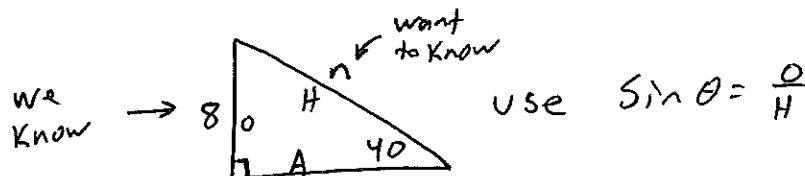


Section 5.4 Trig Applications

Day 1

Strategies:

- 1. Always draw a good diagram
- 2. Label what you know and mark H, O, A
- 3. Use the Trig Ratio that uses one side you know and one you want to know.

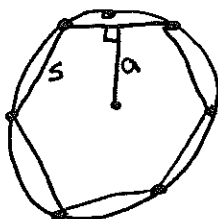


Examples from 5-4A: 5, 7, 9

Your Turn from 5-4A: 6, 8

Assignment: finish worksheet 5-4A

Note: an apothem is the distance from the center of the regular polygon to a side such that it makes a right angle with the side (the apothem is the same to each side).



Section 5.4 Trig Applications

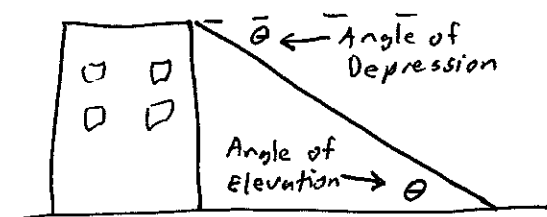
Day 2

Examples from 5-4B: 20, 25

Your Turn from 5-4B: 21, 23

Assignment: finish worksheet 5-4B

* Note:



Solving Triangles

When you are asked to SOLVE a triangle, find all angles and sides

Inverse Trigonometry

Regular trig functions: input is an angle, answer is a ratio

Inverse trig functions: input is a ratio, answer is an angle

Arcsin is \sin^{-1} Arccos is \cos^{-1} Arctan is \tan^{-1}

Reminder about the properties of inverse functions

Inverse functions cancel each other out

Arcsine is the inverse of sine so $\sin(\arcsin \frac{1}{2}) = \frac{1}{2}$

Arccosine is the inverse of cosine so $\tan^{-1}(\tan x) = x$

Examples from 5-5A: 5, 8

Your Turn from 5-5A: 6, 7

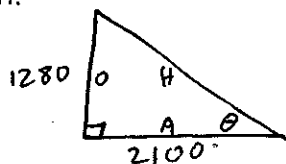
Examples from 5-5A: 11, 12

Your Turn from 5-5A: 13

Word Problem Example

The tower rises 1280 feet above the valley of the Fourche River.

A. Shadow is 2100 ft. Find angle of elevation.

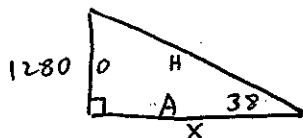


$$\tan \theta = \frac{1280}{2100}$$

$$\theta = \tan^{-1}\left(\frac{1280}{2100}\right)$$

$$\theta = 31.36$$

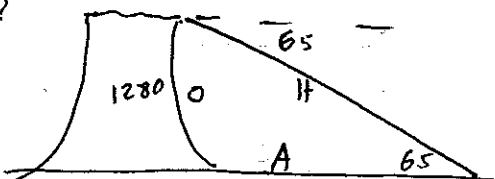
B. How long is shadow when angle is 38°?



$$\tan 38 = \frac{1280}{x}$$

$$x = 1638.3$$

C. If a person at the top of Devils Tower sees a hiker at an angle of depression of 65°, how far is the hiker from the base of the tower?



$$\tan 65 = \frac{1280}{A}$$

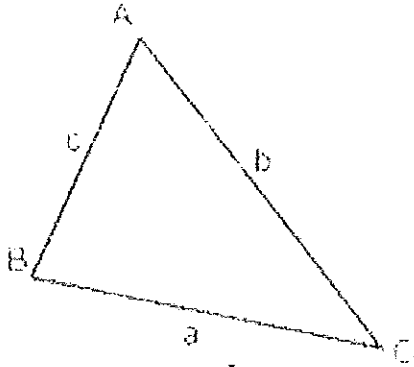
$$A = 596.9$$

Assignment: finish worksheet 5-5A

Section 5.6 Law of Sines Day 1

Law of Sines

Use you know an angle and a side across from the angle.



