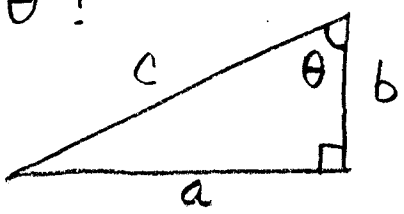
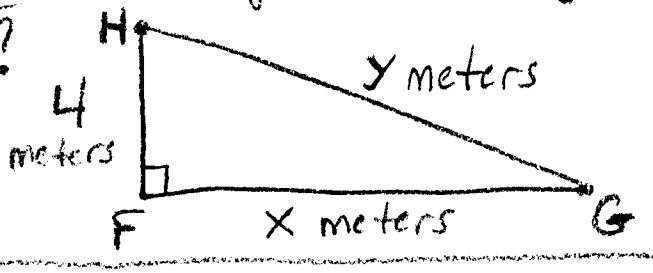
BE-Alg 2 | TUESDAY 12-1-09

ACT ① The dimensions of the right triangle shown below are given in feet. What is $\sin\theta$?



(A) $\frac{a}{b}$ (B) $\frac{a}{c}$ (C) $\frac{b}{c}$ (D) $\frac{b}{a}$ (E) $\frac{c}{a}$

② For $\triangle FGH$ shown below, which of the following is an expression for y in terms of x?

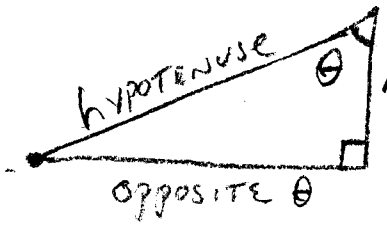


(A) $x+4$ (B) $\sqrt{x^2+4}$ (C) $\sqrt{x^2+8}$

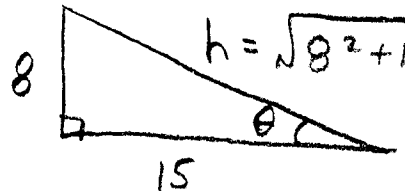
(D) $\sqrt{x^2-16}$ (E) $\sqrt{x^2+16}$

Homework Review: Pg. 706 # 2, 4-6, 15.

(2)



(4.)



$h = \sqrt{8^2+15^2} = \sqrt{64+225} = \sqrt{289} = 17$

$\therefore \sin\theta = \frac{8}{17}$ $\quad \csc\theta = \frac{17}{8}$

$\cos\theta = \frac{15}{17}$ $\quad \sec\theta = \frac{17}{15}$

$\tan\theta = \frac{8}{15}$ $\quad \cot\theta = \frac{15}{8}$

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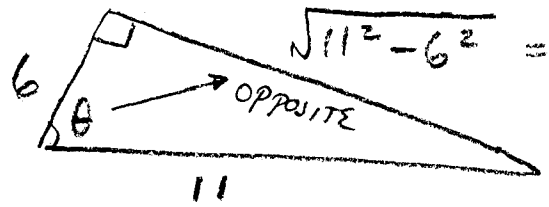
(5)



$\sqrt{11^2-6^2} = \sqrt{121-36} = \sqrt{85}$

$\therefore \sin\theta = \frac{\sqrt{85}}{11}$ $\quad \csc\theta = \frac{11}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{11\sqrt{85}}{85} = \csc\theta$

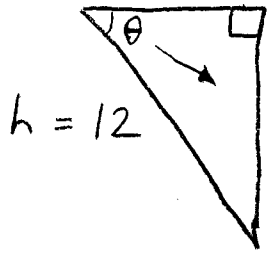
$\cos\theta = \frac{6}{11}$ $\quad \sec\theta = \frac{11}{6}$

$\tan\theta = \frac{\sqrt{85}}{6}$ $\quad \cot\theta = \frac{6}{\sqrt{85}} = \frac{6\sqrt{85}}{85} = \cot\theta$

$\sqrt{12^2-10^2} = \sqrt{144-100} = \sqrt{44} = 2\sqrt{11}$

$4 \cdot 11$

(6)



$\sin\theta = \frac{10}{12} = \frac{5}{6}$ $\quad \csc\theta = \frac{6}{5}$

$\cos\theta = \frac{2\sqrt{11}}{12} = \frac{\sqrt{11}}{6}$ $\quad \sec\theta = \frac{6}{\sqrt{11}} = \frac{6\sqrt{11}}{11}$

$\tan\theta = \frac{10}{2\sqrt{11}} = \frac{5}{\sqrt{11}} = \frac{5\sqrt{11}}{11}$ $\quad \cot\theta = \frac{\sqrt{11}}{5}$

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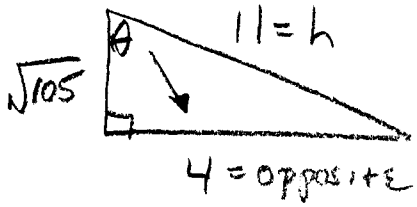
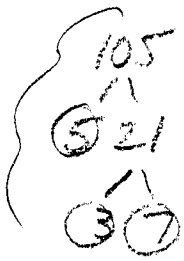
(15)



adjacent $= \sqrt{11^2-4^2}$

$= \sqrt{121-16}$

$= \sqrt{105}$



$\sin\theta = \frac{4}{11}$ $\quad \csc\theta = \frac{11}{4}$

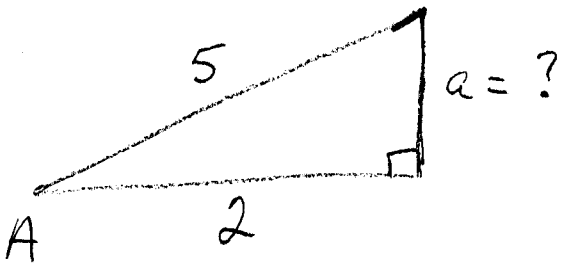
$\cos\theta = \frac{\sqrt{105}}{11}$ $\quad \sec\theta = \frac{11}{\sqrt{105}} = \frac{11\sqrt{105}}{105}$

