HIGHER

7.12 The Sine Rule: 1-hour Pack

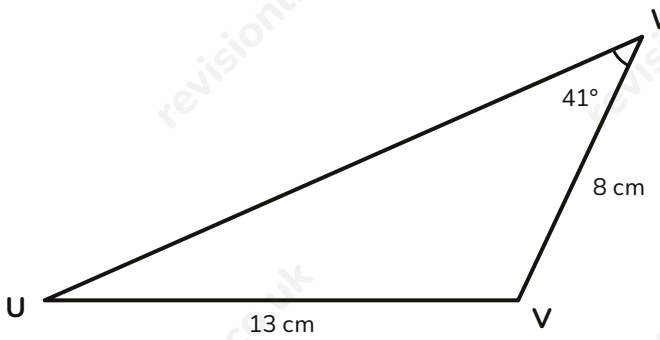
EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

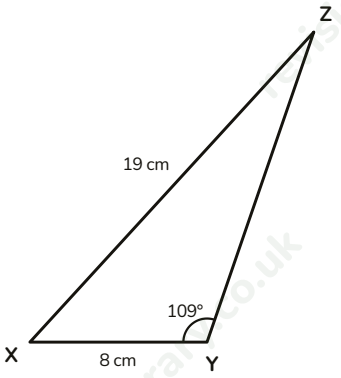
1 In triangle UVW, angle W = 41 degrees, UV = 13 cm (opposite angle W), and VW = 8 cm (opposite angle U). Calculate the size of angle U. Give your answer correct to 1 decimal place.



(Total for Question 1 is 2 marks)

© Revision Library | revisionlibrary.co.uk

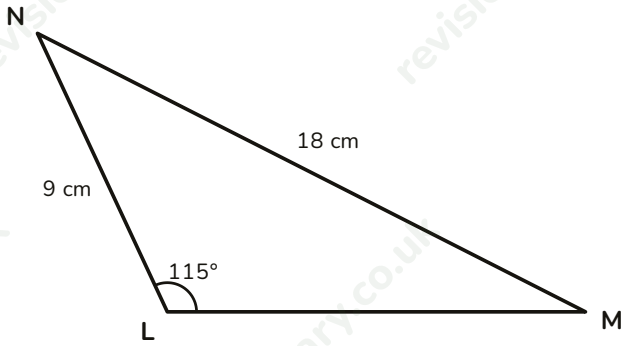
2 In triangle XYZ, angle Y = 109 degrees, XZ = 19 cm (opposite angle Y), and XY = 8 cm (opposite angle Z). Calculate the size of angle Z. Give your answer correct to 1 decimal place.



(Total for Question 2 is 2 marks)

© Revision Library | revisionlibrary.co.uk

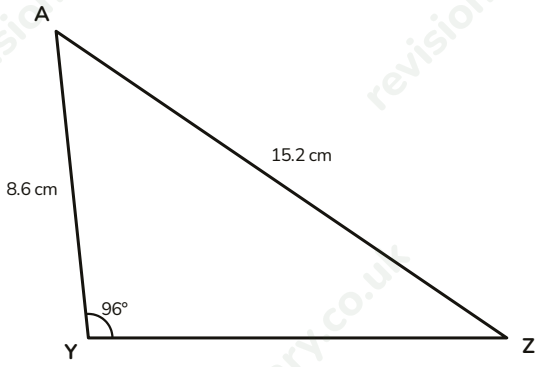
3 In triangle LMN, angle L = 115 degrees, MN = 18 cm (opposite angle L), and LN = 9 cm (opposite angle M). Calculate the size of angle N. Give your answer correct to 1 decimal place.



(Total for Question 3 is 3 marks)

---

4 In triangle YZA, angle Y = 96 degrees, ZA = 15.2 cm (opposite angle Y), and YA = 8.6 cm (opposite angle Z). Calculate the size of angle Z. Give your answer correct to 1 decimal place.

