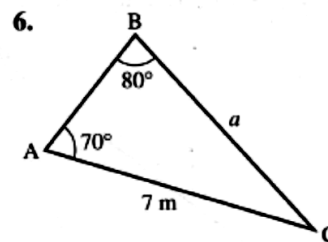
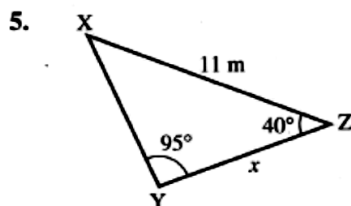
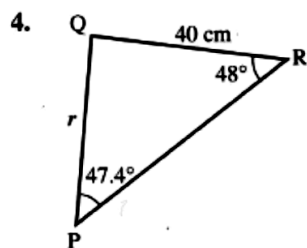
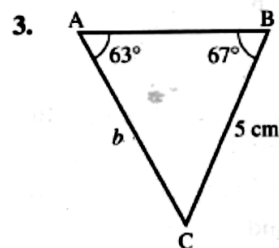
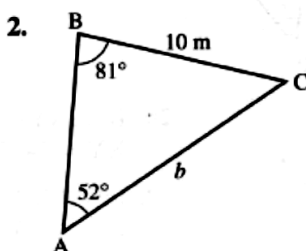
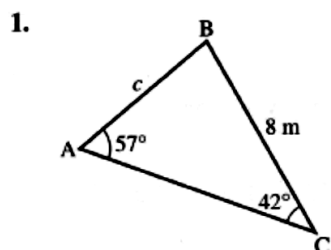


Sine Rule and Cosine Rule

Exercise A

For Questions 1 to 6, find each side marked with a letter.



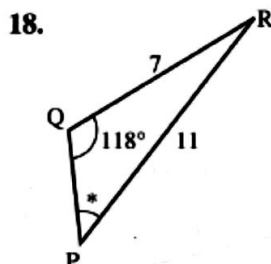
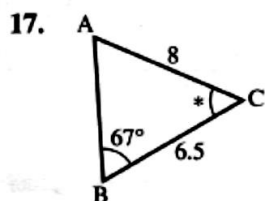
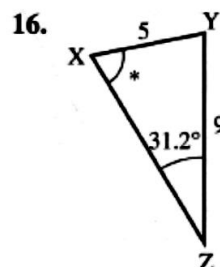
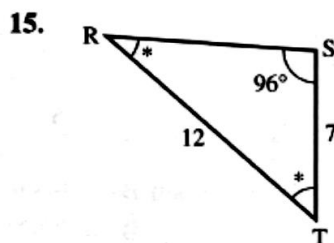
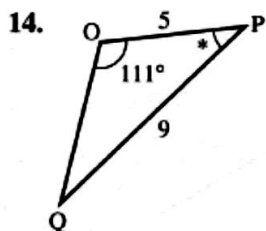
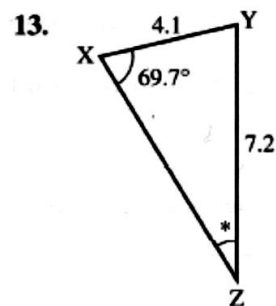
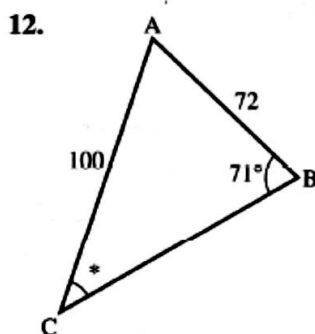
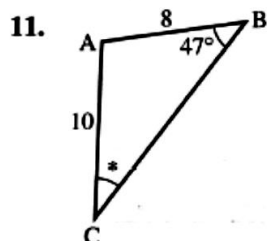
7. In $\triangle ABC$, $\hat{A} = 61^\circ$, $\hat{B} = 47^\circ$, $AC = 7.2$ cm. Find BC .

8. In $\triangle XYZ$, $\hat{Z} = 32^\circ$, $\hat{Y} = 78^\circ$, $XY = 5.4$ cm. Find XZ .

9. In $\triangle PQR$, $\hat{Q} = 100^\circ$, $\hat{R} = 21^\circ$, $PQ = 3.1$ cm. Find PR .

10. In $\triangle LMN$, $\hat{L} = 21^\circ$, $\hat{N} = 30^\circ$, $MN = 7$ cm. Find LN .

In Questions 11 to 18, find each angle marked *. All lengths are in centimetres.



