Unit 7 · Solution of Triangle

WORKSHEET

Full marks 37

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 37

1 Key words [4]

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

acute	**augmented**	**cosine**	**longest**	**map**	**projection**	**shape**	**sine**	**solving**	**sum**

Finding all six parts of a triangle from the ones given is called _____ the triangle. Three angles alone fix only its _____, not its size. From three sides, find the angles by the _____ law. From one side and two angles, find the third angle from the angle _____, then the sides by the _____ law. $\sin^{-1}$ gives only angles between $-90°$ and $90°$, so with the sine law find only an angle known to be _____: one that faces a side other than the _____. A chain of triangles, each solved from the one before, was how surveyors made a _____ of a whole country.

2 True or false [3]

Write ✓ for a true statement and ✗ for a false one. Correct the false ones.

i. Three angles fix a triangle. ☐

ii. If $\sin B = 0.5$ in a triangle, B could be $30°$ or $150°$. ☐

iii. Only the largest angle of a triangle can be obtuse. ☐

iv. Given one side and two angles, start with the cosine law. ☐

v. $\sin^{-1}$ gives every angle from $0°$ to $180°$. ☐

vi. Given two sides and the angle between them, the cosine law gives the third side. ☐

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Given one side and the two angles at its ends, the law that gives the other sides is the: [1]

a. sine law **b.** cosine law

c. projection law **d.** half-angle law

ii. In $\triangle ABC$, $a = 5$, $b = 7$ and $C = 60°$. Then c is: [1]

a. 6 **b.** $\sqrt{39}$

c. $\sqrt{74}$ **d.** $\sqrt{109}$

iii. In $\triangle ABC$, $A = 45°$, $B = 60°$ and $a = 2\sqrt{2}$. Then b is: [1]

a. $2\sqrt{3}$ **b.** $\sqrt{6}$

c. $2\sqrt{6}$ **d.** 3

iv. Two sides of a triangular plot are 50 m and 60 m, with an angle of 120° between them. The third side is about: **[1]**

a. 55.7 m **b.** 78.1 m

c. 95.4 m **d.** 110 m

v. Asmita is told a triangle has $a = 5$, $b = 8$ and $A = 40°$. How many triangles have these parts? **[1]**

a. none **b.** one

c. two **d.** infinitely many

4 Short answers **[9]**

Write short answers to the following questions.

a. Explain why, after finding a triangle's third side by the cosine law, it is safer to find the angle opposite the **shorter** of the other two sides by the sine law than the angle opposite the longest side. **[2]**

b. In $\triangle ABC$, $b = 4$, $c = 9$, $A = 50°$, and $a \approx 7.12$. Nisha finds C by the sine law: $\sin C = \dfrac{9 \sin 50°}{7.12} \approx 0.968$, so $C \approx 75.5°$. Find her mistake and the right value of C. **[2]**

c. Solve the triangle with $a = 12$, $B = 40°$ and $C = 65°$. **[2]**

d. Solve the triangle with $b = 4$, $c = 6$ and $A = 60°$. **[3]**

5 Long answers [13]

Write long answers to the following questions. Show your working.

a. A drone flies 6 km in a straight line from A to B, then turns and flies 4 km to C, so that $\angle ABC = 110°$. Find how far C is from A, and the angle $\angle BAC$ between its first path and the straight line back from C to A. [5]

b. Surveyors measure a base $AB = 2$ km. From its ends they sight a hilltop C: $\angle CAB = 58°$ and $\angle CBA = 72°$. From B and C they then sight a fourth point D, on the far side of BC from A: $\angle DBC = 64°$ and $\angle DCB = 66°$. [8]

i. Find $\angle ACB$, BC and AC.

ii. Find $\angle BDC$, CD and BD.

iii. Which lengths were measured on the ground, and which only worked out?

Answer:

6 Think [3]

In $\triangle ABC$, $a = 2b$ and $C = 60°$. Show that the triangle is right-angled, and find all its angles.

7 Activity: Solve it, then measure it (not marked)

Draw $AB = 8$ cm. At A draw an angle of $50°$ and at B an angle of $60°$, on the same side, and let the arms meet at C. Measure AC, BC and $\angle C$; then work them out.

Part	Measured	Worked out	Difference
$\angle C$			
AC			
BC			

Which law did you use, and why that one?