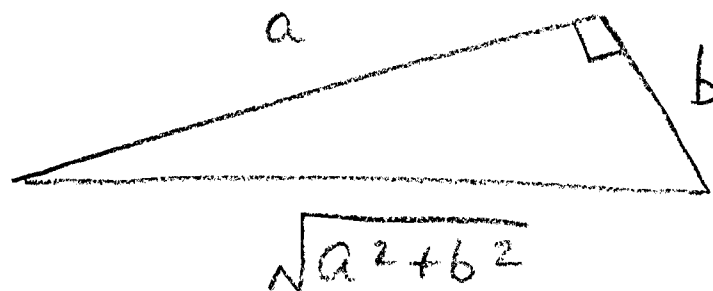


BE-Precalc TUESDAY 10-20-09

ACT  
2009  
2010  
Sample

- ① In the right triangle below,  
 $0 < b < a$ . One of the angle  
measures in the triangle is  $\tan^{-1}\left(\frac{a}{b}\right)$ .  
What is  $\cos\left[\tan^{-1}\left(\frac{a}{b}\right)\right]$ ?

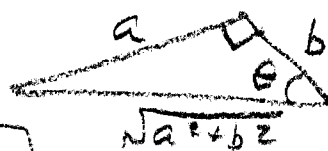


- Ⓐ  $\frac{a}{b}$  Ⓑ  $\frac{b}{a}$  Ⓒ  $\frac{a}{\sqrt{a^2 + b^2}}$  Ⓓ  $\frac{b}{\sqrt{a^2 + b^2}}$  Ⓔ  $\frac{\sqrt{a^2 + b^2}}{a}$

ANS

$$\tan^{-1}\left(\frac{a}{b}\right)$$

↑ the angle whose tan is  $\frac{a}{b}$   
is  $\theta$



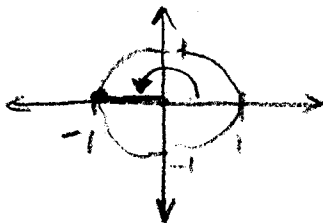
$$\cos(\theta) = \frac{b}{\sqrt{a^2 + b^2}}$$

Precalc - Homework Review: Pg. 296-297  
 #5, 7, 8, 14-16, 23  
 Pg. 303 #25, 26  
 Pg. 310 #47

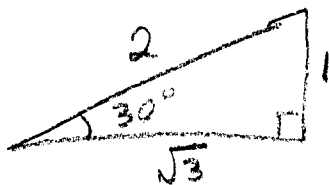
⑤  $\tan 180^\circ$

$$\Rightarrow \frac{y}{x} = \frac{0}{-1}$$

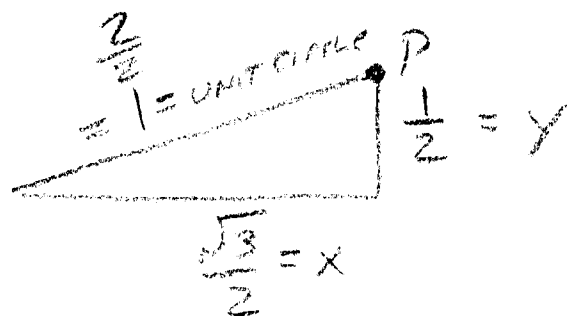
$$= \boxed{0}$$



⑦



$\Rightarrow$



$$\therefore P\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

$$\sin 30 = y = \frac{1}{2}$$

$$\cos 30 = x = \frac{\sqrt{3}}{2}$$

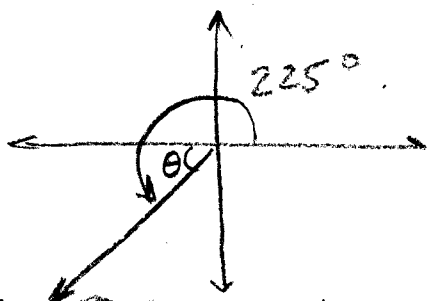
$$\tan 30 = \frac{y}{x} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\csc 30 = 2$$

$$\sec 30 = \frac{2}{\frac{\sqrt{3}}{2}} = \frac{2\sqrt{3}}{3}$$

$$\cot 30 = \frac{3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$$

⑧

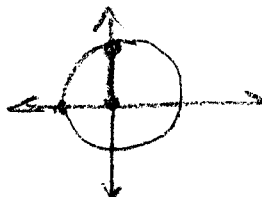


$$\text{Reference } \angle \theta \Rightarrow 225 \\ - 180 \\ \hline 45^\circ$$

$$\text{ASTC} \Rightarrow \textcircled{T} \oplus \begin{array}{l} \tan/\cot + \\ \sin/\csc - \\ \cos/\sec - \end{array}$$