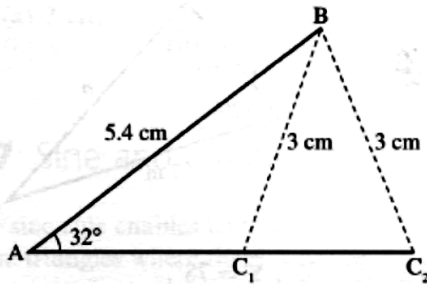
19. In $\triangle ABC$, $\hat{A} = 62^\circ$, $BC = 8$, $AB = 7$.
Find \hat{C} .

20. In $\triangle XYZ$, $\hat{Y} = 97.3^\circ$, $XZ = 22$,
 $XY = 14$. Find \hat{Z} .

21. In $\triangle DEF$, $\hat{D} = 58^\circ$, $EF = 7.2$, $DE = 5.4$.
Find \hat{F} .

22. In $\triangle LMN$, $\hat{M} = 127.1^\circ$, $LN = 11.2$,
 $LM = 7.3$. Find \hat{L} .

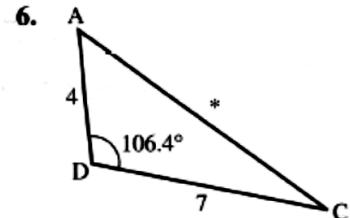
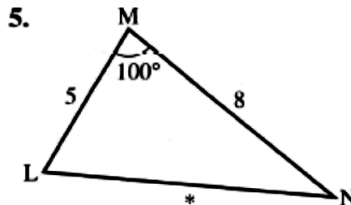
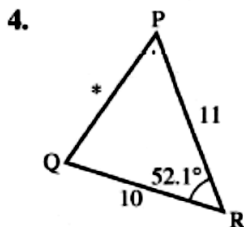
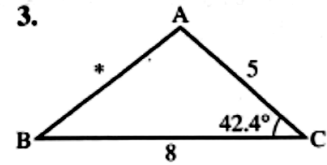
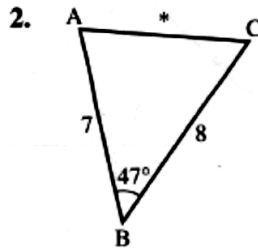
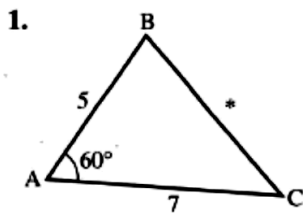
23. The sine rule can be ambiguous.



The diagram shows two possible triangles with $AB = 5.4$, $\hat{A} = 32^\circ$
and $BC = 3$.
Find the two possible values of angle C.

Exercise B

Find the sides marked *.



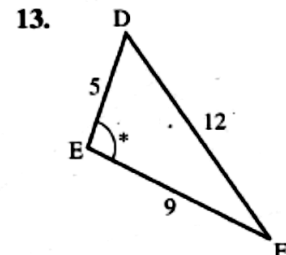
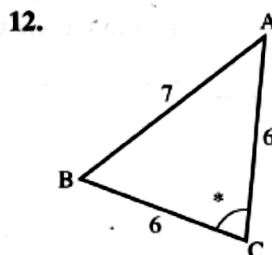
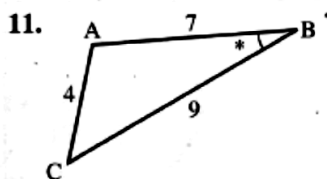
7. In $\triangle ABC$, $AB = 4$ cm, $AC = 7$ cm,
 $\hat{A} = 57^\circ$. Find BC .

8. In $\triangle XYZ$, $XY = 3$ cm, $YZ = 3$ cm,
 $\hat{Y} = 90^\circ$. Find XZ .

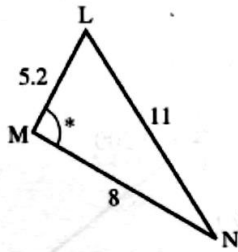
9. In $\triangle LMN$, $LM = 5.3$ cm, $MN = 7.9$ cm,
 $\hat{M} = 127^\circ$. Find LN .