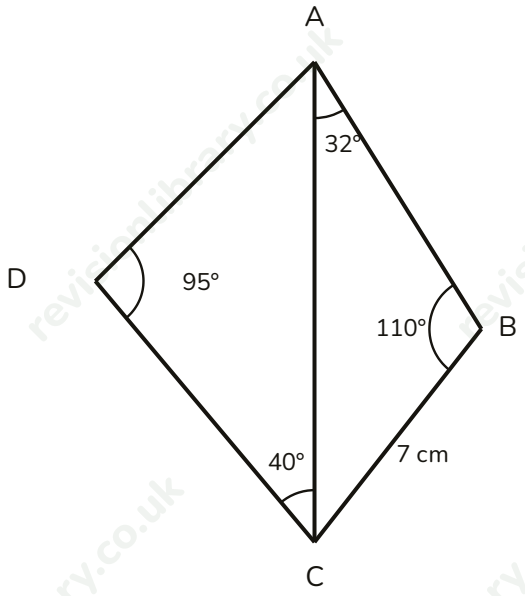


(Total for Question 4 is 2 marks)

© Revision Library | revisionlibrary.co.uk

5 The diagram shows quadrilateral ABCD, made up of triangle ABC and triangle ACD joined along the diagonal AC. In triangle ABC, angle BAC = 32 degrees, angle ABC = 110 degrees and BC = 7 cm (opposite angle A). In triangle ACD, angle ACD = 40 degrees and angle ADC = 95 degrees.

Diagram NOT accurately drawn



(a) Calculate the length of AC. Give your answer correct to 3 significant figures. **(3)**

.....

(b) Hence calculate the length of CD. Give your answer correct to 3 significant figures. **(4)**

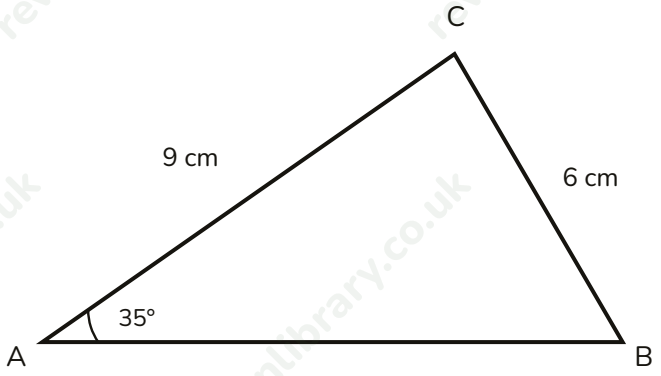
.....

(Total for Question 5 is 7 marks)

© Revision Library | revisionlibrary.co.uk

6 In triangle ABC, angle A = 35 degrees, BC = 6 cm (opposite angle A) and AC = 9 cm (opposite angle B).

Diagram NOT accurately drawn



(a) Calculate the two possible values of angle B. Give each answer correct to 1 decimal place. **(3)**

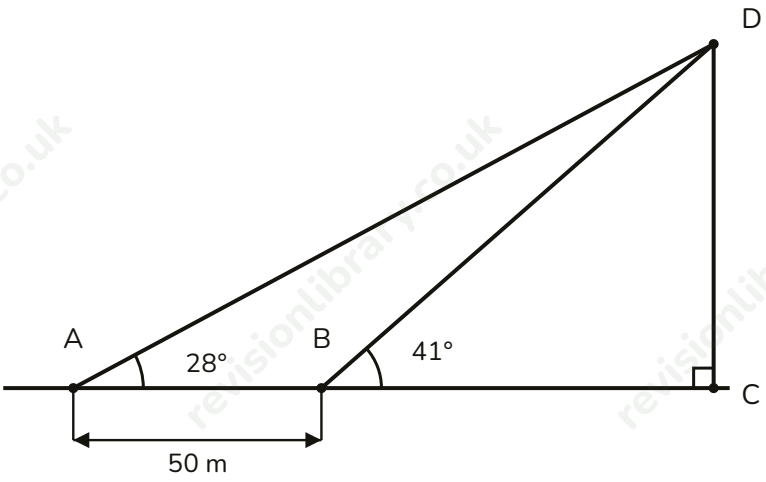
(b) Explain why there are two possible values for angle B. **(1)**

(Total for Question 6 is 4 marks)

© Revision Library | revisionlibrary.co.uk

7 From a point A on level ground, the angle of elevation of the top, D, of a tower is 28 degrees. From a point B, 50 m closer to the tower along the same straight line as A and the foot of the tower, the angle of elevation of D is 41 degrees.

Diagram NOT accurately drawn



(a) Show that angle ADB = 13 degrees. **(1)**

(b) Calculate the length of BD. Give your answer correct to 3 significant figures. **(3)**

.....

