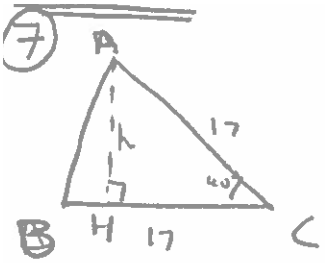
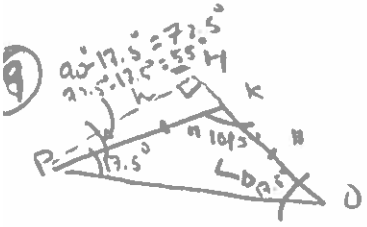
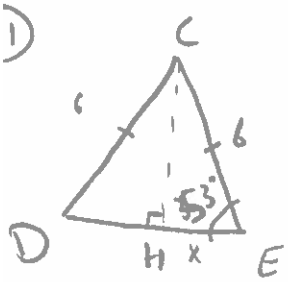
(7) 

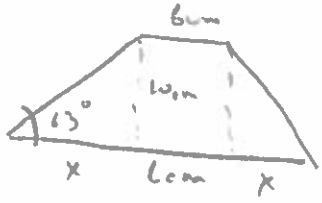

$h = 17 \cdot \sin(40°) =$

(9) 


$h = 11 \cdot \cos(55°) =$

(11) 


$\overline{DE} = 2x = 2(6 \cdot \cos(53°)) =$

(13) 

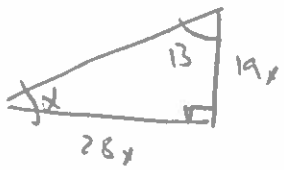

$\text{base} = 2x + 6\text{cm} = 2\left(\frac{10\text{cm}}{\sin 63°}\right) + 6\text{cm} =$

(15) $\arcsin(.0175) =$ $\quad \arccos(.06814) =$

$\arcsin(.5015) =$ $\quad \arccos(.0670) =$

(17) $\arctan(.3227) =$ $\quad \arctan(6.152) =$

$\arctan(.7846) =$ $\quad \arctan(9.254) =$

(19) 


$\alpha = \arctan \frac{19}{28} =$

$\beta = \arctan \frac{28}{19} =$

(21) a) $\sin\alpha = \sqrt{1 - \cos^2\alpha} = \sqrt{1 - (5/13)^2} = \frac{\sqrt{13^2 - 5^2}}{13} = \boxed{12/13}$

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \boxed{12/5}$

b) $\sin\alpha = \sqrt{1 - \cos^2\alpha} = \sqrt{1 - (15/17)^2} = \frac{\sqrt{17^2 - 15^2}}{17} = \boxed{8/17}$

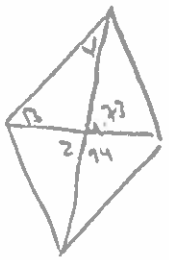
$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \boxed{8/15}$

c) $\sin\alpha = \sqrt{1-.36} = \boxed{.8}$ $\tan\alpha = .8/.6 = \boxed{4/3}$

(23) $a \cdot \cos(60°) = \boxed{1/2\,a}$

(25) a) $\underline{\alpha}$ b) $\underline{\beta}$ c) $\cos\alpha = 15/35$ $\cos\beta = 14/35$ $\underline{\beta}$ d) $\underline{\beta}$ e) $\underline{\beta}$ f) $\underline{\alpha}$

(27)

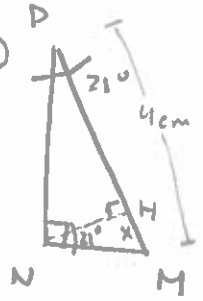



$\alpha = \arctan\left(\frac{2.94}{2} \div \frac{4.73}{2}\right)$

$2\alpha = \boxed{2\arctan\left(\frac{2.94}{4.73}\right)} =$ (actual angle)

$2\beta = \boxed{2\arctan\left(\frac{4.71}{2.94}\right)} =$

(29)

