

Reflect and turn in!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: <u>11/13</u> Topic: <u>20E Problem Solving</u>	0 1 2	
Tuesday Date: <u>11/14</u> Topic: <u>Quiz 3.1 Review</u>	0 1 2	
Wednesday Date: <u>11/15</u> Topic: <u>Quiz 3.1 - No homework</u>	0 1 2	
Thursday Date: <u>11/16</u> Topic: <u>13AB Ratios of Trigonometry</u>	0 1 2	
Friday Date: <u>11/17</u> Topic: <u>13C Solving for Side lengths</u>	0 1 2	

Class Plan:

1. Warm-up

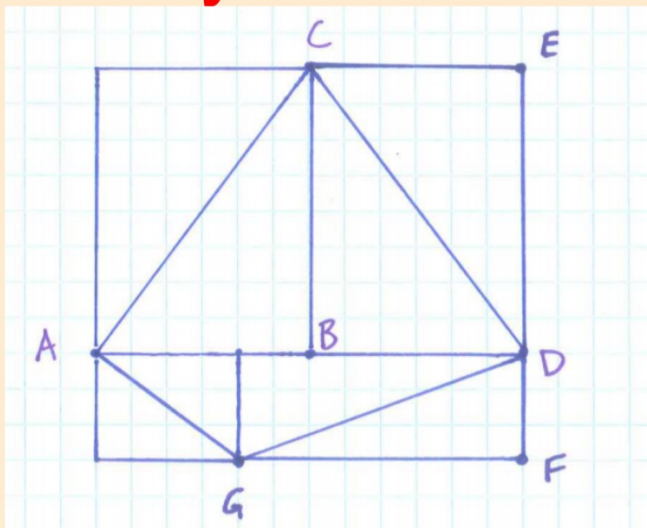
2. A Day in the Life of Mr. Ehlke

3. Joke Break!

4. How can we use trigonometry to find missing angles?

5. Practice

A Day in the Life of Mr. Ehlke:



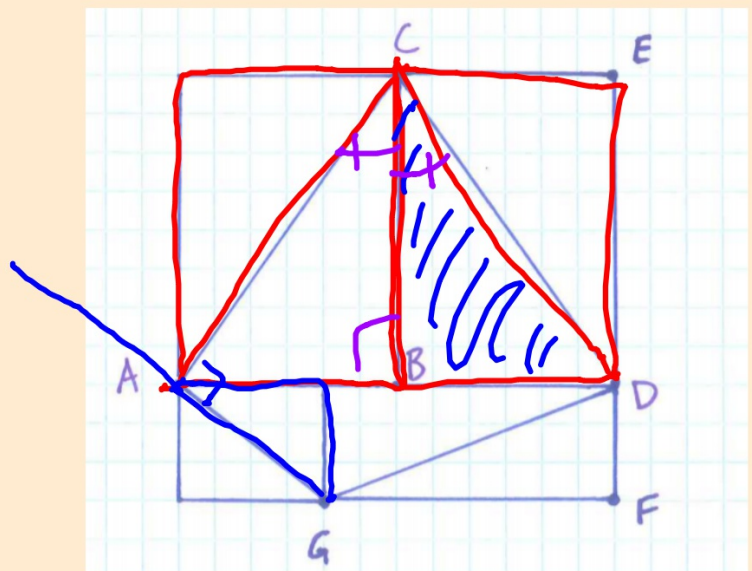
Each point represents a stop that Mr. Ehlke made on a day in August, 2017.
Where do you think he went?

Think like a mathematician. What shapes do you notice? How long are the sidelengths?
What angles can you find? _____

A Day in the Life of Mr. Ehlke:

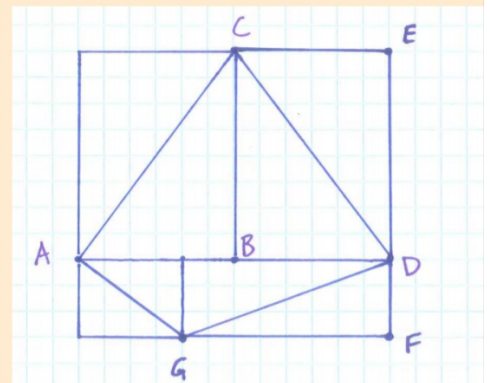
Think like a mathematician. What shapes do you notice? How long are the sidelengths?

