

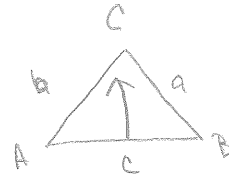
Notes: Day 5 Law of Cosines

Key

In **ANY** triangle, if you know all 3 sides (**SSS**) or 2 sides and the included angle (**SAS**), then you can find the missing angles or side by using the **Law of Cosines**.

Law of Cosines

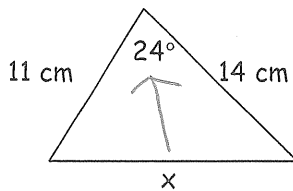
$$c^2 = a^2 + b^2 - 2ab \cos C$$



a , b , and c are the sides of the Δ and c is the side opposite $\angle C$

1-4 Find the value of x .

1)

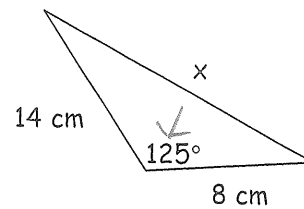


$$x^2 = 11^2 + 14^2 - 2(11)(14) \cos 24^\circ$$

$$x^2 = 35.628$$

$$x = 5.969 \text{ cm}$$

2)

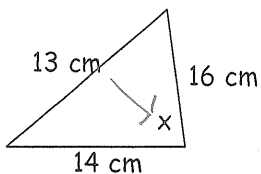


$$x^2 = 14^2 + 8^2 - 2(8)(14) \cos 125^\circ$$

$$x^2 = 388.481$$

$$x = 19.710 \text{ cm}$$

3)

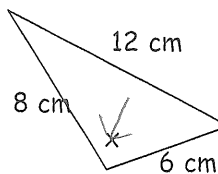


$$13^2 = 14^2 + 16^2 - 2(14)(16) \cos x^\circ$$

$$.632 = \cos x$$

$$x = 50.825^\circ$$

4)



$$12^2 = 8^2 + 6^2 - 2(6)(8) \cos x^\circ$$

$$-.458 = \cos x$$

$$x = 117.280^\circ$$

5) The lengths of the sides of a triangle are 7 cm, 9cm, and 14 cm. Find the measure of the largest angle.

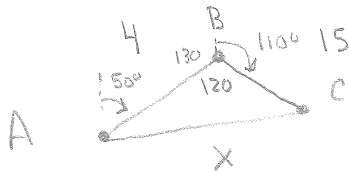


$$14^2 = 7^2 + 9^2 - 2(7)(9) \cos X^\circ$$

$$-0.524 = \cos X$$

$$X = 121.588^\circ$$

6) The bearing from A to B is 50° and the bearing from B to C is 110° . The distance from A to B is 4 m and the distance from B to C is 15 m. Find the distance from A to C.

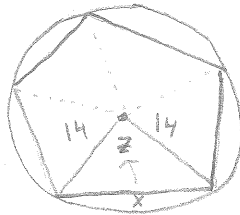


$$X^2 = 4^2 + 15^2 - 2(4)(15) \cos 120^\circ$$

$$X^2 = 300$$

$$X = 17.349 \text{ m}$$

7) A regular pentagon is inscribed in a circle with a radius of 14cm. Find the perimeter of the regular pentagon.



$$\text{Perimeter} = 5X = 82.290 \text{ cm}$$

$$Z = 360^\circ$$

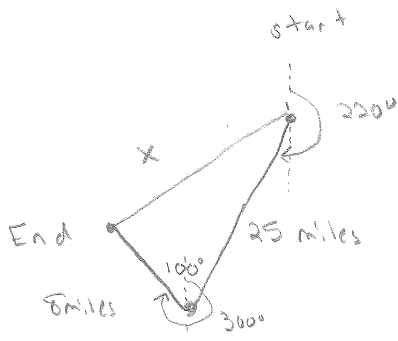
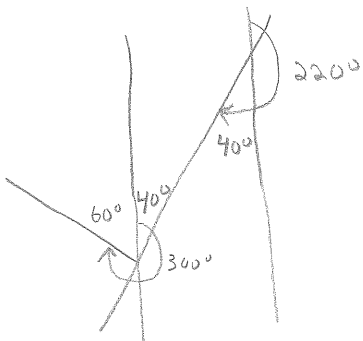
$$Z = 72^\circ$$

$$X^2 = 14^2 + 14^2 - 2(14)(14) \cos 72^\circ$$

$$X^2 = 270.865$$

$$X = 16.458 \text{ cm}$$

8) Tony runs 25 miles on a bearing of 220° , then walks 8 miles on a bearing of 300° . How far is Tony from where he started?



$$X^2 = 8^2 + 25^2 - 2(8)(25) \cos 100^\circ$$

$$X^2 = 758.459$$

$$X = 27.540 \text{ miles}$$