$\tan\theta = \frac{4}{\sqrt{105}} = \frac{4\sqrt{105}}{105}$ $\quad \cot\theta = \frac{\sqrt{105}}{4}$

Finding one trig. ratio if you already know one. Ex 2 Pg 702

If $\cos A = \frac{2}{5}$, find $\tan A$

✱→ Make a drawing, label everything you know. Use Pythagorean Theorem to find missing side.



$$a = \sqrt{5^2 - 2^2} = \sqrt{25-4} = \sqrt{21}$$

$$\therefore \boxed{\tan A = \frac{\sqrt{21}}{2}}$$

Recall: $\sin^{-1}\left(\frac{O}{H}\right) = \text{Angle}$ or $\text{Arcsin}\left(\frac{O}{H}\right) = \text{Angle}$

$\cos^{-1}\left(\frac{A}{H}\right) = \text{Angle}$ or $\text{Arccos}\left(\frac{A}{H}\right) = \text{Angle}$

$\tan^{-1}\left(\frac{O}{A}\right) = \text{Angle}$ or $\text{Arctan}\left(\frac{O}{A}\right) = \text{angle}$

(Ex) $\sin(20°) = ?$ $\quad \sin^{-1}(.3420) = ?$

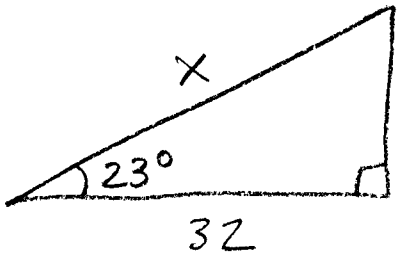
$\sin(20°) = .3420$ $\quad \sin^{-1}(.3420) \cong 19.9988° \approx 20°$

↑ $X = \text{Angle}$ ↑ $Y = \frac{O}{H}$ $\quad$ ↑ $X = \frac{O}{H}$ ↑ $Y = \text{Angle}$

Basic trig ⇒ find missing side
⇒ use sin, cos, or tan

⇒ find missing angle
use $\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$

(Ex) Find missing side X:



Use trig. function that involves 23°, 32, and X
(32: adjacent; X: hypotenuse)

$\cos 23^\circ = \frac{32}{X}$

(cos 23°: known)

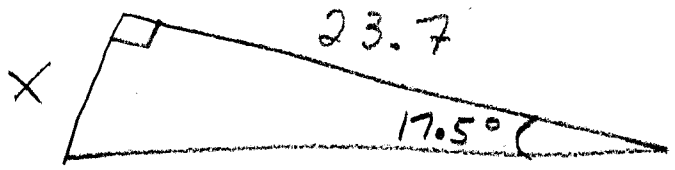
$X \cdot \cos 23^\circ = \frac{32}{X} \cdot X$

$\frac{X \cos 23^\circ}{\cos 23^\circ} = \frac{32}{\cos 23^\circ}$

$X = \frac{32}{(.9209)}$

$\boxed{X = 34.76}$ Reasonable? X must be > 32 ✓

(Ex) Find missing side X:



$$\tan 17.5^\circ = \frac{X}{23.7}$$

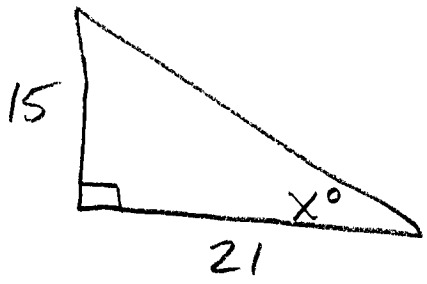
$$23.7 \tan 17.5^\circ = X$$

$$23.7(.3153) = X$$

$$\boxed{7.47 = X}$$

(Ex) Find missing angle X:

Need Angle, think $\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$



$$\tan X = \frac{15}{21} = \frac{5}{7}$$

$$\tan X = .7143$$

$$\tan^{-1}(.7143) = X$$

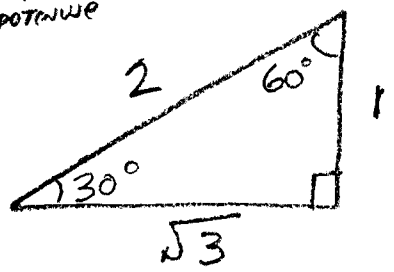
$$\boxed{35.5^\circ = X}$$

Two special triangles:

$1, 2, \sqrt{3} \Rightarrow 30, 60, 90$

↑ smallest → opposite 30°

↑ Biggest → hypotenuse



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

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

$\tan 30 = \frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$

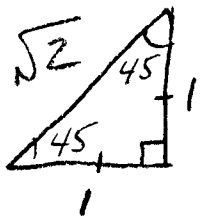
$\sin 60 = \frac{\sqrt{3}}{2}$

$\cos 60 = \frac{1}{2}$

$\tan 60 = \frac{\sqrt{3}}{1} = \sqrt{3}$

$1, 1, \sqrt{2} \Rightarrow 45, 45, 90$

↑ biggest



$\sin 45^\circ = \cos 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan 45^\circ = 1$

Homework: Pg 707 # 21, 22, 23, 25, 26