What angles can you find? _____



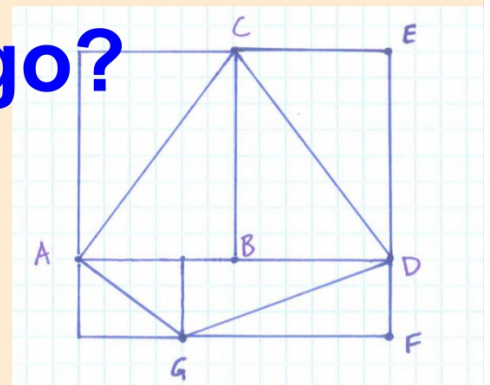
A Day in the Life of Mr. Ehlke:

Each point represents a stop that Mr. Ehlke made on a day in August, 2017.
Where do you think he went?



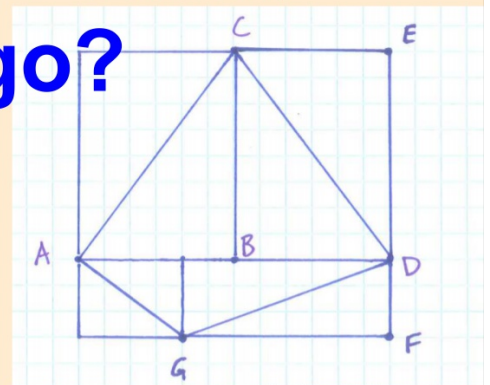
A Day in the Life of Mr. Ehlke:
Where did I actually go?

A: Zara's House



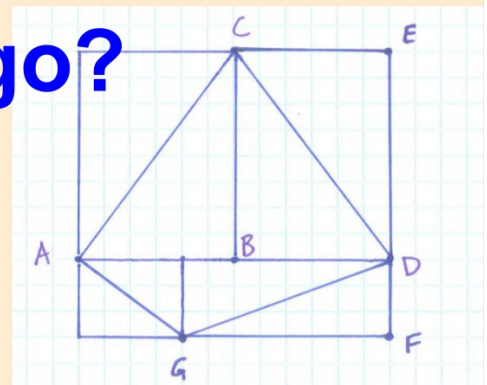
A Day in the Life of Mr. Ehlke: Where did I actually go?

B: Groundswell



A Day in the Life of Mr. Ehlke:
Where did I actually go?

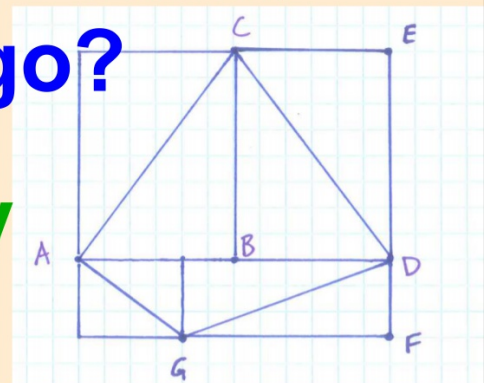
C: Fasika



A Day in the Life of Mr. Ehlke:

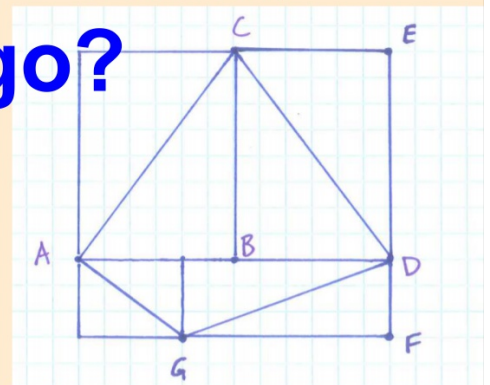
Where did I actually go?

D: Hamline University

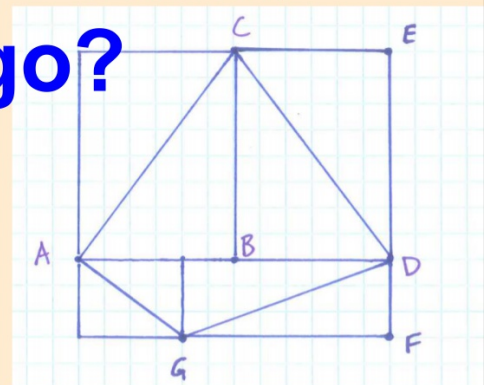


A Day in the Life of Mr. Ehlke: Where did I actually go?

