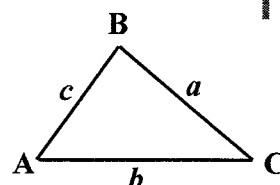


The Sine Rule

In any triangle the length of any edge is proportional to the sine of the opposite angle.

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$



1. Given triangle ABC has $C = 67^\circ$ $B = 42^\circ$ $c = 5.3$ cm find b
2. In triangle ABC $A = 56^\circ$ $C = 73^\circ$ $a = 11$ cm find B, b, c
3. Given triangle ABC has $\angle BAC = 36^\circ$ $AC = 4.3$ cm $BC = 6.7$ cm find $\angle ABC$
4. Triangle XYZ has $\angle YXZ = 28^\circ$ $\angle YZX = 73^\circ$ $YZ = 9.3$ cm find XY
5. Triangle PQR has $P = 41^\circ$ $p = 7.89$ cm $r = 10.1$ cm find Q
6. Triangle LMN has $\angle LMN = 56^\circ$ $\angle LNM = 58^\circ$ $ML = 14.8$ cm find MN

7. In the triangle ABC $a = 7.4$ cm $b = 8.9$ cm $A = 47^\circ$. Calculate C. Use a, b and C to find the area of the triangle.

8. Triangle ABC has $AC = 3.24$ cm, $AB = 5.53$ cm and $\angle ABC = 32^\circ$. Find its area.

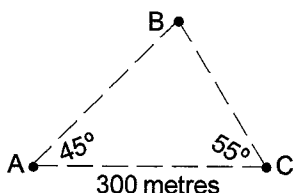
9. Triangle XYZ has $\angle XYZ = 71^\circ$ $\angle YXZ = 33^\circ$ $YZ = 15.8$ cm. Find its area.

10. A quadrilateral ABCD has these dimensions

$$AB = 4.1 \text{ cm} \quad BC = 5.2 \text{ cm} \quad BD = 3.75 \text{ cm} \quad \angle BAD = 45^\circ \quad \angle BCD = 35^\circ$$

Find the sizes of (i) $\angle BDA$ (ii) $\angle BDC$ (iii) $\angle ADC$ (iv) $\angle ABC$

11.



In the diagram, A and C represent the positions of two boats. They are 300 metres apart and both are racing to reach the buoy at B. Calculate how far each has to go.

12. An isosceles triangle has two equal angles of 72° and two equal edges of 6.7 cm. Find the length of the third edge.

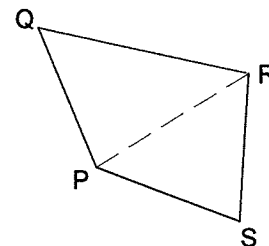
13. The diagram on the right is the plan view of a field.

A survey has produced the following measurements

$$PQ = 650 \text{ metres} \quad \angle QPR = 83^\circ \quad \angle QPS = 127^\circ$$

$$\angle PQR = 56^\circ \quad \angle PRS = 65^\circ$$

Calculate the area of the field.



Given the sizes of $A, a,$ and c if $a < c \sin A$ no triangle is possible
 $a = c \sin A$ the triangle is right-angled at C
 $a > c$ only one triangle is possible

otherwise, two triangles are possible fitting the data given. (This is known as 'the ambiguous case'.)

Investigate each of the following sets of data and say how many triangles are possible in each case.

- | | |
|--|--|
| 14. $A = 40^\circ$ $a = 6.1$ cm $c = 6$ cm | 20. $A = 60^\circ$ $a = 5.08$ cm $c = 3.5$ cm |
| 15. $A = 70^\circ$ $a = 5.25$ cm $c = 5.4$ cm | 21. $A = 32.6^\circ$ $a = 5.16$ cm $c = 7.24$ cm |
| 16. $A = 45^\circ$ $a = 15.4$ cm $c = 10.6$ cm | 22. $A = 26.9^\circ$ $a = 13.0$ cm $c = 19.2$ cm |
| 17. $A = 30^\circ$ $a = 4.5$ cm $c = 9$ cm | 23. $A = 43.7^\circ$ $a = 21.3$ cm $c = 18.6$ cm |
| 18. $A = 20^\circ$ $a = 6.79$ cm $c = 8$ cm | 24. $A = 54.1^\circ$ $a = 39.5$ cm $c = 44.7$ cm |
| 19. $A = 50^\circ$ $a = 3.09$ cm $c = 4$ cm | 25. $A = 61.8^\circ$ $a = 42.6$ cm $c = 30.5$ cm |