10. In $\triangle PQR$, $\hat{Q} = 117^\circ$, $PQ = 80$ cm,
 $QR = 100$ cm. Find PR .

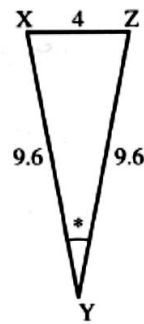
In Questions 11 to 16, find the angles marked *.



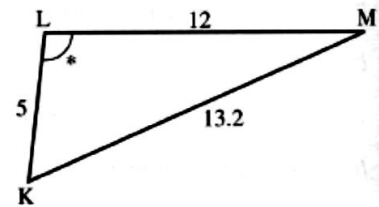
14.



15.



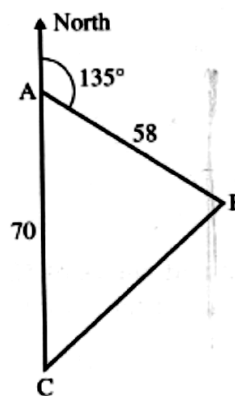
16.

17. In $\triangle ABC$, $a = 4.3$, $b = 7.2$, $c = 9$. Find \hat{C} .18. In $\triangle DEF$, $d = 30$, $e = 50$, $f = 70$. Find \hat{E} .19. In $\triangle PQR$, $p = 8$, $q = 14$, $r = 7$. Find \hat{Q} .20. In $\triangle LMN$, $l = 7$, $m = 5$, $n = 4$. Find \hat{N} .

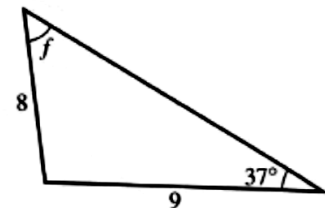
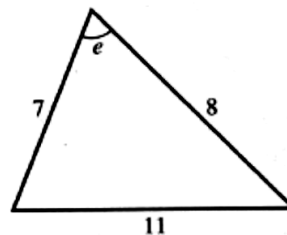
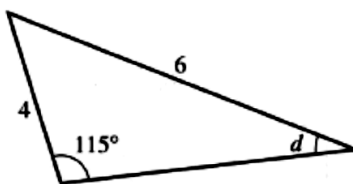
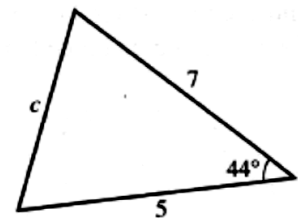
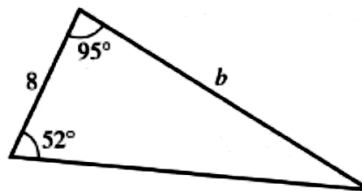
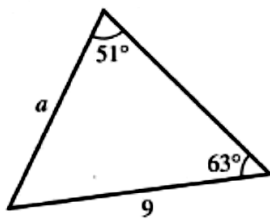
Exercise C

1. Ship B is 58 km south-east of Ship A.
Ship C is 70 km due south of Ship A.

- (a) How far is Ship B from Ship C?
(b) What is the bearing of Ship B from Ship C?



2. A destroyer D and a cruiser C leave port P at the same time. The destroyer sails 25 km on a bearing 040° and the cruiser sails 30 km on a bearing of 320° . How far apart are the ships?
3. Two honeybees A and B leave the hive H at the same time; A flies 27 m due south and B flies 9 m on a bearing of 111° . How far apart are they?
4. Find the sides and angles marked with letters. All lengths are in cm.



5. Find the largest angle in a triangle in which the sides are in the ratio 5:6:8.

6.

A rhombus has sides of length 8 cm and angles of 50° and 130° .
Find the length of the longer diagonal of the rhombus.

7.

From A, B lies 11 km away on a bearing of 041° and C lies 8 km away on a bearing of 341° . Find:

- (a) the distance between B and C
- (b) the bearing of B from C.

8.

From a lighthouse L an aircraft carrier A is 15 km away on a bearing of 112° and a submarine S is 26 km away on a bearing of 200° . Find:

- (a) the distance between A and S
- (b) the bearing of A from S.