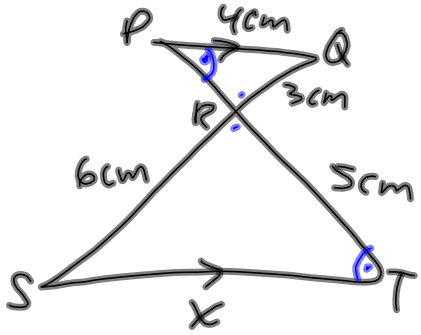
Before we begin, are there any questions from last day's work?

pp. 348-350 #7, 8ab, 9, 11, 12, 16, 19

Let's correct/discuss some of the homework on similar triangles.

p.348 #7



$\angle QPR = \angle STR$ (Z pattern)

$\angle PRQ = \angle TRS$ (opposite)

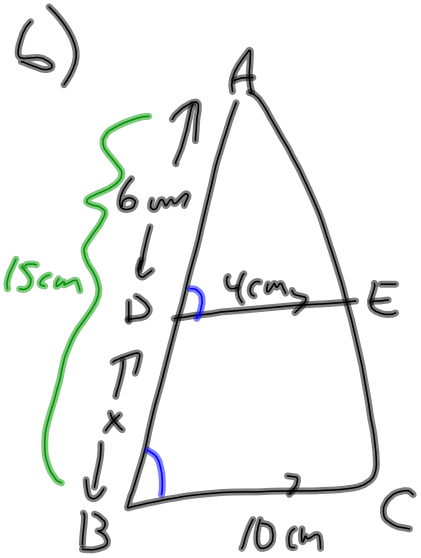
$\therefore \triangle PRQ \sim \triangle TRS$

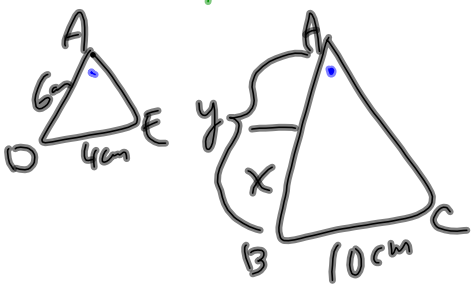
$\frac{x}{4} \Rightarrow \frac{6}{3}$

$x = 4\left(\frac{6}{3}\right)$

$x = 8$ cm

b)





$\angle DAE = \angle BAC$ (common)

$\angle ADE = \angle ABC$ (F pattern)

$\therefore \triangle ADE \sim \triangle ABC$

$\frac{y}{6} \Rightarrow \frac{10}{4}$ $\leftarrow$ $\frac{6}{y} = \frac{4}{10}$

$y = 6\left(\frac{10}{4}\right)$

$= 15$ cm

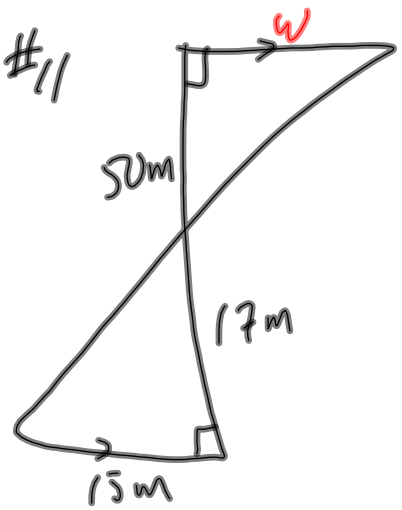
$y = x + 6$

$15 = x + 6$

$15 - 6 = x$

$9 = x$

p.349
#11



12.

