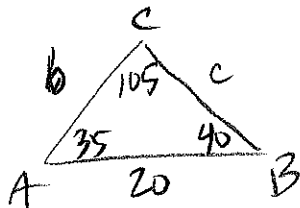


Law of Sines and Cosines Practice

Question 1

$$\angle C = 105^\circ, \angle B = 40^\circ, c = 20$$

Type of triangle? AAS law to use? sin



$$\frac{b}{\sin 40} = \frac{20}{\sin 105} = \frac{c}{\sin 35}$$

$$b \approx 13.31$$

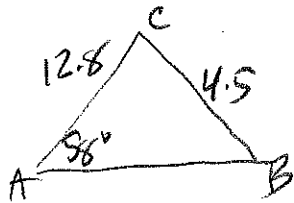
$$A = 35^\circ$$

$$a \approx 11.88$$

Question 2

$$\angle A = 58^\circ, a = 4.5, b = 12.8$$

Type of triangle? SSA law to use? Sines



$$\frac{\sin B}{12.8} = \frac{\sin 58^\circ}{4.5}$$

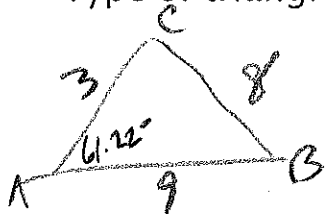
$$\sin B \approx 2.422$$

$B \approx$ impossible!

Question 3

$$a = 8, b = 3, c = 9$$

Type of triangle? SSS law to use? cos



$$8^2 = 3^2 + 9^2 - 2(3)(9)\cos A$$

$$\cos A = \frac{8^2 - 3^2 - 9^2}{-2(3)(9)} = \frac{13}{27}$$

$$A \approx 61.22^\circ$$

$$3^2 = 8^2 + 9^2 - 2(8)(9)\cos B$$

$$\cos B \approx \frac{17}{18}$$

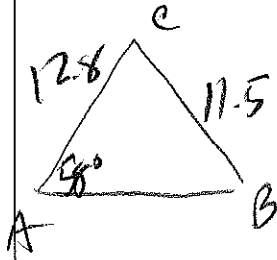
$$B \approx 19.19$$

$$C \approx 99.59$$

Question 4

$\angle A = 58^\circ$, $a = 11.5$, $b = 12.8$

Type of triangle? SAS law to use? Sin



$$\frac{\sin B}{12.8} = \frac{\sin 58}{11.5} = \frac{\sin 51.28}{c}$$

$$\sin B = .9439$$

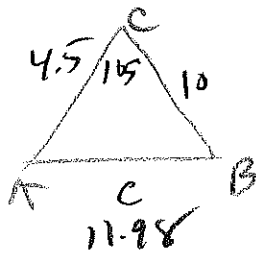
$$\begin{aligned} B &\approx 70.72^\circ \\ C &\approx 51.28^\circ \\ c &\approx 10.58 \end{aligned}$$

$$\begin{aligned} &109.28^\circ \\ &12.72 \\ &2.99 \end{aligned}$$

Question 5

$\angle C = 105^\circ$, $a = 10$, $b = 4.5$

Type of triangle? SAS law to use? CS



$$c^2 = 4.5^2 + 10^2 - 2(4.5)(10)\cos 105^\circ$$

$$c \approx 11.98$$

$$\frac{\sin A}{10} = \frac{\sin 105}{11.98}$$

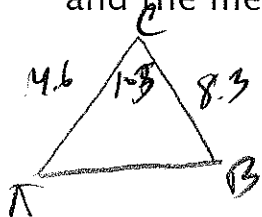
$$\sin A = .8062$$

$$A \approx 53.73^\circ$$

$$B \approx 21.27^\circ$$

Question 6

Find the area of the triangle if $a = 8.3$, $b = 4.6$ and the measure of angle C is 103° .



$$A = \frac{1}{2}(8.3)(4.6) \sin 103$$

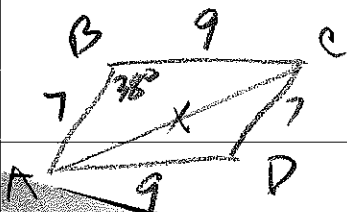
$$\approx 18.60 \text{ u}^2$$

Question 7

Let ABCD be a parallelogram. If $AB = 7$ and $BC = 9$ and $\angle B = 38^\circ$, find the length of the diagonal of the parallelogram.

$$x = \sqrt{7^2 + 9^2 - 2(7)(9) \cos 38} \approx 5.54$$

Then find the area of the parallelogram.

