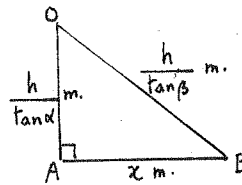
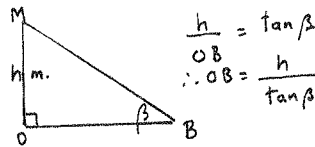
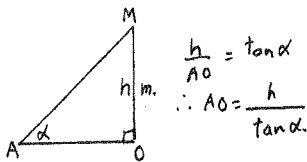
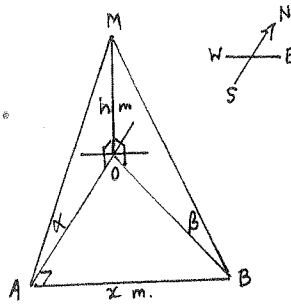
Similarly, in  $\Delta VBC$ ,  
 $PC \approx 0.72618$



$\therefore \gamma \approx 31.091^\circ$

Angle between sloping faces  
 $= \angle APC = 2\gamma \approx 62.182^\circ$   
 $= \underline{62^\circ 11'}$

14.



$OB^2 = OA^2 + AB^2$

$\therefore \frac{h^2}{\tan^2 \beta} = \frac{h^2}{\tan^2 \alpha} + x^2$

$\therefore h^2 \frac{\cos^2 \beta}{\sin^2 \beta} - h^2 \frac{\cos^2 \alpha}{\sin^2 \alpha} = x^2$

$\therefore h^2 \{ \cos^2 \beta \sin^2 \alpha - \cos^2 \alpha \sin^2 \beta \}$   
 $= x^2 \sin^2 \alpha \sin^2 \beta$

$\therefore h^2 \{ (1 - \sin^2 \beta) \sin^2 \alpha - (1 - \sin^2 \alpha) \sin^2 \beta \}$   
 $= x^2 \sin^2 \alpha \sin^2 \beta$

$\therefore h^2 (\sin^2 \alpha - \sin^2 \beta) = x^2 \sin^2 \alpha \sin^2 \beta$

$\therefore h = \frac{x \sin \alpha \sin \beta}{\sqrt{\sin^2 \alpha - \sin^2 \beta}}$  (since  $h > 0$ )