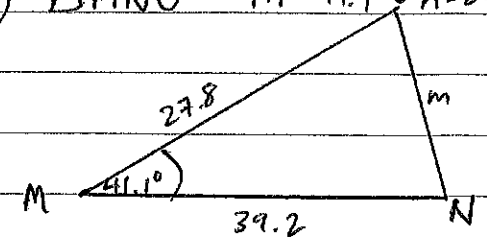
Selected Answers only

2/02/12

EX 1.4 – The Cosine Rule

3a) ΔMNO $M = 41.1^\circ$ $n = 27.8$ $o = 39.2$



$m^2 = n^2 + o^2 - 2no\cos M$

$= (27.8)^2 + (39.2)^2 - 2\times 27.8\times 39.2\cos 41.1^\circ$

$= 667.07$

$m = \sqrt{667.07}$

$= \underline{25.83}$ ✓

4d) FIND ALL sides + angles

ΔABC $a = 8.5^m$, $b = 20_m$, $c = 15.2_m$

⇒ find B (I usually find largest angle first)

$\cos B = \dfrac{a^2 + c^2 - b^2}{2ac}$

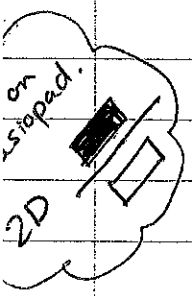
$= \dfrac{8.5^2 + 15.2^2 - 20^2}{2\times 8.5\times 15.2}$

$= -0.374$

$B = \cos^{-1}(-0.374)$

$= 111.98$

$\approx \underline{112^\circ}$



find C

$\cos C = \dfrac{a^2 + b^2 - c^2}{2ab}$

$= \dfrac{8.5^2 + 20^2 - 15.2^2}{2\times 8.5\times 20}$

$= 0.709$

$C = \cos^{-1}(0.709)$

$= 44.80$

To get A.

$A = 180^\circ - 112^\circ - 45^\circ$

$= \underline{23^\circ}$ ✓

$\underline{A = 23^\circ}$, $\underline{B = 112^\circ}$, $\underline{C = 45^\circ}$

(5) Greatest angle is opposite longest side.

i.e. if $a = 12$, $b = 9$, $c = 8$

then A is greatest angle.

$\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

$= \dfrac{9^2 + 8^2 - 12^2}{2\times 9\times 8}$

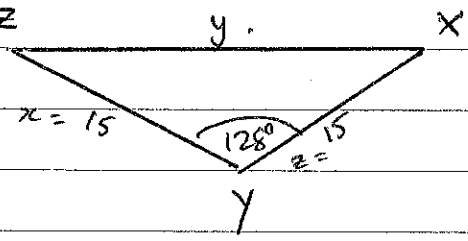
$= 0.00694$

$A = \cos^{-1}(0.00694)$

$= 89.6^\circ$

So greatest angle is $\underline{A = 89.6^\circ}$

EX 1.4 – cont'd.



$y^2 = x^2 + z^2 - 2xz\cos Y$

$= 15^2 + 15^2 - 2\times15\times15\cos 128°$

$= 727$

$y = \sqrt{727}$

$= 26.96$

≈ 27 m

XZ is approx 27 m

Use Sine Rule to find Y.

$\frac{\sin Y}{y} = \frac{\sin X}{x}$

$\frac{\sin Y}{3.4} = \frac{\sin 24.6}{1.8}$

$\sin Y = \frac{3.4 \sin 24.6}{1.8}$

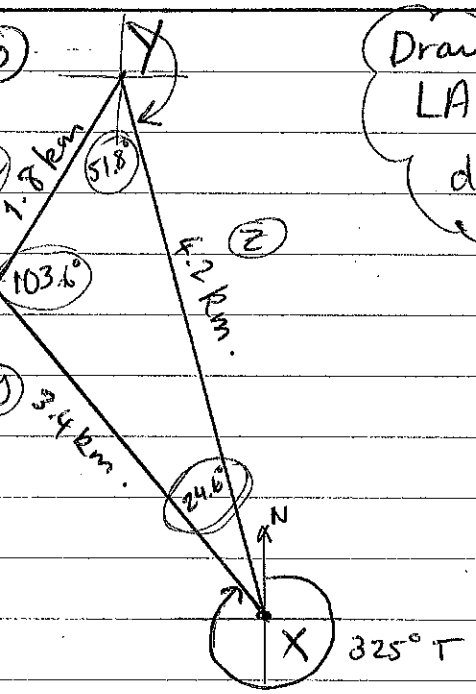
$= 0.786$

$= \sin^{-1}(0.786)$

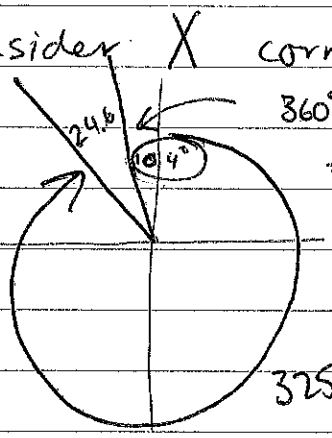
$= 51.8°$

NOT REQUIRED

Draw a LARGE diagram



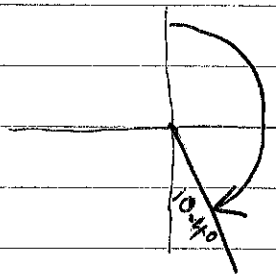
Consider X corner.



$360° - 24.6 - 325°$

$= 10.4°$

Consider Y Corner.



$180° - 10.4°$

$= 169.6°$ T

So Bearing of X from Y is 169.6° T

Find X

$\cos X = \frac{y^2 + z^2 - x^2}{2yz}$

$= 3.4^2 + 4.2^2 - 1.8^2$