

1. Solve the triangle.

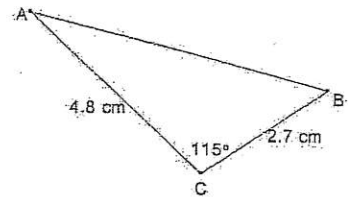
$$\frac{\sin 115^\circ}{c} = \frac{\sin B}{4.8} = \frac{\sin A}{2.7}$$

Not enough info!

Law of Cosines: $a^2 = b^2 + c^2 - 2bc \cos A$

$$c^2 = 2.7^2 + 4.8^2 - 2(2.7)(4.8) \cos 115^\circ$$

$$\boxed{c = 6.4 \text{ cm}}$$



Now we can use law of sines $\rightarrow \frac{\sin 115^\circ}{6.4} = \frac{\sin B}{4.8}$

$$\boxed{B = 39.6^\circ}$$

$$C = 180 - A - B = \boxed{25.4^\circ}$$

2. Describe how the unknown side in the Law of Cosines is related to the given angle and how the given angle is related to the two given sides, using terms you studied in geometry.

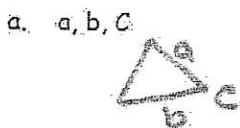
the unknown side is opposite the known angle and the known angle is included between 2 given sides

3. What information needs to be given about a triangle in order to use the Law of Cosines be applied?

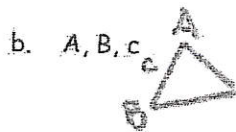
SSS
SAS

Law of Sines \rightarrow AAS
SSA
ASA

4. Given triangle ABC, decide whether the law of sines or the law of cosines should be used to begin solving the triangle.



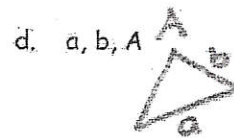
Cosines



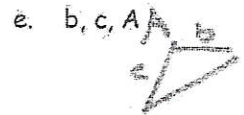
Sines



Sines



Sines



Cosines

5. Given triangle ABC, a = 5, b = 9, c = 7 calculate the measure of each angle to the nearest degree.

$$5^2 = 9^2 + 7^2 - 2(9)(7) \cos A$$

$$\frac{5^2 - 9^2 - 7^2}{-2(9)(7)} = \cos A$$

$$\boxed{A = 34^\circ}$$

$$\frac{\sin 34^\circ}{5} = \frac{\sin B}{9}$$

No Solution

*Since this is an ambiguous case problem \rightarrow we get the incorrect solution

*to avoid SSA (amb case) calculate angles from least to greatest or greatest to least *

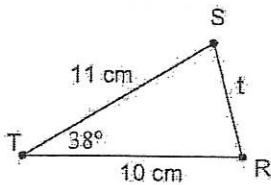
$$\frac{\sin 34^\circ}{5} = \frac{\sin C}{7}$$

$$\boxed{C = 52^\circ}$$

$$\boxed{B = 180 - A - C = 94^\circ}$$

Solve each triangle given below. Show all work!! Round all angles to the nearest degree. Round all sides to the nearest tenth.

1.



$$t^2 = 11^2 + 10^2 - 2(11)(10)\cos 38^\circ$$

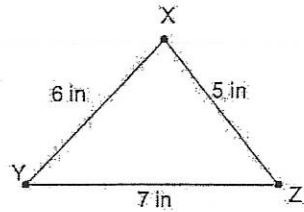
$$t = 6.9$$

$$\frac{\sin R}{t} = \frac{\sin 38^\circ}{10}$$

$$R = 79^\circ$$

$$S = 63^\circ$$

2.



$$7^2 = 6^2 + 5^2 - 2(6)(5)\cos X$$

$$X = 78^\circ$$

$$\frac{\sin 78^\circ}{7} = \frac{\sin Z}{6}$$

$$Z = 57^\circ$$

$$Y = 45^\circ$$

3. In $\triangle ABC$, $A=51^\circ$, $b=7$, $c=10$

$$a^2 = 7^2 + 10^2 - 2(7)(10)\cos 51^\circ$$

$$a = 7.8$$

$$\frac{\sin 51^\circ}{7.8} = \frac{\sin B}{7}$$

$$B = 44^\circ$$

$$C = 85^\circ$$

4. In $\triangle RPQ$, $r=7$, $p=8$, $q=3$

$$8^2 = 7^2 + 3^2 - 2(7)(3)\cos P$$

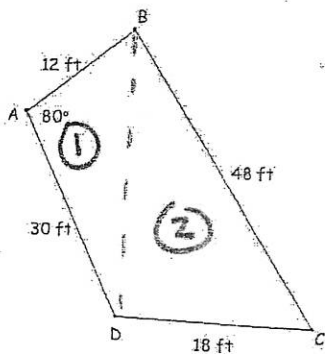
$$P = 98^\circ$$

$$\frac{\sin 98^\circ}{8} = \frac{\sin R}{7}$$

$$R = 60^\circ$$

$$Q = 22^\circ$$

5. Find the area of the quadrilateral.



$$DB^2 = 12^2 + 30^2 - 2(12)(30)\cos 80^\circ$$

$$DB = 30.31 \text{ ft}$$

$$\textcircled{1} K = \frac{1}{2}(12)(30)\sin 80^\circ = 177.27 \text{ ft}^2$$

$$\textcircled{2} S = 48.16$$

$$K = \sqrt{48.16(0.16)(30.16)(17.85)} = 64.41 \text{ ft}^2$$

$$\text{Total: } 241.68 \text{ ft}^2$$