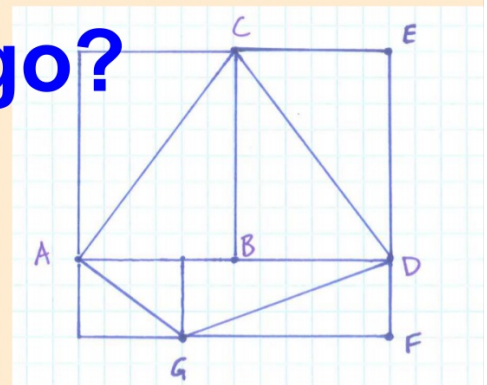
E: Turf Club



A Day in the Life of Mr. Ehlke:
Where did I actually go?
F: Target



A Day in the Life of Mr. Ehlke:
Where did I actually go?
G: Perkins



Joke Break

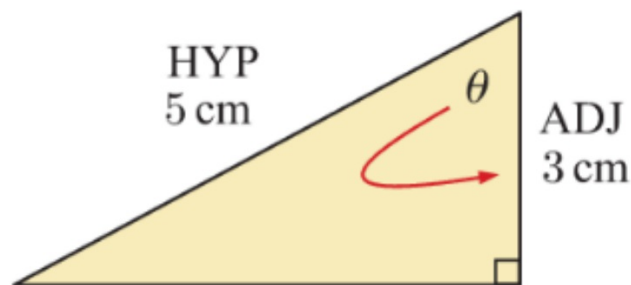
D**FINDING ANGLES**

How do I solve for an angle measure?

Example:

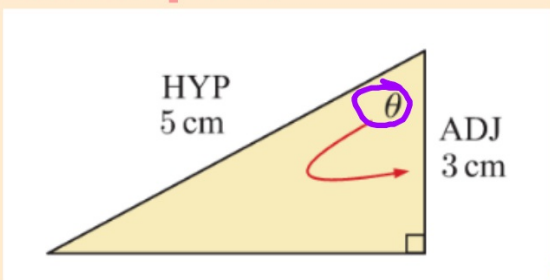
To find θ , we need an angle whose cosine is $\frac{3}{5}$.

We say that θ is the **inverse cosine** of $\frac{3}{5}$, and write $\theta = \cos^{-1}\left(\frac{3}{5}\right)$.



D**FINDING ANGLES***Steps to follow...*

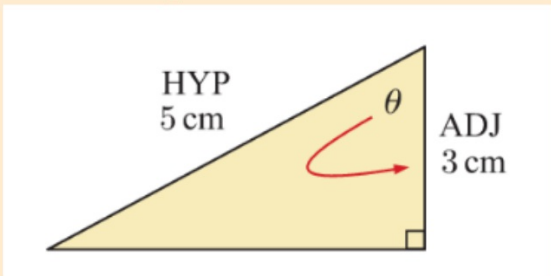
1. Label the given sides (adj, opp, hyp)
2. Determine what trig function to use
3. Solve using inverse trig operations

Example:

$$\cos(\theta) = \frac{\text{ADJ}}{\text{HYP}}$$
$$\cos(\theta) = \left(\frac{3}{5}\right)$$
$$\theta = \cos^{-1}\left(\frac{3}{5}\right)$$
$$\theta = 53.13^\circ$$

D**FINDING ANGLES***Steps to follow...*

1. Label the given sides (adj, opp, hyp)
2. Determine what trig function to use
3. Solve using inverse trig operations

Example: 

OPP

$\cos(\theta) = \frac{\text{Adj}}{\text{HYP}}$

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

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

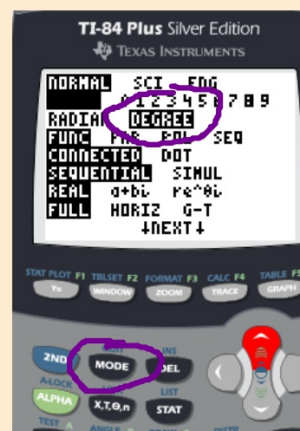
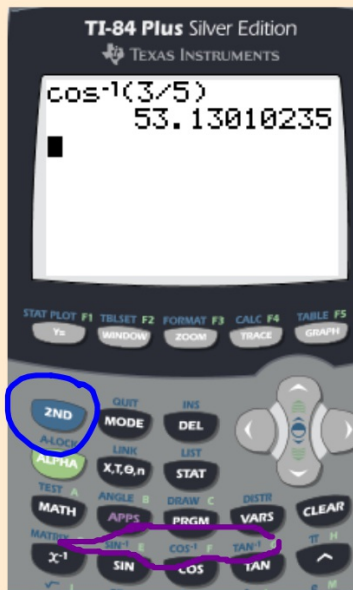
D