(c) Hence calculate the height of the tower, CD. Give your answer correct to 3 significant figures. **(2)**

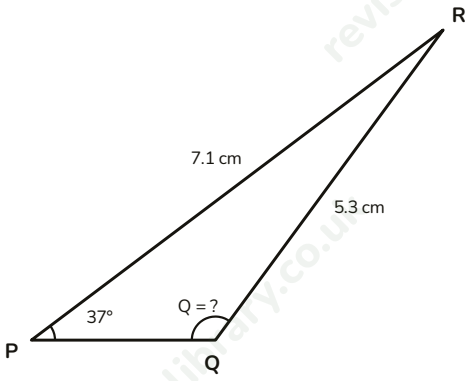
.....

(Total for Question 7 is 6 marks)

© Revision Library | revisionlibrary.co.uk

8 In triangle PQR, angle P = 37 degrees, QR = 5.3 cm and PR = 7.1 cm. Angle Q is obtuse. Work out the size of angle Q. Give your answer correct to 1 decimal place.

Diagram NOT accurately drawn

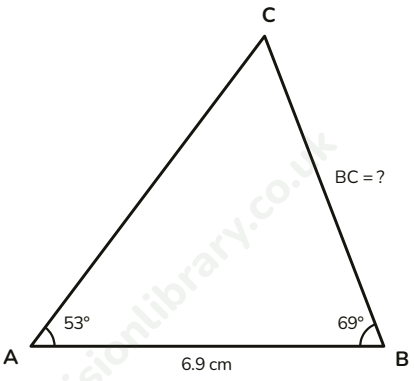


(Total for Question 8 is 4 marks)

---

9 In triangle ABC, angle A = 53 degrees, angle B = 69 degrees and AB = 6.9 cm. Work out the length of BC. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

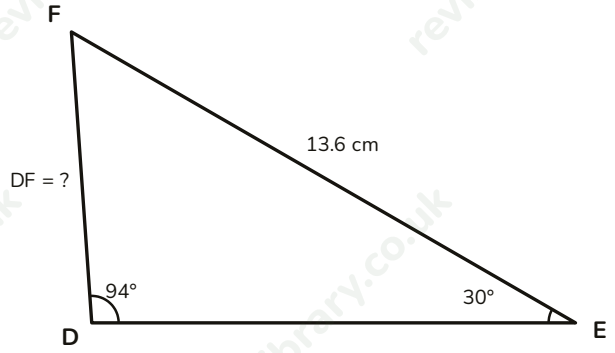


(Total for Question 9 is 4 marks)

© Revision Library | revisionlibrary.co.uk

10 In triangle DEF, angle D = 94 degrees, angle E = 30 degrees and EF = 13.6 cm. Work out the length of DF. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

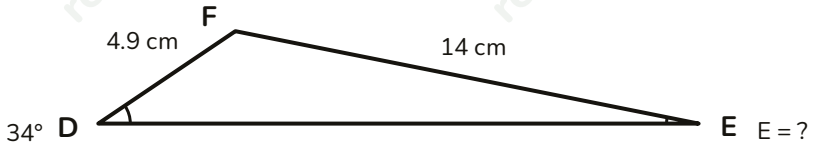


(Total for Question 10 is 3 marks)

---

11 In triangle DEF, angle D = 34 degrees, EF = 14 cm and DF = 4.9 cm. Angle E is acute. Work out the size of angle E. Give your answer correct to 1 decimal place.

Diagram NOT accurately drawn

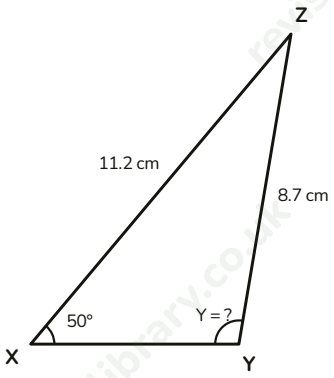


(Total for Question 11 is 3 marks)

© Revision Library | revisionlibrary.co.uk

12 In triangle XYZ, angle X = 50 degrees, YZ = 8.7 cm and XZ = 11.2 cm. Angle Y is obtuse. Work out the size of angle Y. Give your answer correct to 1 decimal place.

