6. If $\sin A = 3/5$ and $\cos D = 5/13$, show that $\cos A \cot D = 1/3$. Verify that $\sin^2 A + \cos^2 A = 1$. Verify the other relationships in problems 1 and 2 for the specific angles A and D. — 06/02/2019

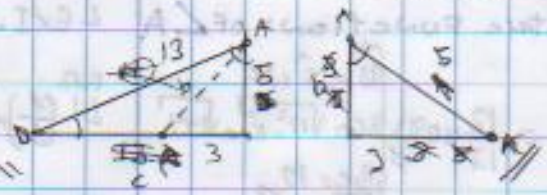
$\cot D = \frac{1}{\tan D} = \frac{1}{(\frac{12}{5})} = \frac{5}{12} = 0.416666667$

$\tan D = \frac{12}{5}$

$b^2 + 5^2 = 13^2 \Rightarrow b = \sqrt{144}$

$b^2 = 13^2 - 5^2 \quad b = 12$

$\cos D = 5/13 \qquad \sin A = 3/5 \qquad \sin^2 A + \cos^2 A = 1$



$\cos A \cot D = 1/3$

~~$h^2 = 5^2 + 3^2 = 25 + 9 = 34$~~

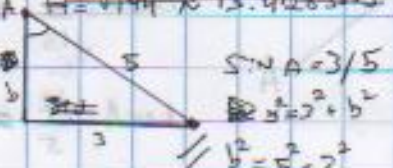
~~$h = \sqrt{34} \approx 5.83095189$~~

~~$H^2 = 13^2 + 5^2 = 169 + 25$~~

~~$H = \sqrt{194} \approx 13.92838827$~~

$\cos D \cot D = \left(\frac{3}{\sqrt{34}}\right)\left(\frac{1}{\frac{5}{13}}\right) = \left(\frac{3}{\sqrt{34}}\right)\left(\frac{13}{5}\right)$

$= \frac{3(5)}{3\sqrt{34}} = \frac{15}{3\sqrt{34}} \approx 0.857492926$



$\sin A = 3/5$

$5^2 = 3^2 + b^2$

$b^2 = 5^2 - 3^2$

$b = \sqrt{25 - 9} = \sqrt{16} = 4$ //

$\cos A = \frac{4}{5}$ //

$\cot D = \frac{1}{(\frac{5}{13})} = \frac{13}{5}$

$\cos A \cot D = \left(\frac{4}{5}\right)\left(\frac{13}{5}\right) = \frac{4(13)}{5} = \frac{52}{5}$ ~~= 10.4~~

$13^2 = c^2 + 5^2 \quad c^2 = 13^2 - 5^2 \quad c = \sqrt{144}$

$c = 12 \qquad \tan D = \frac{5}{12} \qquad \cot D = \frac{1}{(\frac{5}{12})} = \frac{12}{5}$

$\cos A = \frac{4}{5} \qquad \cos A \cot D = \left(\frac{4}{5}\right)\left(\frac{12}{5}\right)$ ~~$= \frac{4(12)}{5} = \frac{48}{5} = 9.6$~~

$= \frac{4(5)}{5(12)} = \frac{20}{60} = \frac{10}{30} = \frac{1}{3}$ ///

$\sin^2 A + \cos^2 A = 1$

$\sin^2 A = \left(\frac{3}{5}\right)^2 = \frac{9}{25} = 0.36 \qquad \cos^2 A = \left(\frac{4}{5}\right) = \frac{16}{25} = 0.64$

$\sin^2 A + \cos^2 A = \frac{9}{25} + \frac{16}{25} = \frac{25}{25} = 1$ ///

7. A triangular piece of land MNP, has a right angle at N and MN = 450 feet. If $\cos M = 4/5$, find the area. (First find the lenght of NP.)

$\overline{NP} = b \qquad 5^2 = 4^2 + b^2 \qquad b^2 = 5^2 - 4^2 = 25 - 16$

$b = \sqrt{9} = 3 \qquad MN = \frac{450 \text{ ft}}{4 \text{ u}} = \frac{112.5}{\text{u}}$ ~~ft/u~~

$A = \frac{1}{2}(4)(3)(112.5) = 675 \text{ ft}^2$ // 57