Are there any questions from Last day's work:

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pp. 280-282 #1 – 12, 14 [18, 20]

6a, 14

5 bii, biii

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) determine the trig ratios for 30°, 60° and 90° using the special triangles.

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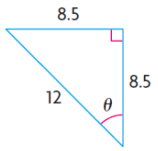
5. a) For each triangle, calculate csc θ, sec θ, and cot θ.

K b) For each triangle, use one of the reciprocal ratios from part (a) to determine θ to the nearest degree.

ii)



$\csc\theta = \frac{12}{8.5}$

$\frac{1}{\sin\theta} = \frac{12}{8.5}$

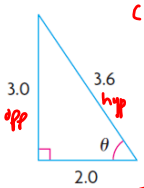
$\sin\theta = \frac{8.5}{12}$

$\theta = \sin^{-1}\left(\frac{8.5}{12}\right)$

$\doteq 45.0$

$\doteq 45°$

iii)



$\csc\theta = \frac{3.6}{3.0}$

$\sec\theta = \frac{3.6}{2.0}$

$\cot\theta = \frac{2.0}{3.0}$

$\sec\theta = \frac{3.6}{2.0}$

$\frac{1}{\sec\theta} = \frac{2.0}{3.6}$

$\cos\theta = \frac{2.0}{3.6}$

$\theta = \cos^{-1}\left(\frac{2.0}{3.6}\right)$

$\doteq 56.2$

$\doteq 56°$

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6. Determine the value of θ to the nearest degree.

a) $\cot\theta = 3.2404$

$\theta = \cot^{-1}(3.2404)$ → No button →

$\frac{1}{\tan\theta} = 3.2404$

$\tan\theta = \frac{1}{3.2404}$

$\theta = \tan^{-1}\left(\frac{1}{3.2404}\right)$

$\doteq 17.15$

$\doteq 17°$

$\frac{3}{8} = \frac{6}{16}$

$\frac{8}{3} = \frac{16}{6}$

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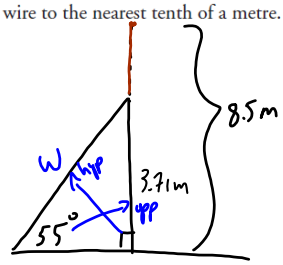
14. The two guy wires supporting an 8.5 m TV antenna each form an angle of 55° with the ground. The wires are attached to the antenna 3.71 m above ground. Using ~~a reciprocal trigonometric ratio,~~ calculate the length of each wire to the nearest tenth of a metre. What assumption did you make?



Let w represent the length of the wire, in m.

$\csc 55° = \frac{w}{3.71}$

$\frac{1}{\sin 55°} = \frac{w}{3.71}$

$\sin 55° = \frac{3.71}{w}$

$w = \frac{3.71}{\sin 55°}$

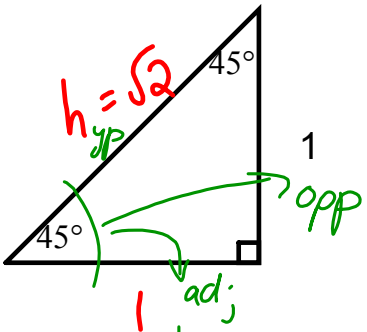
$\doteq 4.52$

$\doteq 4.5$ m

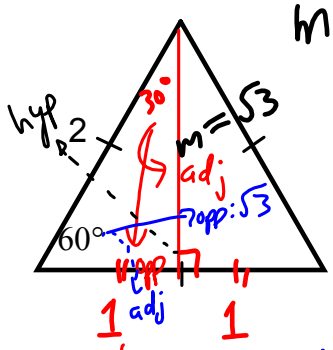
*Assumptions: level ground, wire at 90° (straight up)

5.2 Evaluating Trigonometric Ratios of Special Angles

Date: Apr. 25/18



$h^2 = 1^2 + 1^2$
$= 2$
$h = \sqrt{2}$

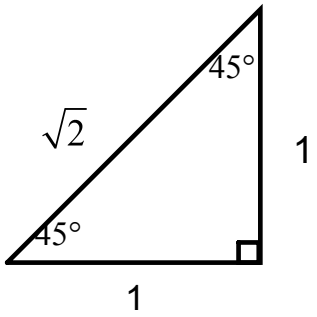


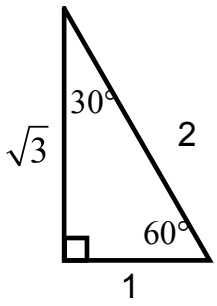
$m^2 = 2^2 - 1^2$
$= 4 - 1$
$= 3$
$\therefore m = \sqrt{3}$

$\sin 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\csc 45° = \sqrt{2}$
$\cos 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\sec 45° = \sqrt{2}$
$\tan 45° = 1$ $\cot 45° = 1$

$\sin 30° = \frac{1}{2}$ $\sin 60° = \frac{\sqrt{3}}{2}$
$\cos 30° = \frac{\sqrt{3}}{2}$ $\cos 60° = \frac{1}{2}$
$\tan 30° = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ $\tan 60° = \sqrt{3}$

These triangles need to be memorized and are used to calculate the exact values for angles 30°, 60°, 45° and their multiples.





