Lesson 8-11L/8-9R : Double Trig

Agenda - Check HW 8-10L / 8-8R
Notes 8-11L/8-9R

HW - Worksheet 8-11L / 8-9R

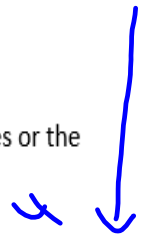
Quiz - Next Class

GEOMETRY **Name:** _____ **Section:** _____ **Date:** _____

8-9 REG + 8-11 LAB Double Trig Problems

Sometimes you need to use more than one right triangle and the segment addition postulate to solve a problem. Remember, you must be working with a RIGHT triangle to use trig!

1. Label the needed lengths/dimensions with variables
2. If segment addition/subtraction will be needed, write the equation
3. Draw the right triangles you will need
4. Set up the appropriate trig ratio equations and solve them – carry at least 4 decimal places or the trig function
5. Plug lengths/dimensions into any segment addition equation if applicable
6. Round at the very end!



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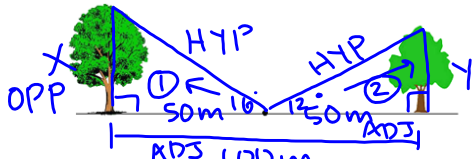
Comparing Heights

Two trees are 100 m apart. From the exact middle between them, the angles of elevation of their tops are 12° and 16°. How much taller is one tree than the other (2 decimal places)?



① X: SOH CAH TOA

TAN 16° = X/50

50(TAN16°) = X

X = 14.3372 m

② Y: SOH CAH TOA

TAN 12° = Y/50

50(TAN12°) = Y

10.6278 = Y m

X (LEFT) IS TALLER BY

DIFF: X − Y

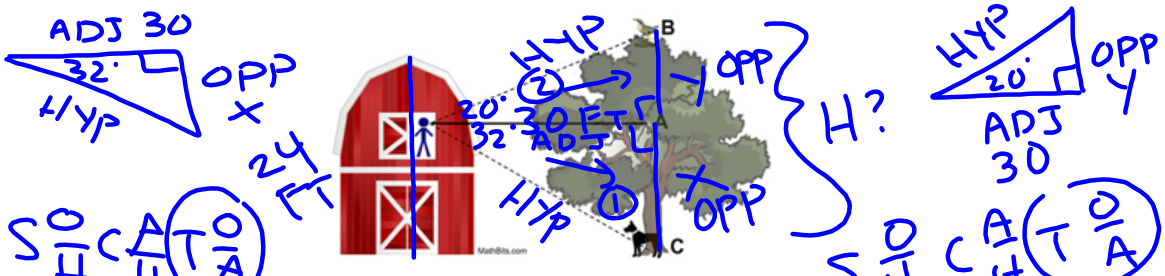
14.3372 − 10.6278

3.7094 m

3.71 m

Adding Lengths (Segment Addition)

A farmer standing in his hay loft 30 feet from a tree can see a bird (B) at an angle of elevation of 20° and a dog (C) at an angle of depression of 32°. Is the tree taller than his 24 foot tall barn?



SOH CAH TOA

TAN 32° = X/30

30(TAN32°) = X

18.7461 = X

H = X + Y

= 18.7461 + 10.9191

= 29.6652 FT

TAN 20° = Y/30

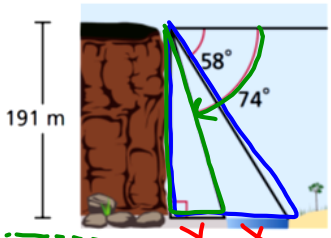
30(TAN20°) = Y

10.9191 = Y

YES, TREE = 29.7 FT WHICH IS TALLER THAN THE 24-FT BARN.

Indirect Measurement (Segment Subtraction)

Example 1: From the top of the canyon, the angle of depression to the far side of the river is 58°, and the angle of depression to the near side of the river is 74°. The depth of the canyon is 191 m. What is the width of the river, to the nearest tenth of a meter, at the bottom of the canyon?



LET WIDTH = X

$X + Y = Z$

$X = Z - Y$

$X = 119.3500 - 54.7683$

$X = 64.5817$

WIDTH ≈ 64.9 m

Z: 191 OPP, HYP, 58°, ADJ

SOH CAH TOA

$\tan 58° = \frac{191}{Z}$

$Z(\tan 58°) = 191$

$Z = \frac{191}{\tan 58°}$

$Z = 119.3500$ m

Y: 191, 74°, 74°

SOH CAH TOA

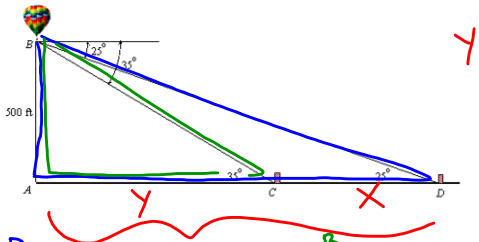
$\tan 74° = \frac{191}{Y}$

$Y(\tan 74°) = 191$

$Y = \frac{191}{\tan 74°}$

$Y = 54.7683$ m

Example 2: A hot air balloon is flying at an altitude of 500 ft. The angle of depression to a landmark at D is 25°, and the angle of depression to a landmark located at C is 35°. Find the distance between the landmarks.



$= X$

$Y + X = Z$

$X = Z - Y$

B, OPP 500 FT, HYP, 25°, A, ADJ Z, D

$\tan 25° = \frac{500}{Z}$

$Z = \frac{500}{\tan 25°}$

$Z = 1072.2534$

B, OPP 500 FT, HYP, 35°, A, Y ADJ, C

$\tan 35° = \frac{500}{Y}$

$Y = \frac{500}{\tan 35°}$

$714.0740 = Y$

$X = Z - Y$

$X = 1072.2534 - 714.0740$

$X = 358.1794$

$X \approx 358.2$ FT DISTANCE BETWEEN

Attachments

Bridge to 8.docx

Quiz 1 L.pdf