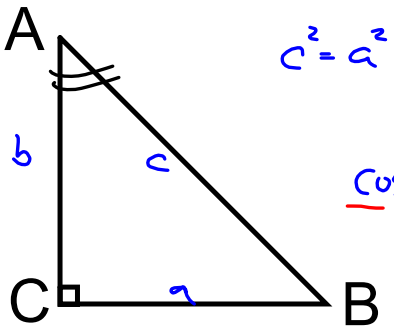
5.1 Trig of Acute Angles

Apr 27

Recall: SOH CAH TOA



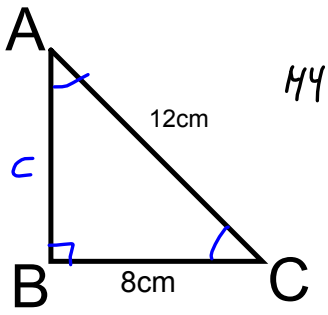
$c^2 = a^2 + b^2$

sine — $\sin A = \frac{a}{c}$

cosine — $\cos A = \frac{b}{c}$

tangent — $\tan A = \frac{a}{b}$

Solve each triangle. ie. Find all missing sides and angles



$12^2 = c^2 + 8^2$

$144 - 64 = c^2$

$c^2 = 80$

$c = \sqrt{80}$

$c = \sqrt{16 \times 5}$

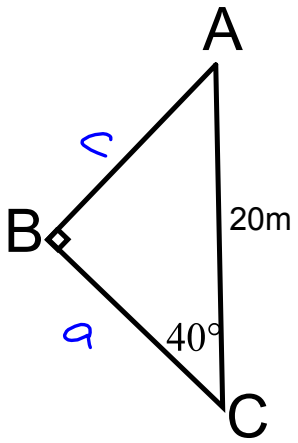
$c = 4\sqrt{5}$ cm

$\sin A = \frac{8}{12} = .6666$

$A = \sin^{-1}(.6666)$

$A \doteq 42°$

$C = 180 - 90 - 42 \doteq 48°$



$A = 180 - 90 - 40$

$= 50°$

$a^2 + 12.9^2 = 20^2$

$a^2 = 400 - 165.27.....$

$a^2 = 234.7$

$a \doteq 15.3$ m

$\sin 40° = \frac{c}{20}$

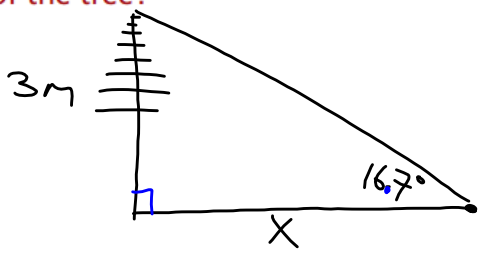
$20 \sin 40° = c$

$c \doteq 12.9$ m

From a position some distance away from the base of a tree, Monique uses a clinometer to determine the angle of elevation to a treetop. Monique estimates that the height of the tree is about 3.0 m.

Her clinometer measures 16.7 degrees

How far, to the nearest tenth of a metre, is Monique from the base of the tree?



$\tan 16.7 = \frac{3}{x}$

$x \tan 16.7 = 3$

$x = \frac{3}{\tan 16.7} \doteq 10.0\text{m}$

Reciprocal Trig Ratios

cosecant $\csc\theta = \frac{1}{\sin\theta} = \frac{H}{O}$

secant $\sec\theta = \frac{1}{\cos\theta} = \frac{H}{A}$ SOC

cotangent $\cot\theta = \frac{1}{\tan\theta} = \frac{A}{O}$

ex. $\sec x = 3$

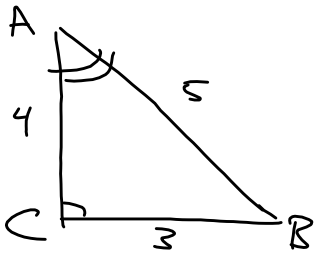
$\frac{1}{\cos x} = 3$

$\cos x = \frac{1}{3}$

$x = \cos^{-1}\left(\frac{1}{3}\right)$

$x \doteq 71°$

$\triangle ABC$ is a right triangle with side lengths of 3 cm, 4 cm, and 5 cm. If $CB = 3$ cm and $\angle C = 90°$, which trigonometric ratio of $\angle A$ is the greatest?



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$\frac{3}{5}, \frac{4}{5}, \frac{3}{4}, \frac{5}{3}, \frac{5}{4}, \frac{4}{3}$

$\csc A$

Homework: p. 280#1,5i,6-8,11,12,14,15