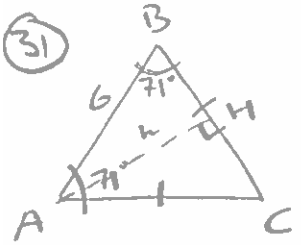



$\overline{NM} = 4\text{cm} \cdot \sin 21°$

$\overline{HM} = \overline{NM} \cdot \sin 21° = 4\text{cm} \cdot \sin^2 21° =$

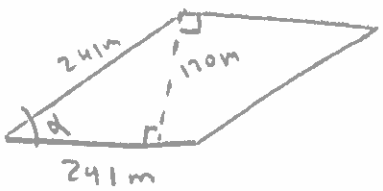
(BTW - $\overline{HP}$ is $4\text{cm} \cdot \cos^2 21°$ ... $\sin^2 + \cos^2 = 1$ !!)

(31)




$\overline{AH} = 6 \cdot \sin 71° =$

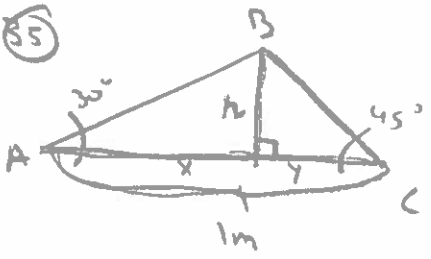
(33)




$\sin\alpha = \frac{120m}{241m}$ $\alpha = \arcsin\left(\frac{120}{241}\right) =$

$\beta = \arccos\left(\frac{120}{241}\right) + \pi/2 =$

(35)




$\tan 45° = h/y$ $\tan 30° = h/x$

$y = h \cdot \cot 45°$ $x = h \cdot \cot 30°$ $x + y = 1$

$h(\cot 45° + \cot 30°) = 1$

$h(1 + \sqrt{3}) = 1$

$h = \frac{1}{1+\sqrt{3}} = \frac{1-\sqrt{3}}{1-3} = \frac{\sqrt{3}-1}{2}$

$AB = \frac{h}{\sin 30°} = \frac{\sqrt{3}-1/2}{1/2} = \underline{\sqrt{3}-1}$

$Bc = \frac{h}{\sin 45°} = \frac{\sqrt{3}-1/2}{\sqrt{2}/2} = \underline{\frac{\sqrt{6}-\sqrt{2}}{2}}$

(37) $2\tan^{-1}\left(\frac{9}{4\sqrt{3}}\right) = \underline{60^\circ}$ $2\tan^{-1}\left(\frac{4\sqrt{3}}{9}\right) = \underline{120^\circ}$

(39) a) $\frac{\sin^2\alpha}{1+\cos\alpha} = \frac{1-\cos^2\alpha}{1+\cos\alpha} = \underline{1-\cos\alpha}$ b) $\frac{\cos^2\alpha}{\sin\alpha - 1} = \frac{1-\sin^2\alpha}{\sin\alpha - 1} = \underline{-1-\sin\alpha}$

c) $\frac{\tan\alpha + \tan\beta}{\cot\alpha + \cot\beta} = \frac{(\sin\alpha\sin\beta)(\sin\alpha\cos\beta + \sin\beta\cos\alpha)}{(\cos\alpha\cos\beta)(\cos\alpha\sin\beta + \cos\beta\sin\alpha)} = \underline{\tan\alpha\tan\beta}$

d) $\frac{\sin\alpha + \cos\alpha}{\sec\alpha + \csc\alpha} = \frac{(\sin\alpha\cos\alpha)(\sin\alpha + \cos\alpha)}{\sin\alpha + \cos\alpha} = \underline{\sin\alpha\cos\alpha}$

