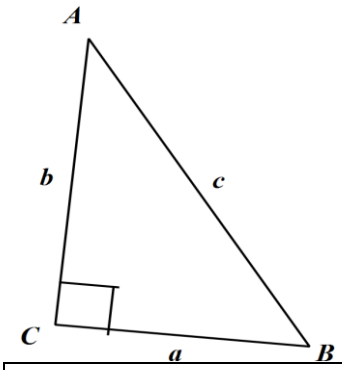
SM 3H

Date: 2/28/23 **Section:** 7.3

Objective: I can use trig to solve real-world situations.

A. Right Triangle Reminders

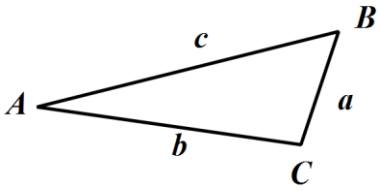


1. Right triangle trigonometric functions:

2. How to solve for a side if given 2 sides:

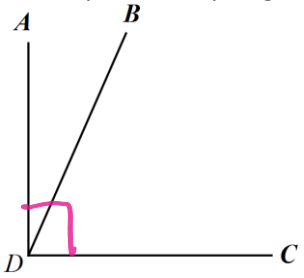
3. How to find an angle:

B. Information on all triangles



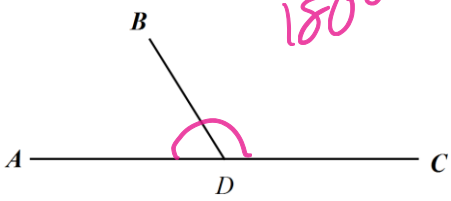
1. Triangle Sum Theorem:

2. Complementary Angles:



90°

3. Supplementary Angles:

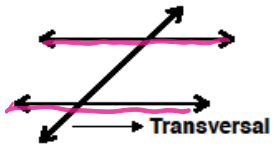
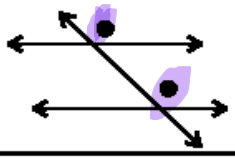
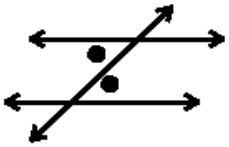
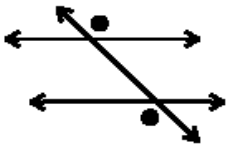
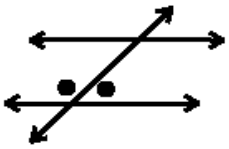
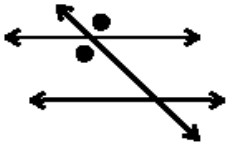
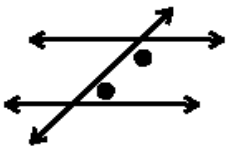


180°

4. How to solve if given AAS, ASA, ASS:

5. How to solve if given SAS, SSS:

Parallel Lines Cut By A Transversal

Definition	Diagram
Transversal A transversal is a line that intersects two or more lines at different points.	
Corresponding Angles Two angles that lie on the same side of the transversal in corresponding positions.	
Alternate Interior Angles Interior angles that lie on opposite sides of the transversal.	
Alternate Exterior Angles Exterior angles that lie on opposite sides of the transversal.	
Supplementary Angles Two (or more) angles whose sum is 180°.	
Vertical Angles Two angles whose sides form opposite rays.	
Consecutive Interior Angles Angles that lie on the same side of the transversal between two lines.	

congruent

congruent

congruent

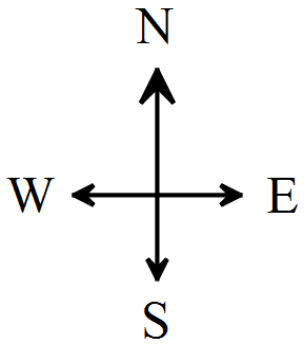
congruent

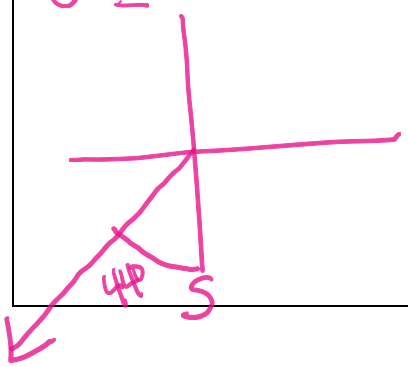
Supplementary

same side int

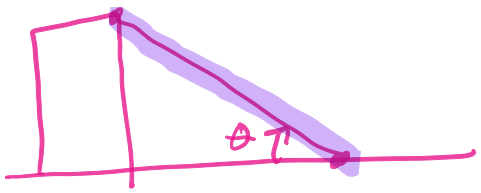
D. Directions

Vocabulary: Bearing, heading, in the direction of



1. $S44°W$ 	2. $N72°E$

E. Descriptions of angles and variables

1. Define your variables:	2. Line of sight:
3. Angle of Elevation: 	4. Angle of depression:

E. DRAW pictures!!!!!!!

Example 1

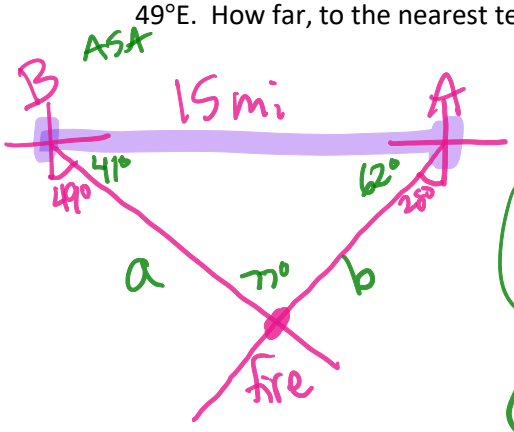
The Sandlot boys are sitting in the treehouse looking at The Beast. The angle of depression from their line of sight to The Beast is 17°. If The Beast is standing 34 feet away from the base of the treehouse, how tall is the treehouse? Round to the nearest tenth.