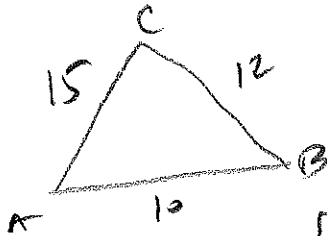


$$A = 2 \frac{1}{2}(7)(9) \sin 38^\circ$$

$$\approx 38.79 \text{ u}^2$$

Question 8

Find the area of the triangle if $a = 12$, $b = 15$
and $c = 10$.



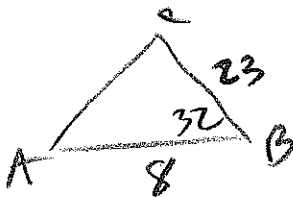
$$s = \frac{15 + 12 + 10}{2} = \frac{37}{2} = 18.5$$

$$A = \sqrt{18.5(18.5 - 15)(18.5 - 12)(18.5 - 10)}$$

$$\approx 59.81 \text{ u}^2$$

Question 9

Find the area of the triangle if $a = 23$, $c = 8$
and the measure of angle B is 32° .



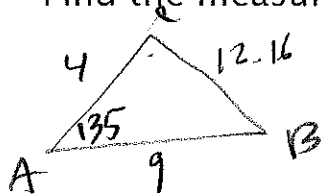
$$A = \frac{1}{2}(23)(8)\sin 32$$

$$\approx 43.75 \text{ u}^2$$

Question 10

$$\angle A = 135^\circ, b = 4, c = 9$$

Find the measure of angle C



$$b = \sqrt{4^2 + 9^2 - 2(4)(9)\cos 135}$$
$$\approx 12.16$$

$$\frac{\sin C}{9} = \frac{\sin 135}{12.16}$$

$$\sin C \approx 0.5233$$

$$C \approx 31.55^\circ$$

Question 11

Find the area of the triangle if $a = 12$, $b = 12$
and $c = 12$.

$$s = \frac{12+12+12}{2} = 18$$

$$A = \sqrt{18(18-12)^3} = 62.35 \text{ u}^2$$

$$= \sqrt{18 \cdot 216}$$

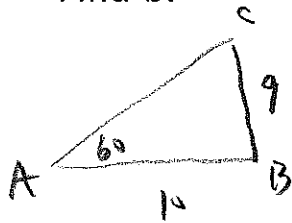
$$= 3\sqrt{2 \cdot 216}$$

$$= 3\sqrt{2 \cdot 6} = 18\sqrt{2} = 25.45 \text{ u}^2$$

Question 12

$\angle A = 60^\circ$, $a = 9$, $c = 10$

Find b .



$$\frac{\sin C}{10} = \frac{\sin 60}{9} = \frac{\sin B}{b}$$

$$\sin C \approx 9.623$$

$$C \approx 74.21^\circ$$

$$B \approx 45.79^\circ$$

$$b \approx 7.45$$

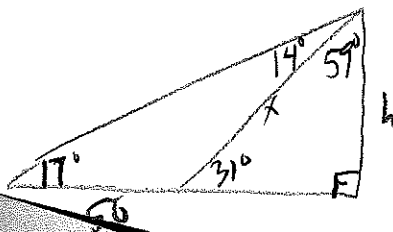
$$\text{or } 105.79^\circ$$

$$14.21^\circ$$

$$2.55$$

Question 13

- From a certain distance, the angle of elevation to the top of a building is 17° . At a point 50m closer to the building, the angle of elevation is 31° . Approximate the height of the building to the nearest hundredth using the Law of Sines.



$$\frac{x}{\sin 17} = \frac{50}{\sin 14}$$

$$x = 60.43$$

$$\frac{h}{\sin 31} = \frac{60.43}{\sin 70}$$

$$h = 31.12 \text{ m}$$