$\sin 45° =$
$\cos 45° =$
$\tan 45° =$

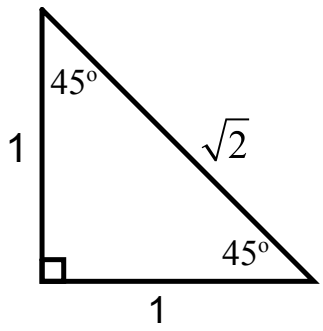
$\sin 30° = \frac{1}{2}$ $\csc 30° = 2$
$\cos 30° = \frac{\sqrt{3}}{2}$ $\sec 30° = \frac{2}{\sqrt{3}}$
$\tan 30° = \frac{1}{\sqrt{3}}$ $\cot 30° = \sqrt{3}$

$\sin 60° = \frac{\sqrt{3}}{2}$ $\csc 60° = \frac{2}{\sqrt{3}}$
$\cos 60° = \frac{1}{2}$ $\sec 60° = 2$
$\tan 60° = \sqrt{3}$ $\cot 60° = \frac{1}{\sqrt{3}}$

Ex.1 Draw the special triangles for the following and determine the **exact** value.

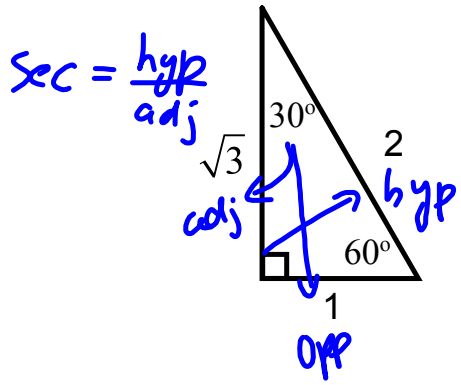
Have students draw triangles from memory.

a) $\sin 45° = \frac{\sqrt{2}}{2}$ list all 6 for each



b) $\sec 30° = \frac{1}{\cos 30°} = \frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

sec = hyp / adj



sin 45° =	csc 45° =	sin 30° =	csc 30° =
cos 45° =	sec 45° =	cos 30° =	sec 30° =
tan 45° =	cot 45° =	tan 30° =	cot 30° =

Ex.2 Determine the exact values of:

Have students draw triangles from memory?

a) $\sin^2(60^\circ)+\cos^2(60^\circ)$

$=(\sin 60^\circ)^2+(\cos 60^\circ)^2$

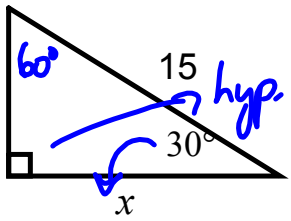
$=\left(\frac{\sqrt{3}}{2}\right)^2+\left(\frac{1}{2}\right)^2$

$=\frac{3}{4}+\frac{1}{4}$

$=\frac{4}{4}$

$=1$

b)



adj

$\cos 30^\circ=\frac{x}{15}$

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

$\frac{\sqrt{3}}{2}=\frac{x}{15}$

$2x=15\sqrt{3}$

$x=\frac{15\sqrt{3}}{2}$

$\frac{15\sqrt{3}}{2}$

1

Ex.3 Use the appropriate special triangle to determine the value of θ, if $0\le\theta\le 90^\circ$. **Have students draw triangles from memory?**

a) $\tan\theta=\frac{1}{\sqrt{3}}$ b) $\cos\theta=\frac{1}{2}$ c) $\cos\theta=\frac{\sqrt{2}}{2}$

$\theta=30^\circ$ $\theta=60^\circ$ $\theta=45^\circ$

30° 60° 45°

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 280-282 #1 – 12, 14 [18, 20]

Today's Homework Practice includes:

pp. 286-287 # 1 – 9 [13 – 15]

Sin θ

- over 2
- square root sign
- fingers away from 0

Sin θ		
0	$\frac{\sqrt{0}}{2}$	0
30	$\frac{\sqrt{1}}{2}$	$\frac{1}{2}$
45	$\frac{\sqrt{2}}{2}$	
60	$\frac{\sqrt{3}}{2}$	
90	$\frac{\sqrt{4}}{2}$	1