Diagram NOT accurately drawn

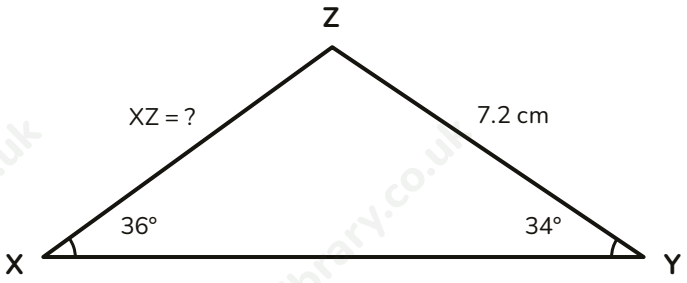


(Total for Question 12 is 4 marks)

---

13 In triangle XYZ, angle X = 36 degrees, angle Y = 34 degrees and YZ = 7.2 cm. Work out the length of XZ. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn



(Total for Question 13 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 7.12 The Sine Rule: 1-hour Pack

Question 1

sin(U)/8 = sin(41)/13 oe	**M1**
awrt 23.8 (degrees)	**A1**

Answer: angle U = 23.8 degrees (1 d.p.)

Question 2

sin(Z)/8 = sin(109)/19 oe	**M1**
awrt 23.5 (degrees)	**A1**

Answer: angle Z = 23.5 degrees (1 d.p.)

Question 3

sin(M)/9 = sin(115)/18 oe	**M1**
angle M = awrt 26.9 (degrees), dep on correct sine rule setup	**M1**
angle N = 180 - 115 - their M = awrt 38.1 (degrees) ft	**A1**

Answer: angle N = 38.1 degrees (1 d.p.)

Question 4

sin(Z)/8.6 = sin(96)/15.2 oe	**M1**
awrt 34.2 (degrees)	**A1**

Answer: angle Z = 34.2 degrees (1 d.p.)

Question 5

(a) AC/sin110 = 7/sin32 oe	**M1**
(a) AC = 7 x sin110 / sin32	**M1**
(a) 12.4 cm awrt	**A1**

(a) Answer: 12.4 cm (3 sf)

(b) angle CAD = 180 - 40 - 95 (=45 degrees)	**B1**
(b) CD/sin45 = their AC/sin95 oe (ft)	**M1**
(b) CD = their AC x sin45 / sin95	**M1**
(b) 8.81 cm awrt (ft their AC)	**A1**

(b) Answer: 8.81 cm (3 sf)

Question 6

(a) sinB/9 = sin35/6 oe	**M1**
(a) 59.4 degrees awrt (first solution)	**A1**
(a) 120.6 degrees awrt (180 - first solution)	**A1**

(a) Answer: 59.4 degrees or 120.6 degrees

(b) because angle A is acute and the side opposite it (BC = 6) is shorter than the other given side (AC = 9), both an acute and an obtuse angle satisfy the same sine value, and both give a valid triangle (angle sum under 180 degrees)	**C1**

(b) Answer: Because angle A is acute and BC < AC, both the acute and obtuse angles with the same sine value produce a valid triangle (the ambiguous case).

Question 7

(a) 41 - 28 = 13 degrees cso (exterior angle of triangle ABD equals the sum of the two opposite interior angles)	**B1**

(a) Answer: 13 degrees (answer given)

(b) BD/sin28 = 50/sin13 oe	**M1**
(b) BD = 50 x sin28 / sin13	**M1**
(b) 104 m awrt	**A1**

(b) Answer: 104 m (3 sf)

(c) CD = their BD x sin41 (using right-angled triangle BCD) ft	**M1**
(c) 68.5 m awrt (ft their BD)	**A1**

(c) Answer: 68.5 m (3 sf)

Question 8

sin Q/7.1 = sin 37/5.3	**M1**
acute angle 53.7 found	**M1**
subtracts from 180	**M1**
126.3 degrees cao	**A1**

Answer: 126.3 degrees

Question 9

angle C = 58 degrees	**M1**
BC/sin 53 = 6.9/sin 58	**M1**
rearranges	**M1**
6.50 cm cao	**A1**

Answer: 6.50 cm

Question 10

DF/sin 30 = 13.6/sin 94	**M1**
rearranges to make the unknown side the subject	**M1**
6.82 cm cao	**A1**

Answer: 6.82 cm

Question 11

sin E/4.9 = sin 34/14	**M1**
sin E = 0.1957 or equivalent	**M1**
11.3 degrees cao	**A1**

Answer: 11.3 degrees

Question 12

sin Y/11.2 = sin 50/8.7	**M1**
acute angle 80.5 found	**M1**
subtracts from 180	**M1**
99.5 degrees cao	**A1**

Answer: 99.5 degrees

Question 13

XZ/sin 34 = 7.2/sin 36	**M1**
rearranges to make the unknown side the subject	**M1**
6.85 cm cao	**A1**

Answer: 6.85 cm

© Revision Library | revisionlibrary.co.uk