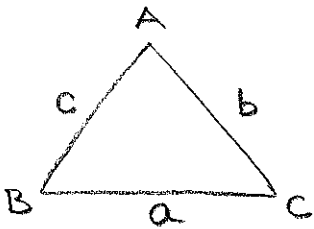


Cosine Law

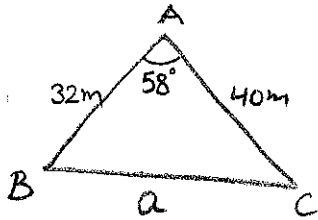
$$a^2 = b^2 + c^2 - 2bc \cos A$$

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

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

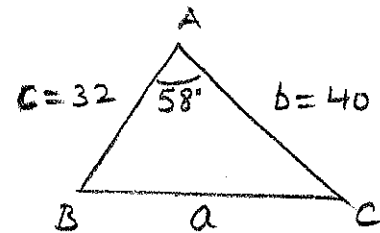


Ex. 1.



Determine the length of side CB.

Sol. I want to determine side 'a'
therefore, I will use the first
formula.



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

$$a^2 = (40)^2 + (32)^2 - (2)(40)(32)(\cos 58^\circ)$$

$$a^2 = 1600 + 1024 - (2)(40)(32)(0.53)$$

{BEDMAS}

$$a^2 = 1600 + 1024 - 1356.8$$

$$a^2 = 2624 - 1356.8$$

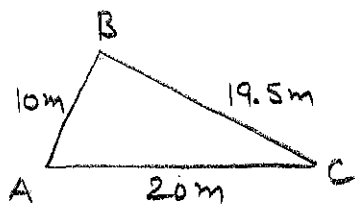
$$a^2 = 1267.2$$

$$a = \sqrt{1267.2}$$

$$a = 35.59 \text{ m}$$

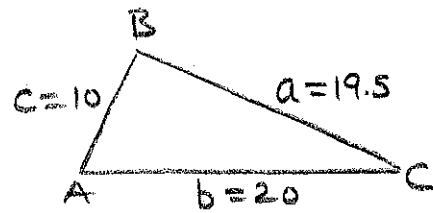
$$\boxed{CB = 35.59 \text{ m}}$$

Ex.2



Determine $\angle B$.

Sol. I want to determine $\angle B$, therefore I will use the following formula.



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

$$(20)^2 = (10)^2 + (19.5)^2 - 2(10)(19.5) \cos B$$

$$400 = 100 + 380.25 - (390) \cos B$$

$$400 = 480.25 - (390) \cos B$$

$$-480.25 \quad -480.25$$

$$-80.25 = -(390) \cos B$$

$$\frac{-80.25}{-390} = \frac{-(390) \cos B}{-390}$$

$$0.21 = \cos B$$

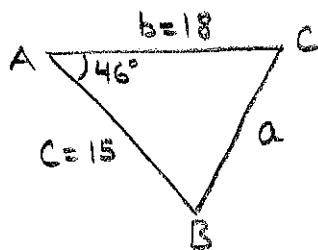
$$\cos^{-1}(0.21) = \cos^{-1}(\cos B)$$

$$77.88^\circ = B$$

$$\boxed{B = 77.88^\circ}$$

cosine law

Q.2



Determine side 'a'.

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

$$a^2 = (18)^2 + (15)^2 - (2)(18)(15) (\cos 46^\circ)$$

$$a^2 = 324 + 225 - (2)(18)(15)(0.6947)$$

$$a^2 = 324 + 225 - 375.14$$

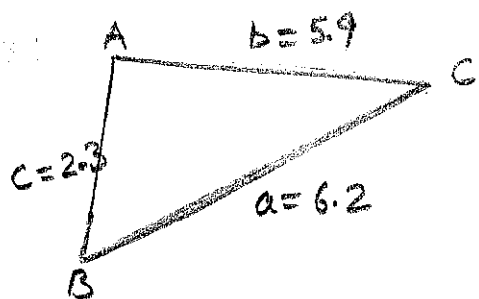
$$a^2 = 549 - 375.14$$

$$a^2 = 173.86$$

$$a = \sqrt{173.86}$$

$$a = 13.186 \text{ cm}$$

Q.3



Determine $\angle B$.