$$\begin{array}{l} \sin 225 = -.707 \\ \cos 225 = -.707 \\ \csc 225 = -.707 \\ \sec 225 = -.707 \\ \tan 225 = 1 \\ \cot 225 = 1 \end{array}$$

$$\textcircled{14} \sin 90 \Rightarrow \frac{x}{1} \Rightarrow$$

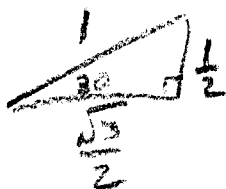


$$\frac{y}{1} = \boxed{0}$$

$$\textcircled{15} \tan 360 \Rightarrow \tan 0^\circ = \boxed{0}$$

$$\textcircled{16} \cot -180 \Rightarrow \frac{x}{y} \Rightarrow \frac{-1}{0} = \boxed{\text{UNDEFINED}}$$

$$\textcircled{23} \text{Ref. } \angle \Rightarrow 30^\circ \quad \textcircled{22} \Rightarrow \sin/\csc +$$

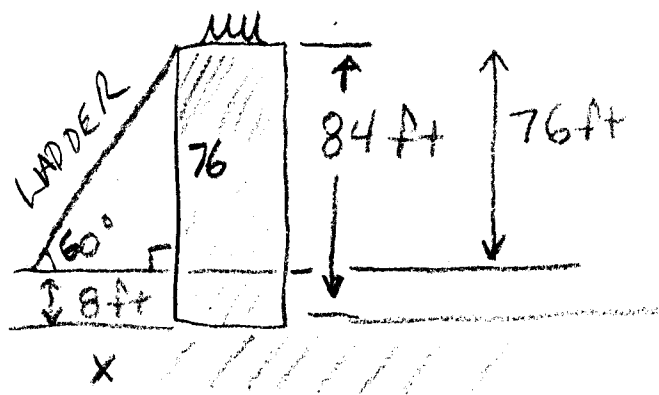


$$\begin{array}{ll} \sin 30 = +\frac{1}{2} & \csc 30 = +\frac{2}{1} \\ \cos 30 = -\frac{\sqrt{3}}{2} & \sec 30 = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3} \\ \tan 30 = -\frac{\sqrt{3}}{3} & \cot 30 = -\frac{3}{\sqrt{3}} = -\frac{3\sqrt{3}}{3} \\ & = -\sqrt{3} \end{array}$$

Pg 303

(25)

(A)



$$\textcircled{C} \quad \sin 60^\circ = \frac{76}{l} \quad \therefore l = \frac{76}{\sin 60^\circ}$$

$$l = \frac{76}{0.8660} \approx \boxed{87.8 \text{ ft}}$$

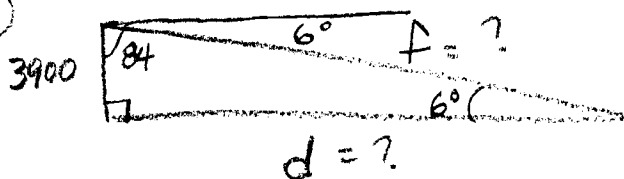
EXTEND  
LADDER

$$\textcircled{B} \quad \tan 60^\circ = \frac{76}{x} \quad \therefore x = \frac{76}{\tan 60}$$

$$x = \frac{76}{1.732} \approx \boxed{43.9 \text{ ft}}$$

DISTANCE  
FROM  
BASE

(26)



$$\textcircled{B} \quad f = ? \quad \sin 6^\circ = \frac{3900}{f} \quad \therefore f = \frac{3900}{\sin 6^\circ} = \frac{3900}{0.1045}$$

$$f \approx \boxed{37310 \text{ ft}}$$

fly distance

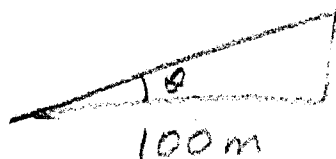
$$\textcircled{A} \quad d = ? \quad \tan 6^\circ = \frac{3900}{d}$$

$$\therefore d = \frac{3900}{\tan 6} = \frac{3900}{0.1051} = \boxed{37106 \text{ ft}}$$

