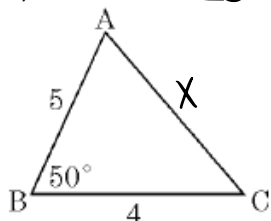


Pre-Calculus 11: Ch2 Trigonometry HW Lesson 7 Cosine Law

1. Given each triangle, find the value of the indicated side or angle.

a) $AC = 3.910$



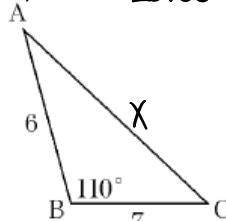
$$X^2 = 5^2 + 4^2 - 2 \cdot 4 \cdot 5 (\cos 50^\circ)$$

$$X^2 = 41 - 40(\cos 50^\circ)$$

$$X^2 = 15.288$$

$$X = 3.910 //$$

b) $AC = 10.66$



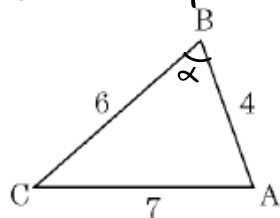
$$X^2 = 6^2 + 7^2 - 2 \cdot 6 \cdot 7 (\cos 110^\circ)$$

$$X^2 = 85 - 84(\cos 110^\circ)$$

$$X^2 = 113.73$$

$$X = 10.66 //$$

c) $\angle B = 86.417^\circ$



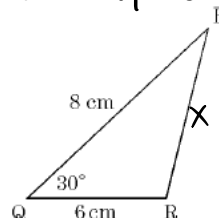
$$7^2 = 6^2 + 4^2 - 2 \cdot 6 \cdot 4 (\cos \alpha)$$

$$49 = 52 - 48(\cos \alpha)$$

$$\frac{-3}{-48} = \cos \alpha$$

$$\alpha = 86.417^\circ //$$

d) $PR = 4.106$



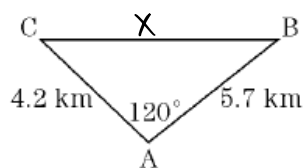
$$X^2 = 8^2 + 6^2 - 2 \cdot 8 \cdot 6 (\cos 30^\circ)$$

$$X^2 = 100 - 96(\cos 30^\circ)$$

$$X^2 = 16.862$$

$$X = 4.106 //$$

e) $\angle B = 25.0^\circ$



$$X^2 = 4.2^2 + 5.7^2 - 2(4.2)(5.7)(\cos 120^\circ)$$

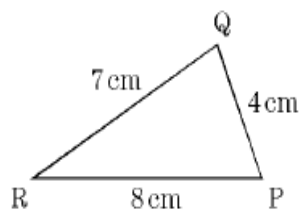
$$X^2 = 50.13 - 47.88(\cos 120^\circ)$$

$$X^2 = 74.07$$

$$X = 8.606 \text{ km}$$

$$\frac{8.606}{\sin 120^\circ} = \frac{4.2}{\sin B} \rightarrow B = 25.0^\circ //$$

f) $\angle Q = 88.977^\circ$



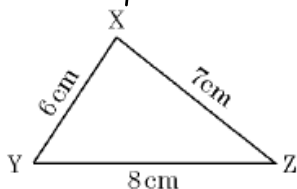
$$8^2 = 7^2 + 4^2 - 2(7)(4)(\cos Q)$$

$$64 = 65 - 56(\cos Q)$$

$$\frac{-1}{-56} = \cos Q$$

$$Q = 88.977^\circ //$$

g) $\angle Z = 46.567^\circ$



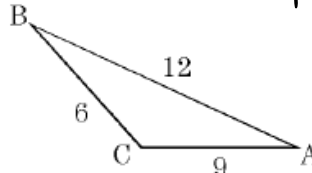
$$6^2 = 7^2 + 8^2 - 2(7)(8)(\cos Z)$$

$$36 = 113 - 112(\cos Z)$$

$$\frac{-77}{-112} = \cos Z$$

$$Z = 46.567^\circ //$$

h) (Obtuse) $\angle C = 104.478^\circ$

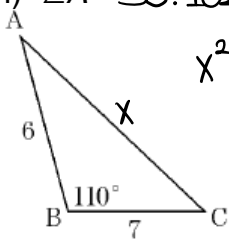
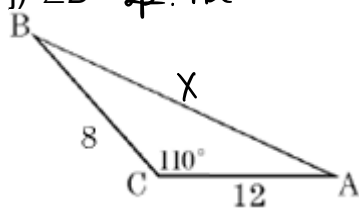