FINDING ANGLES

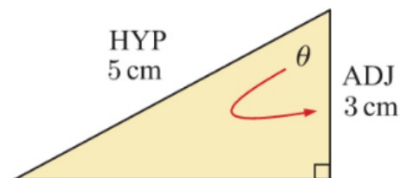
1. MODE: DEGREE

Example:

2. 2ND - COS



GRAPHICS
CALCULATOR
INSTRUCTIONS

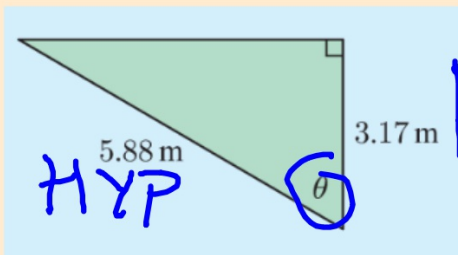


For the right angled triangle with hypotenuse 5 cm and adjacent side 3 cm, $\theta \approx 53.1^\circ$.

We define **inverse sine** and **inverse tangent** in a similar way.

Example:

Find, to 1 decimal place, the measure of the angle marked θ .



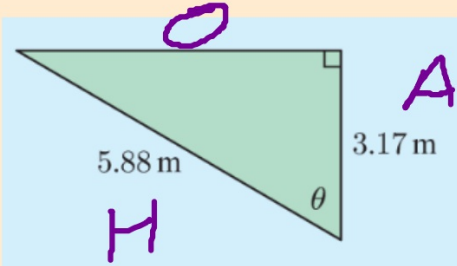
ADJ

~~cos~~

$$\cos(\theta) = \frac{3.17}{5.88}$$
$$\theta = \cos^{-1}\left(\frac{3.17}{5.88}\right)$$
$$\theta = 57.38^\circ$$

Example:

Find, to 1 decimal place, the measure of the angle marked θ .



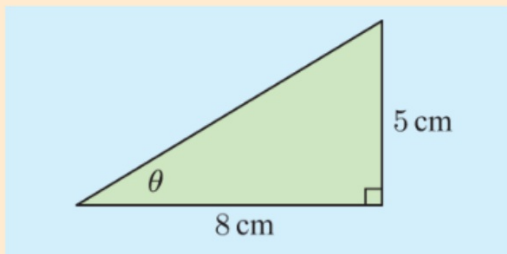
$$\cos(\theta) = \frac{3.17}{5.88}$$

$$\theta = \cos^{-1}\left(\frac{3.17}{5.88}\right)$$

$$\theta = 57.4^\circ$$

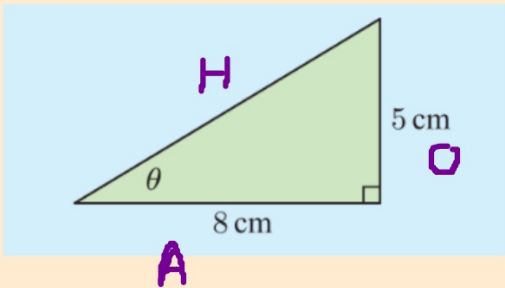
Example:

Find, to 1 decimal place, the measure of the angle marked θ .



Example:

Find, to 1 decimal place, the measure of the angle marked θ .



