

## Section 6.2 – Law of COSINES

The two remaining cases for solving oblique triangles, SSS and SAS, cannot be solved using the Law of Sines because none of the ratios would be complete. In these two cases, the Law of Cosines must be used.

### *Law of Cosines*

Standard Form – use with SAS

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

$$b^2 = a^2 + c^2 - 2accosB$$

$$c^2 = a^2 + b^2 - 2abcosC$$

Alternative Form – use with SSS

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

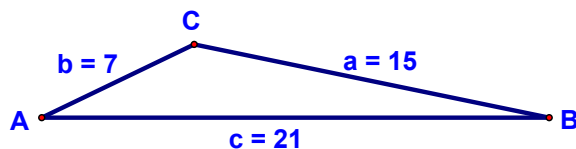
$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

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

**\*\* TRY TO FIND THE LARGEST ANGLE FIRST \*\***

### SSS Case

1) Find the three angles of the triangle in the figure below



$$m\angle A =$$

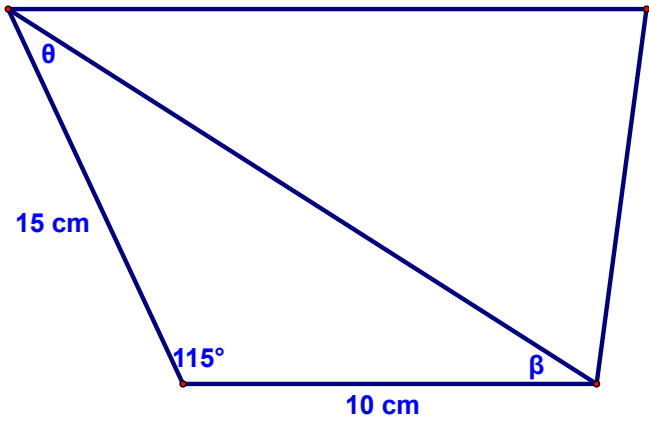
$$m\angle B =$$

$$m\angle C =$$

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### SAS Case

2) Find the length of the diagonal of the trapezoid, and the missing angles.

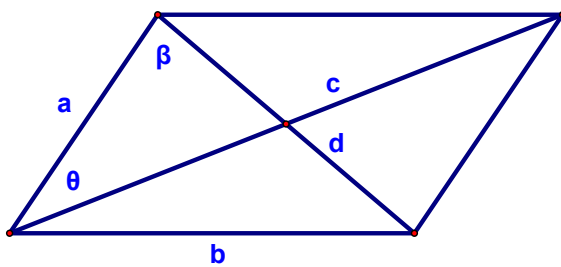


$$\theta =$$

$$\beta =$$

$$\text{diagonal} =$$

3) Solve the parallelogram shown below.



$$a = 40$$

$$b = 60$$

$$d = 80$$

$$c =$$

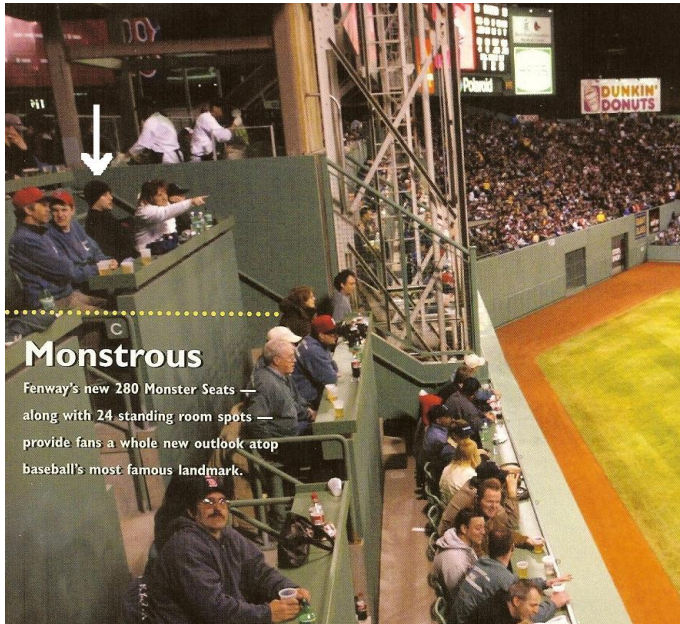
$$\theta =$$

$$\beta =$$

\* c and d are diagonals of the parallelogram

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- 4) Mookie Betts is playing centerfield against the Yankees. He is approximately 300 ft. from the television camera that is behind home plate. Jacoby Ellsbury hits a fly ball that goes to the green monster 350 ft. away from the camera. The camera turns  $8^\circ$  to follow the play. Approximately how far does Betts have to run to make the catch?



## Section 6.2 – Law of COSINES

### Heron's Area Formula

#### *Heron's Area Formula*

Given any triangle with sides of lengths  $a$ ,  $b$ , and  $c$ , the area of the triangle is

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{where } s = \frac{a+b+c}{2}$$

5) Find the area of a triangle having sides of length  $a = 75.4$ ,  $b = 52$ , and  $c = 52$ .

6) Find the area of a triangle with sides of length  $a = 3$ ,  $b = 4$ , and  $c = 5$

Is there a way to check your answer for this one?

WHICH area formula to use?? (Recall: we learned another one with Law of Sines)

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- 7) A parking lot has the shape of a parallelogram. The lengths of the two adjacent sides are 70 meters and 100 meters. The angle between the two sides is  $70^\circ$ . What is the area of the parking lot?