(11) a) $\sin^3\alpha + \sin\alpha\cos^2\alpha = \sin\alpha(\sin^2\alpha + \cos^2\alpha) = \underline{\sin\alpha}$

b) $\frac{\cos^2\alpha}{1-\sin\alpha} = \frac{1-\sin^2\alpha}{1-\sin\alpha} = \underline{1+\sin\alpha}$

c) $\tan\alpha + \cot\alpha = \frac{\sin\alpha}{\cos\alpha} + \frac{\cos\alpha}{\sin\alpha} = \frac{\sin^2\alpha + \cos^2\alpha}{\sin\alpha\cos\alpha} = \frac{1}{\sin\alpha\cos\alpha} = \underline{\csc\alpha\sec\alpha}$

d) $\frac{\sec\alpha}{\cot\alpha + \tan\alpha} = \frac{\sin\alpha\cos\alpha\sec\alpha}{\cos^2\alpha + \sin^2\alpha} = \underline{\sin\alpha}$

e) $\sec\alpha - \sec\alpha\sin^2\alpha = \sec\alpha(1-\sin^2\alpha) = \sec\alpha\cos\alpha\cos\alpha = \underline{\cos\alpha}$

f) $\sin\alpha\sec\alpha\cot\alpha = \sin\alpha \cdot \frac{1}{\cos\alpha} \cdot \frac{\cos\alpha}{\sin\alpha} = \underline{1}$

g) $\sin^2\alpha(1+\cot^2\alpha) = \sin^2\alpha + \cos^2\alpha = \underline{1}$

h) $\sin^2\alpha\sec^2\alpha - \sec^2\alpha = \sec^2\alpha(\sin^2\alpha - 1) = \sec^2\alpha(-\cos^2\alpha) = \underline{-1}$

i) $(\sin\alpha+\cos\alpha)^2 + (\sin\alpha-\cos\alpha)^2 = \sin^2\alpha + 2\sin\alpha\cos\alpha + \cos^2\alpha + \sin^2\alpha - 2\sin\alpha\cos\alpha + \cos^2\alpha = \underline{2}$

j) $\tan^2\alpha\cos^2\alpha + \cot^2\alpha\sin^2\alpha = \sin^2\alpha + \cos^2\alpha = \underline{1}$

k) $\tan\alpha + \frac{\cos\alpha}{1+\sin\alpha} = \frac{\sin\alpha(1+\sin\alpha) + \cos^2\alpha}{\cos\alpha(1+\sin\alpha)} = \frac{\sin\alpha + 1}{\cos\alpha(1+\sin\alpha)} = \underline{\sec\alpha}$

l) $\frac{\sin\alpha}{1+\cos\alpha} + \frac{1+\cos\alpha}{\sin\alpha} = \frac{\sin^2\alpha + (1+\cos\alpha)^2}{(1+\cos\alpha)\sin\alpha} = \frac{\sin^2\alpha + 1 + 2\cos\alpha + \cos^2\alpha}{(1+\cos\alpha)\sin\alpha} = \frac{2+2\cos\alpha}{(1+\cos\alpha)\sin\alpha} = \underline{2\csc\alpha}$

m) $\frac{\tan^2\alpha - \sin^2\alpha}{\tan^2\alpha} = \frac{\sin^2\alpha - \sin^2\alpha\cos^2\alpha}{\sin^2\alpha} = 1 - \cos^2\alpha = \sin^2\alpha$

n) $\frac{\sec\alpha - \csc\alpha}{\sec\alpha + \csc\alpha} = \frac{\sin\alpha - \cos\alpha}{\sin\alpha + \cos\alpha} = \frac{\sin^2\alpha - 2\sin\alpha\cos\alpha + \cos^2\alpha}{\sin^2\alpha - \cos^2\alpha} = \frac{1 - \sin 2\alpha}{\cos 2\alpha} = \frac{\sec 2\alpha}{\tan}$

o) $\frac{\cos\alpha\cot\alpha - \sin\alpha\tan\alpha}{\csc\alpha - \sec\alpha} = \frac{\cos^3\alpha - \sin^3\alpha}{\cos\alpha - \sin\alpha} = \cos^2\alpha + \cos\alpha\sin\alpha + \sin^2\alpha =$

$= 1 + \cos\alpha\sin\alpha$

P) $(\tan\alpha + \cot\alpha)^2 - (\tan\alpha - \cot\alpha)^2 = 4\tan\alpha\cot\alpha = 4$