GROUND DISTANCE

Pg. 310 #47

(A)

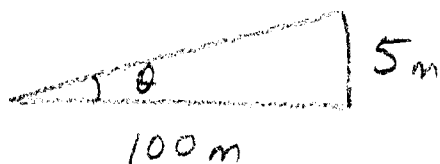


$$8\text{ m } \theta = \tan^{-1}\left(\frac{8}{100}\right) = \tan^{-1}(.08)$$

$$\boxed{\theta = 4.57^\circ}$$

ORIGINAL ANGLE

(B)

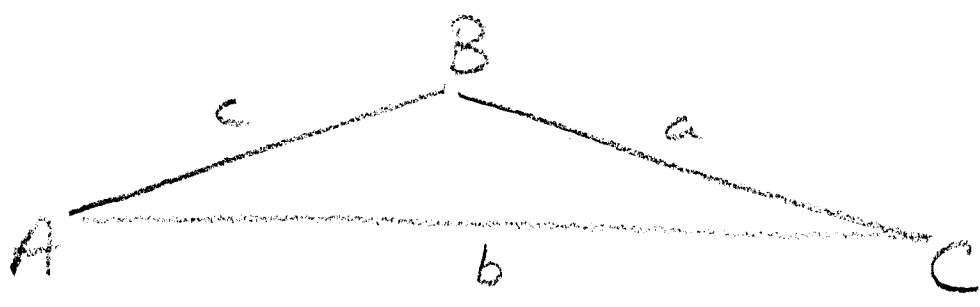


$$\theta = \tan^{-1}\left(\frac{5}{100}\right)$$

$$\boxed{\theta = 2.86^\circ}$$

# Ch. 5-6 The Law of Sines

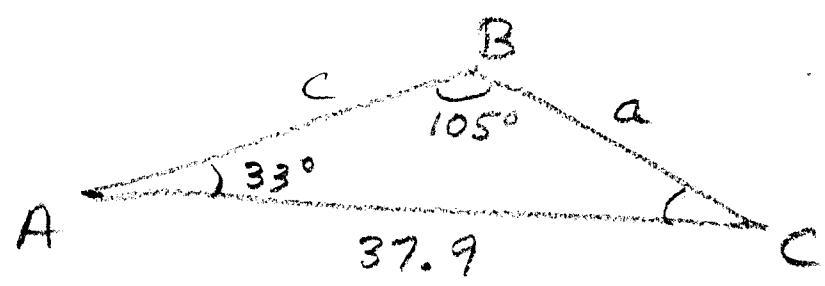
For any triangle:



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

or  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Ex 1  
Pg 314



Find a, c, and C

NOTE  $C = 180 - 105 - 33$   
 $C = 42^\circ$

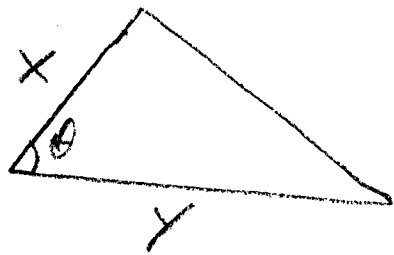
$$\frac{\sin 105}{37.9} = \frac{\sin 42}{c}$$

$$\therefore c = \frac{37.9 \sin 42}{\sin 105} = 26.3 = c$$

$$\frac{\sin 105}{37.9} = \frac{\sin 33}{a}$$

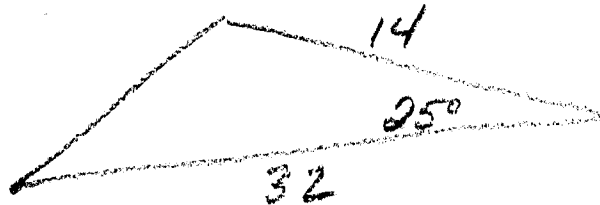
$$\therefore a = \frac{37.9 \sin 33}{\sin 105} = 21.4 = a$$

6  
An Area of  $\Delta$  Formula - used on ACT's!



$$\text{Area} = \frac{1}{2}xy \sin \theta \quad \Rightarrow \quad \text{ANY triangle, ANY 2 sides and included angle.}$$

(EX) Find A



$$A = \frac{1}{2}(14)(32)\sin 25$$

$$= 7(32)(.4226)$$

$$= 224(.4226) = \boxed{94.7 \text{ sq. units}}$$

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• Homework: Pg 316 # 11, 12, 19, 22