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

$$(5.9)^2 = (2.3)^2 + (6.2)^2 - (2)(2.3)(6.2) (\cos B)$$

$$34.81 = 5.29 + 38.44 - (28.52) \cos B$$

$$34.81 = 43.73 - (28.52) \cos B$$

$$-43.73 \quad -43.73$$

$$-8.92 = -(28.52) \cos B$$

$$\frac{-8.92}{-28.52} = \frac{-(28.52) \cos B}{-28.52}$$

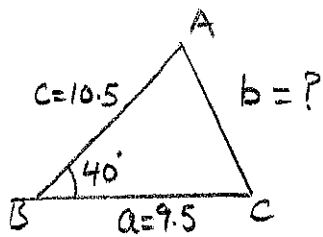
$$0.3128 = \cos B$$

$$\cos^{-1}(0.3128) = \cos^{-1}(\cos B)$$

$$71.77^\circ = B$$

$$B = 71.77^\circ$$

4a
137



Cosine Law

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

$$b^2 = (10.5)^2 + (9.5)^2 - (2)(10.5)(9.5)(\cos 40^\circ)$$

$$b^2 = 110.25 + 90.25 - (2)(10.5)(9.5)(0.7660)$$

$$b^2 = 110.25 + 90.25 - 152.817$$

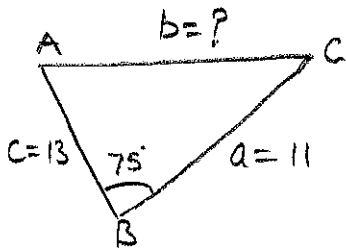
$$b^2 = 200.5 - 152.817$$

$$b^2 = 47.683$$

$$b = \sqrt{47.683}$$

$$b = 6.9 \text{ m}$$

4b
137



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

$$b^2 = (13)^2 + (11)^2 - (2)(13)(11)(\cos 75^\circ)$$

$$b^2 = 169 + 121 - (2)(13)(11)(0.2588)$$

$$b^2 = 169 + 121 - 74.0168$$

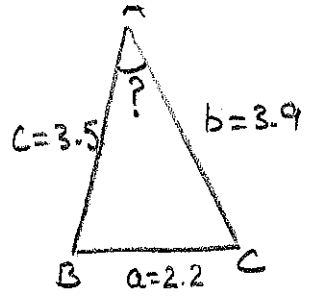
$$b^2 = 290 - 74.0168$$

$$b^2 = 215.9832$$

$$b = \sqrt{215.9832}$$

$$b = 14.7 \text{ cm}$$

5a
137



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

$$(2.2)^2 = (3.9)^2 + (3.5)^2 - 2(3.9)(3.5)(\cos A)$$

$$4.84 = 15.21 + 12.25 - (27.3) \cos A$$

$$4.84 = 27.46 - (27.3) \cos A$$

$$-27.46 \quad -27.46$$

$$-22.62 = -(27.3) \cos A$$

$$\frac{-22.62}{-27.3} = \frac{-(27.3) \cos A}{-27.3}$$

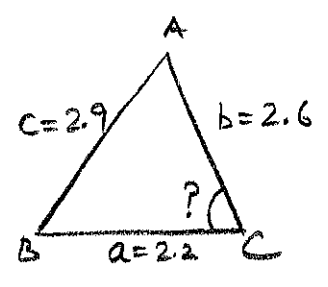
$$0.8286 = \cos A$$

$$\cos^{-1}(0.8286) = \cos^{-1}(\cos A)$$

$$34.05^\circ = A$$

$$\boxed{A = 34.05^\circ}$$

5b



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

$$(2.9)^2 = (2.2)^2 + (2.6)^2 - 2(2.2)(2.6)(\cos C)$$

$$8.41 = 4.84 + 6.76 - (11.44) \cos C$$

$$8.41 = 11.6 - (11.44) \cos C$$

$$-11.6 \quad -11.6$$

$$-3.19 = -(11.44) \cos C$$

$$\frac{-3.19}{-11.44} = \frac{-(11.44) \cos C}{-11.44}$$

$$0.2788 = \cos C$$

$$\cos^{-1}(0.2788) = \cos^{-1}(\cos C)$$

$$73.81^\circ = C$$

$$\boxed{C = 73.81^\circ}$$