$$\tan(\theta) = \frac{5}{8}$$

$$\theta = \tan^{-1}\left(\frac{5}{8}\right)$$

$$\theta = 32.01^\circ$$

Example: Real Life Application

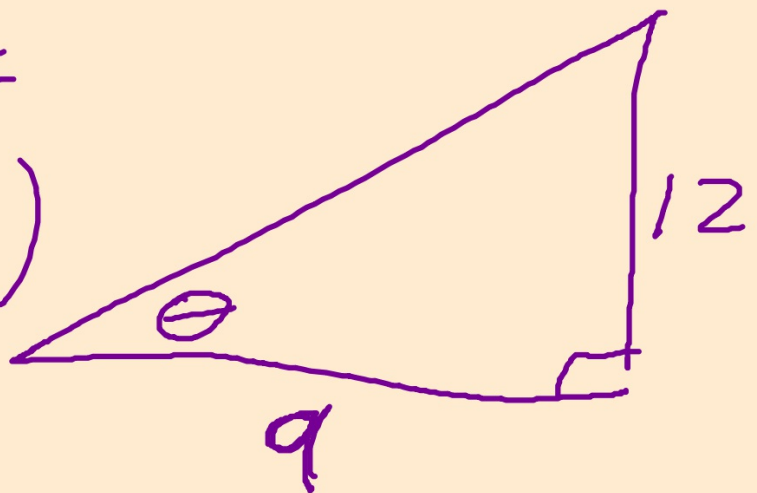
A 12 meter flagpole casts a 9 meter shadow.
Find the angle of elevation of the sun.

****Draw picture to illustrate situation before solving****

$$\tan(\theta) = \frac{12}{9}$$

$$\theta = \tan^{-1}\left(\frac{12}{9}\right)$$

$$\theta = 53^\circ$$



Investigation:

Sine vs. Cosine Investigation

In this investigation we consider formulae for the trigonometric ratios of the negative, complement, and supplement of a given angle.

1) Copy and complete the following table, giving answers correct to four decimal places.

θ	$\cos \theta$	$\sin \theta$	$\cos(-\theta)$	$\sin(-\theta)$	$\cos(90^\circ - \theta)$	$\sin(90^\circ - \theta)$	$\cos(180^\circ - \theta)$	$\sin(180^\circ - \theta)$
18°								
27°								
53°								
70°								
125°								

2) Use your table to predict a relationship between:

a $\cos(-\theta)$ and $\cos(\theta)$

b $\sin(-\theta)$ and $\sin(\theta)$

c $\cos(90^\circ - \theta)$ and $\sin \theta$

d $\sin(90^\circ - \theta)$ and $\cos \theta$

e $\cos(180^\circ - \theta)$ and $\cos \theta$

f $\sin(180^\circ - \theta)$ and $\sin \theta$

From the **Investigation**, complete the following relationships in your notes.

$\cos(-\theta)$ _____

$\cos(90^\circ - \theta)$ _____

$\cos(180^\circ - \theta)$ _____

$\sin(-\theta) =$ _____

$\sin(90^\circ - \theta)$ _____

$\sin(180^\circ - \theta)$ _____

Investigation Key

Anderson
Key

Sine vs. Cosine Investigation

In this investigation we consider formulae for the trigonometric ratios of the negative, complement, and supplement of a given angle.

1) Copy and complete the following table, giving answers correct to four decimal places.

θ	$\cos \theta$	$\sin \theta$	$\cos(-\theta)$	$\sin(-\theta)$	$\cos(90^\circ - \theta)$	$\sin(90^\circ - \theta)$	$\cos(180^\circ - \theta)$	$\sin(180^\circ - \theta)$
18°	0.9511	0.309	0.9511	-0.309	0.309	0.9511	-0.9511	0.309
27°	0.891	0.454	0.891	-0.454	0.454	0.891	-0.891	0.454
53°	0.6018	0.7986	0.6018	-0.7986	0.7986	0.6018	-0.6018	0.7986
70°	0.342	0.9397	0.342	-0.9397	0.9397	0.342	-0.342	0.9397
125°	-0.5736	0.8192	-0.5736	-0.8192	0.8192	-0.5736	0.5736	0.8192

2) Use your table to predict a relationship between:

a $\cos(-\theta)$ and $\cos(\theta)$
same value

b $\sin(-\theta)$ and $\sin(\theta)$
negative, opposites

c $\cos(90^\circ - \theta)$ and $\sin \theta$
same value

d $\sin(90^\circ - \theta)$ and $\cos \theta$
same value

e $\cos(180^\circ - \theta)$ and $\cos \theta$
negative, opposite

f $\sin(180^\circ - \theta)$ and $\sin \theta$
same value

From the Investigation, complete the following relationships in your notes.

$$\cos(-\theta) = \cos(\theta)$$

$$\cos(90^\circ - \theta) = \sin(\theta)$$

$$\cos(180^\circ - \theta) = -\cos(\theta)$$

$$\sin(-\theta) = -\sin(\theta)$$

$$\sin(90^\circ - \theta) = \cos(\theta)$$

$$\sin(180^\circ - \theta) = \sin(\theta)$$