Example 2

A ladder is leaning against a house. The ladder is 8 feet tall. The distance from the bottom of the ladder to the bottom of the house is 6 feet. How far up the house does the ladder go? Round to the nearest tenth of a foot.

Example 3

Two fire-lookout stations are 15 miles apart, with station B directly west of station A. Both stations spot a fire. The bearing of the fire from station A is S 28° W and the bearing of the fire from station B is S 49°E. How far, to the nearest tenth of a mile, is the fire from each lookout station?



b = distance from fire to station A

a = distance from fire to station B

$\left(\frac{b}{\sin 41^\circ} = \frac{15}{\sin 77^\circ}\right) \sin 41^\circ$

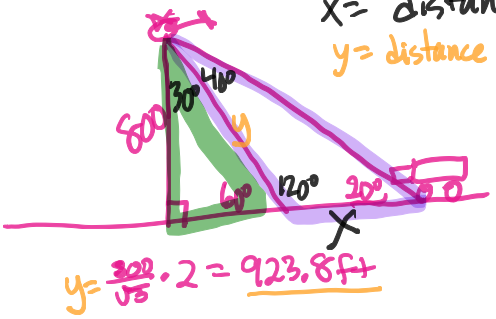
$b \approx 10.1 \text{ mi}$

$\left(\frac{a}{\sin 62^\circ} = \frac{15}{\sin 77^\circ}\right) \sin 62^\circ$

$a \approx 13.6 \text{ mi}$

Example 4

A helicopter is hovering 800 feet above a road. A truck driver observes the helicopter at a twenty degree angle. Twenty five seconds later the truck driver notices the angle of the helicopter is now at sixty degrees. How fast is the truck moving? Round your answer to the nearest foot/second.



$y = \frac{800}{\sqrt{3}} \cdot 2 = 923.8\text{ ft}$

x = distance travelled in 25 sec

y = distance from heli to truck at 60°

$\left(\frac{x}{\sin 40°} = \frac{923.7...}{\sin 20°}\right) \sin 40°$

$x \approx 1736.1\text{ ft.}$

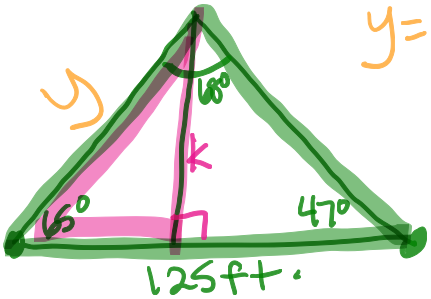
z = velocity of truck

$z = \frac{1736.1\text{ ft}}{25\text{ sec}}$

$z = 69\text{ ft/sec}$

Example 5

Two tourists are 125 feet apart on opposite sides of a monument. The angles of elevation from the tourists to the top of the monument are 47° and 65°. Find the height of the monument to the nearest foot.



k = height of monument

y = distance from top of monument to tourist at 65°

$\left(\frac{y}{\sin 47°} = \frac{125}{\sin 68°}\right) \sin 47°$

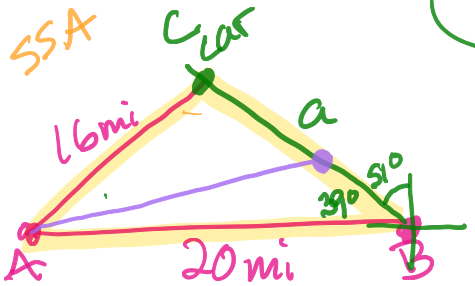
$y \approx 98.6\text{ ft.}$

$\left(\sin 65° = \frac{k}{98.6}\right) 98.6$

$k \approx 89\text{ ft.}$

Example 6

Observatory B is 20 miles east of observatory A in the middle of the dessert. A car leaves A and drives 16 miles towards a meteor sighting. At this time, it is sighted from B. If the car is N51°W from observatory B, how far from observatory B is the car? Round your answer to the nearest tenth of a mile.



a = distance from car to obser B

C = angle car is with both observatories

$\left(\frac{\sin C}{20} = \frac{\sin 39°}{16}\right) 20$

$\sin^{-1}\left(\frac{20 \sin 39°}{16}\right) = C$

$C_1 \approx 51.9°$ 2 Δ's

$A_1 \approx 89.1°$

$\left(\frac{a}{\sin 89.1°} = \frac{16}{\sin 39°}\right) \sin 89.1°$

$a_1 \approx 25.4\text{ mi}$

$180° - 51.9° = C_2$

$C_2 \approx 128.1°$

$180° - 39° - 128.1° = A_2$

$A_2 \approx 12.9°$

$\left(\frac{a}{\sin 12.9°} = \frac{16}{\sin 39°}\right) \sin 12.9°$

$a_2 \approx 5.7\text{ mi}$