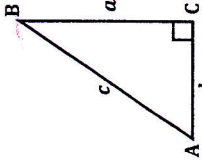


NOTES 9.6 SOLVING RIGHT TRIANGLES

INVERSE TRIGONOMETRIC FUNCTIONS	
Inverse Sine	If $\sin A = \frac{a}{c}$, then $\sin^{-1} \frac{a}{c} = A$.
Inverse Cosine	If $\cos A = \frac{b}{c}$, then $\cos^{-1} \frac{b}{c} = A$.
Inverse Tangent	If $\tan A = \frac{a}{b}$, then $\tan^{-1} \frac{a}{b} = A$.



Example 1: Use the inverse trig functions on your calculator to find the measures of each angle rounded to the nearest degree.

a. $\sin^{-1}(0.8) = \underline{53^\circ}$	b. $\cos^{-1}(0.19) = \underline{79^\circ}$
c. $\tan^{-1}(3.4) = \underline{74^\circ}$	d. $\sin^{-1}(\frac{1}{5}) = \underline{12^\circ}$

Example 2: Use inverse trig functions to find the measures of the indicated angles to the nearest degree.

<p>a. $\tan^{-1}(\frac{1}{3}) = x$</p> <p style="text-align: right;">18°</p>	<p>b. $\sin^{-1}(\frac{24}{51}) = x$</p> <p style="text-align: right;">28°</p>
<p>c. $\cos^{-1}(\frac{12}{29}) = x$</p> <p style="text-align: right;">66°</p>	<p>d. $\sin^{-1}(\frac{28}{47}) = x$</p> <p style="text-align: right;">37°</p>

EXAMPLE 3: Find the unknown measures in each triangle. Round side lengths to the nearest tenth and angle measures to the nearest degree.

<p>a. $m\angle B = 90 - 53 = 37$ $\sin 53^\circ = \frac{10}{x} \Rightarrow x = \frac{10}{\sin 53^\circ} = 12.5$ $x(\sin 53^\circ) = 10 \Rightarrow y = \frac{10}{\tan 53^\circ} = 7.5$</p> <p style="text-align: right;">$m\angle B = \underline{37^\circ}$ $AB = \underline{12.5 \text{ ft}}$ $AC = \underline{7.5 \text{ ft}}$</p>	<p>b. $\tan^{-1}(\frac{4}{8.2}) = x \Rightarrow x = 26$ $\tan^{-1}(\frac{8.2}{4}) = y \Rightarrow y = 64$ $a^2 + b^2 = c^2 \Rightarrow (8.2)^2 + 4^2 = c^2 \Rightarrow 83.24 + 16 = c^2 \Rightarrow 99.24 = c^2 \Rightarrow c = 9.1$</p> <p style="text-align: right;">$m\angle B = \underline{26^\circ}$ $m\angle A = \underline{64^\circ}$ $AB = \underline{9.1 \text{ mi}}$</p>
<p>c. $m\angle A = 90 - 56 = 34$ $\cos 56^\circ = \frac{14}{x} \Rightarrow x = \frac{14}{\cos 56^\circ} = 25.04$ $x \cos 56^\circ = 14 \Rightarrow y = 20.8$</p> <p style="text-align: right;">$m\angle A = \underline{34^\circ}$ $AB = \underline{25.0 \text{ km}}$ $AC = \underline{20.8 \text{ km}}$</p>	<p>d. $\sin^{-1}(\frac{36}{c}) = x \Rightarrow x = 59$ $\cos^{-1}(\frac{31}{c}) = y \Rightarrow y = 31$ $a^2 + b^2 = c^2 \Rightarrow (36)^2 + (31)^2 = c^2 \Rightarrow 1296 + 961 = c^2 \Rightarrow 2257 = c^2 \Rightarrow c = 47.5$</p> <p style="text-align: right;">$m\angle B = \underline{59^\circ}$ $m\angle A = \underline{31^\circ}$ $BC = \underline{18.3 \text{ cm}}$</p>