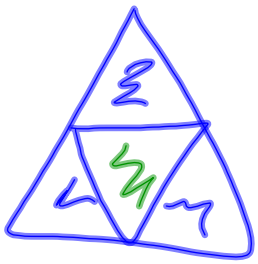
$$\frac{w}{15} = \frac{50}{17}$$

$$w = 15 \times \frac{50}{17}$$

$$\doteq 44.1$$

$$\doteq 44 \text{ m}$$

12)



$b = 10$ cm

$b = 30$ cm $\therefore k = 3$

$$A_{new} = k^2 A_{OLD}$$

$$= (3)^2 (43.5)$$

$$= 391.5 \text{ cm}^2$$

a) $A = \frac{bh}{2}$

$= \frac{10(8.7)}{2}$

$= 43.5$ cm

b) $A_{Green} = \frac{1}{4} A_{Total}$

$= \frac{1}{4}(43.5)$

$= 10.875$ cm

$A_{purple} = \frac{3}{4}(A_T)$

$= \frac{3}{4}(43.5)$

$= 32.625$ cm

d) if $A = 500$ cm^2 $h = ?$

$$\frac{A_{new}}{A_{OLD}} = \frac{500}{43.5}$$

$$k^2 \doteq 11.49$$

$$k \doteq \sqrt{11.49}$$

$$\doteq 3.39$$

$$\therefore h \doteq k(old)$$

$$\doteq 3.39(8.7)$$

$$\doteq 29.49$$

$$\doteq 29.5 \text{ cm}$$

Today's Learning Goal(s):

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

a) Identify the primary trig ratios.
b) Use the primary trig ratios to determine the measure of missing lengths and angles in right triangles.

Use Geometer's Sketchpad file.

(If unavailable, use next 2 slides)

The Tangent Ratio

Date:_____

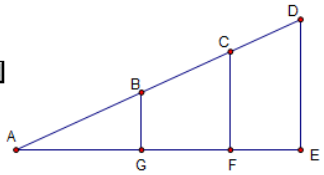
1. Explain why △AGB, △AFC and △AED are similar. Hide Caption

They each have a 90° angle and ∠A in common, therefore the third angle must also be equal.

2. Which angle is common to all three triangles? What is its measure?

Hide Angle Measurement

m∠DAE = 25°



m∠AGB = 90° m∠AFC = 90° m∠AED = 90°

3. Complete the table.

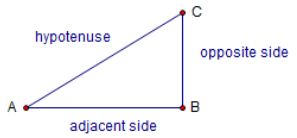
Hide Table

m∠DAE	$\frac{BG}{AG}$	$\frac{CF}{AF}$	$\frac{DE}{AE}$
25°	0.46	0.46	0.46

BG = 1.22 cm AG = 2.68 cm
CF = 2.09 cm AF = 4.58 cm
DE = 2.78 cm AE = 6.09 cm

Hide Distance Measurements

Hide Caption If two right triangles share an angle, ∠A, then they are similar.



Hide Captions

Hide Caption

If triangles are similar, then the ratio of any pair of corresponding sides is constant.

Hide Caption

If they are similar, then the ratio $\frac{\text{opposite side}}{\text{adjacent side}}$ is constant.

We call this the tangent ratio.

Hide Caption

$$\text{tangent of } \angle A = \tan A = \frac{\text{opposite}}{\text{adjacent}}$$

Hide Caption t[6]

There are two other ratios:

$$\text{sine of } \angle A = \frac{\text{opposite}}{\text{hypotenuse}}, \quad \text{cosine of } \angle A = \frac{\text{adjacent}}{\text{hypotenuse}}$$

The Primary Trigonometric Ratios

Hide Caption t[1]

Together, we write them in short form like this:

$\sin A = \frac{opp}{hyp}$, $\cos A = \frac{adj}{hyp}$, and $\tan A = \frac{opp}{adj}$

Hide Caption t[2]

We remember them using the acronym:

SOH CAH TOA

MPM 2DI 7.3_7.4 The Primary Trigonometric Ratios Date: Dec.15/16 (completed)

Before we begin, is your scientific calculator in DEGREE mode for angles?
Check for the following at the top of the display screen: D *or* DRG *or* DEG

Ex. 1 Use your calculator to evaluate. Round to four decimal places.

a) $\sin 25^\circ$ $\doteq 0.422\,61$ $\doteq 0.4226$

b) $\cos 51^\circ$ $\doteq 0.6293\,2$ $\doteq 0.6293$

c) $\tan 70^\circ$ (***Note) $\doteq 2.747\,47$ $\doteq 2.7475$

Ex. 2 Use your calculator to find the measure of each angle, to the nearest degree.