$$12^2 = 6^2 + 9^2 - 2(6)(9)(\cos C)$$

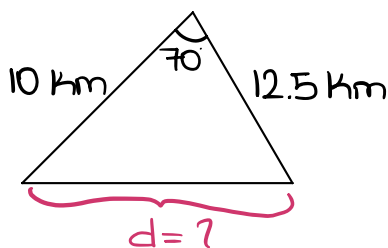
$$144 = 117 - 108(\cos C)$$

$$\frac{27}{-108} = \cos C$$

$$C = 104.478^\circ //$$

i) $\angle A = 38.102^\circ$ $AC = 10.66$  $X^2 = 6^2 + 7^2 - 2 \cdot 6 \cdot 7 (\cos 110^\circ)$ $X^2 = 85 - 84 (\cos 110^\circ)$ $X^2 = 113.73$ $X = 10.66 //$ $\frac{10.66}{\sin 110^\circ} = \frac{7}{\sin A} \rightarrow A = 38.102^\circ //$	j) $\angle B = 42.972^\circ$ $BA = 16.543$  $X^2 = 8^2 + 12^2 - 2 \cdot 8 \cdot 12 (\cos 110^\circ)$ $X^2 = 208 - 192 (\cos 110^\circ)$ $X^2 = 273.668$ $X = 16.543$ $\frac{16.543}{\sin 110^\circ} = \frac{12}{\sin B} \rightarrow B = 42.972^\circ$
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2. Two hikers start out from the same place at 9:00am. The first hiker walks at 4km/h and the second hiker walks at 5km/h. If the angle between the two hikers is 70° then, to 3 decimal places, how far apart are the hikers at 11:30am?



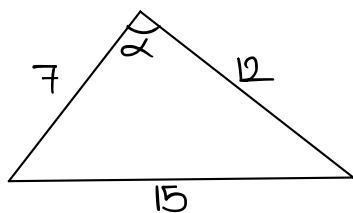
$$d^2 = 10^2 + 12.5^2 - 2 \cdot (10) \cdot (12.5) (\cos 70^\circ)$$

$$d^2 = 256.25 - 250 (\cos 70^\circ)$$

$$d^2 = 170.745$$

$$d = 13.067 \text{ km} //$$

3. Triangle $VABC$ has sides of length 7, 12, and 15cm. To the nearest degree, what is the measure of the largest angle of the triangle?



$\alpha \rightarrow$ biggest angle

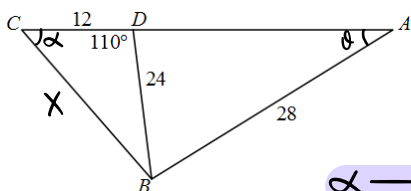
$$15^2 = 7^2 + 12^2 - 2 \cdot 7 \cdot 12 (\cos \alpha)$$

$$225 = 193 - 168 (\cos \alpha)$$

$$\frac{32}{-168} = \cos \alpha$$

$$\alpha = 100.981^\circ //$$

4. Find the measure of angle "A"



$X \rightarrow$

$$X^2 = 12^2 + 24^2 - 2 \cdot 12 \cdot 24 (\cos 110^\circ)$$

$$X^2 = 720 - 576 (\cos 110^\circ) = 917$$

$$X = 30.282$$

$\alpha \rightarrow$

$$\frac{30.282}{\sin 110^\circ} = \frac{24}{\sin \alpha}$$

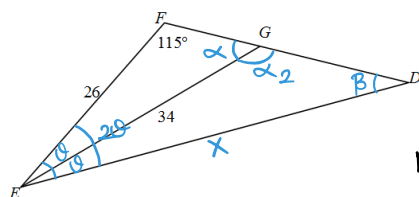
$$\alpha = 48.138^\circ$$

$\theta \rightarrow$

$$\frac{28}{\sin 48.138^\circ} = \frac{30.282}{\sin \theta}$$

$$\theta = 53.654^\circ //$$

5. Given that line GE bisects angle "E", find the length of ED



$$\frac{34}{\sin 115^\circ} = \frac{26}{\sin \alpha}$$

$$\alpha = 43.873^\circ$$

$$180 - 115 - 43.873^\circ$$

$$\theta = 21.127^\circ$$

$$2\theta = 42.254^\circ$$

$$180 - 115 - 42.254^\circ$$

$$\beta = 22.746^\circ$$

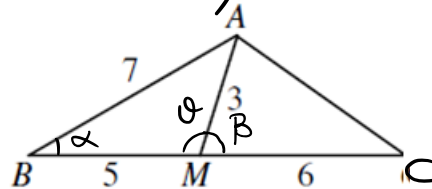
$$180 - 43.873^\circ$$

$$\alpha_2 = 136.127^\circ$$

$$\frac{34}{\sin 22.746^\circ} = \frac{x}{\sin 137.746^\circ}$$

$$x = 59.130 //$$

6. In $\triangle ABC$, M is a point on BC such that $BM = 5$ and $MC = 6$. If $AM = 3$ and $AB = 7$, determine the exact value of AC .



$$\alpha \rightarrow 3^2 = 7^2 + 5^2 - 2 \cdot 7 \cdot 5 (\cos \alpha)$$

$$\alpha = 21.787^\circ$$

$$\theta \rightarrow \frac{3}{\sin 21.787^\circ} = \frac{7}{\sin \theta}$$

$$\theta = 60.0^\circ$$

$$\beta \rightarrow 180 - 60 = 120^\circ \Rightarrow AC^2 = 3^2 + 6^2 - 2 \cdot 3 \cdot 6 (\cos 120^\circ) = 63 \rightarrow AC = 7.937 //$$

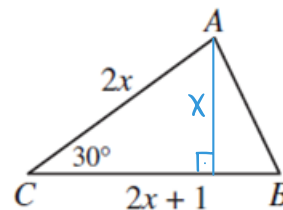
7. In the diagram, $AC = 2x$, $BC = 2x + 1$ and $\angle ACB = 30^\circ$.

If the area of $\triangle ABC$ is 18, what is the value of x ?

$$\text{Area} \rightarrow \frac{(2x+1)x}{2} = 18$$

$$2x^2 + x = 36$$

$$x = 4 //$$



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