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Examples from 5-6A: 5, 7, 22

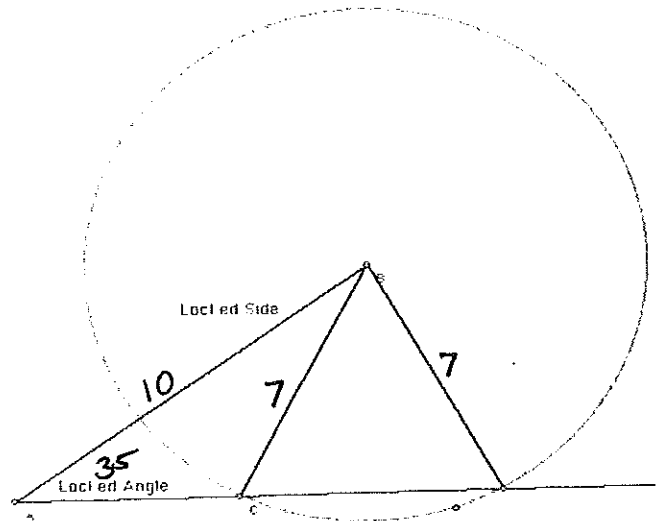
Your Turn from 5-6A: 6, 11

Assignment: finish worksheet 5-6A

Examples from 5-6B: 8, 9

Your Turn from 5-6B: 19, 20

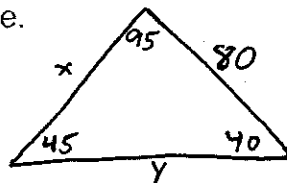
The Ambiguous Case of the Law of Sines



Word Problem Example

A landscaper wants to plant begonias along the edges of a triangular plot of land in Winton Woods Park. Two of the angles of the triangle measure 95° and 40° . The side between these two angles is 80 ft.

A. Find the measure of the third angle.



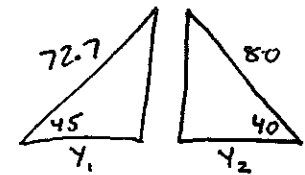
B. Find the length of the other two sides of the triangle.

$$\frac{80}{\sin 45} = \frac{y}{\sin 95}$$

$$y = 112.7$$

$$\frac{80}{\sin 45} = \frac{x}{\sin 40}$$

$$x = 72.7$$



$$\cos 45 = \frac{y_1}{80} \quad \cos 40 = \frac{y_2}{80}$$

$$y_1 = 51.4 \quad y_2 = 61.3$$

$$y = 112.7$$

C. What is the perimeter of the is triangular plot of land?

$$112.7 + 72.7 + 80 = 265.4$$

Assignment: finish worksheet 5-6B

Section 5.8 Law of Cosines Day 1

Law of Cosines

Use when you cannot use law of sines. Another way to say this that you do NOT know a side and angle across from the side.

Start by labeling the angles: A B C and and sides: a b c

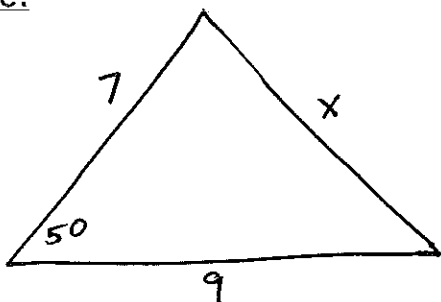
Set up the Law of Cosines for the missing side to be isolated:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

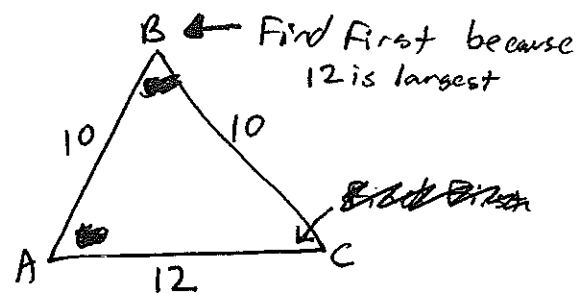
$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

* Strategy: Find the largest angle or use the largest angle with Law of Cosines First to avoid Ambiguous Case of law of Sines



$$x^2 = 7^2 + 9^2 - 2(7)(9)\cos 50$$



$$12^2 = 10^2 + 10^2 - 2(10)(10)\cos B$$

Examples from 5-8A: 5, 6

Your Turn from 5-8A: 7, 11, 12

Assignment: finish worksheet 5-8A front side

DAY 2 – back side

Study for the Quiz!