a) $\cos A = \frac{9}{26}$

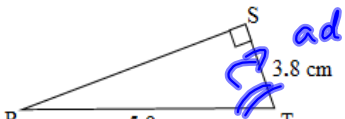
$A = \cos^{-1}\left(\frac{9}{26}\right)$ $\doteq 69.7$ $\doteq 70^\circ$

b) $\tan\theta = 0.3659$ (theta)

$\theta = \tan^{-1}(0.3659)$ $\doteq 20.0$ $\doteq 20^\circ$

Ex. 3 a) Determine cosT. ***Review Labelling a Triangle for Trig!***

b) Calculate the measure of $\angle T$, to the nearest degree.



adj hyp

a) $\cos T = \frac{adj}{hyp}$ $\cos T = \frac{3.8}{5.9}$

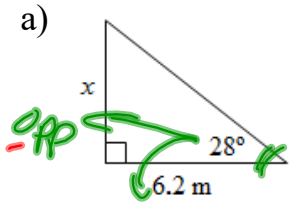
CAH

b) $\cos T = \frac{3.8}{5.9}$

$T = \cos^{-1}\left(\frac{3.8}{5.9}\right)$ $\doteq 49.9$ $\doteq 50^\circ$

Ex. 4 Find the length of the unknown side to the nearest tenth.

a)



TOA

opp

adj

$\tan = \frac{opp}{adj}$

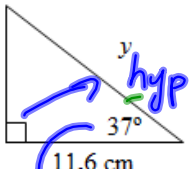
$\tan 28° = \frac{x}{6.2}$

$6.2 \tan 28° = x$

$x \doteq 3.29$

$\doteq 3.3$ m

b)



hyp

adj

(***Note)

CAH

$\cos = \frac{adj}{hyp}$

$\cos 37° = \frac{11.6}{y}$

$y = \frac{11.6}{\cos 37°}$

$\doteq 14.52$

$\doteq 14.5$ cm

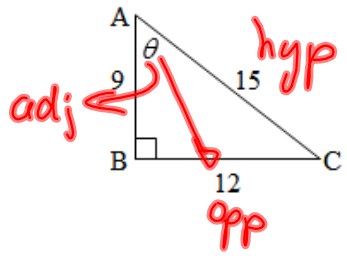
Note: To solve a triangle, means to find all angles and sides…the 3 missing pieces of information.

Review the learning goals. Were we successful today?

a) Identify the primary trig ratios.
b) Use the primary trig ratios to determine the measure of missing lengths and angles in right triangles.

1) Find $\sin\theta$, $\cos\theta$, and $\tan\theta$ for each triangle,

a)



hyp

adj

opp

SOH CAH TOA

$\sin = \frac{opp}{hyp}$ $\cos = \frac{adj}{hyp}$ $\tan = \frac{opp}{adj}$

$\sin\theta = \frac{12}{15}$ $\cos\theta = \frac{9}{15}$ $\tan\theta = \frac{12}{9}$

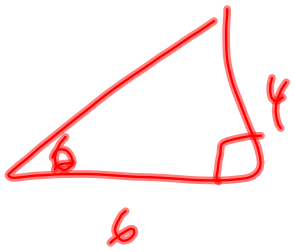
$\sin\theta = \frac{4}{5}$ $= \frac{3}{5}$ $= \frac{4}{3}$

$\theta = \sin^{-1}\left(\frac{4}{5}\right)$ $\theta = \cos^{-1}\left(\frac{3}{5}\right)$ $\theta = \tan^{-1}\left(\frac{4}{3}\right)$

$\doteq 53.13$ $\doteq 53.1°$ $\doteq 53.1°$

$\doteq 53.1°$

1.



$\tan\theta = \frac{4}{6}$

$\doteq 0.66666$

$\doteq 0.6667$

2. $\tan\theta = \frac{4}{6}$

$\theta = \tan^{-1}\left(\frac{4}{6}\right)$

$\doteq 33.69006^\circ$

$\doteq 33.3691^\circ$