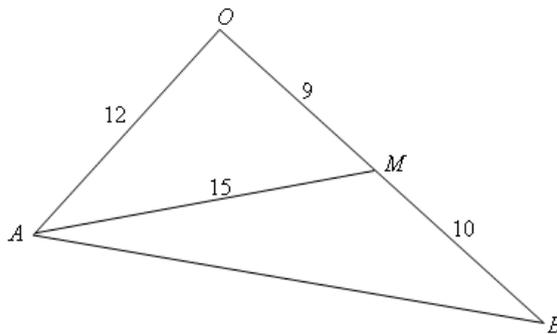


**Applications of Trigonometry  
Worksheet II**

Question 1

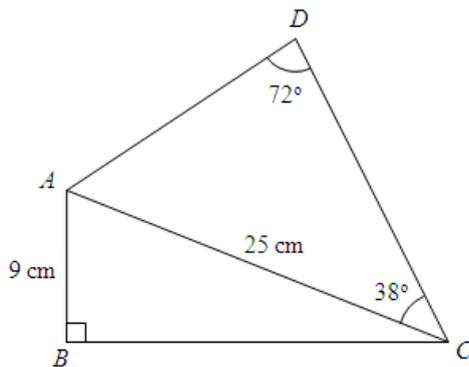


In  $\triangle AMB$ ,  $AM = 15$  cm and  $BM = 10$  cm.  $O$  is a point on  $BM$  produced, where  $OM = 9$  cm and  $OA = 12$  cm.

- (a) Explain why  $\angle AOM$  is a right angle.
- (b) Expressing your answers as fractions in their lowest terms where applicable, find
  - (i)  $\tan \angle ABO$ ,
  - (ii)  $\cos \angle AMB$ .

Ans: (a) Explain using converse of Pythagoras' Thm (b) (i)  $\frac{12}{19}$  (ii)  $-\frac{3}{5}$

Question 2

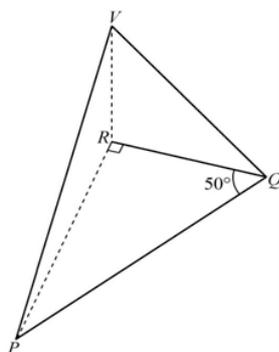


In the figure  $ABCD$  is a quadrilateral such that  $\angle ABC = 90^\circ$ ,  $AC = 25$  cm,  $\angle ADC = 72^\circ$ ,  $AB = 9$  cm and  $\angle ACD = 38^\circ$ . Calculate

- (a) the length of  $AD$ .
- (b) the length of  $BC$ ,
- (c)  $\angle BCD$ .

Ans: (a) 16.2 cm (3 sf) (b) 23.3 cm (3 sf) (c)  $59.1^\circ$  (1 dp)

Question 3

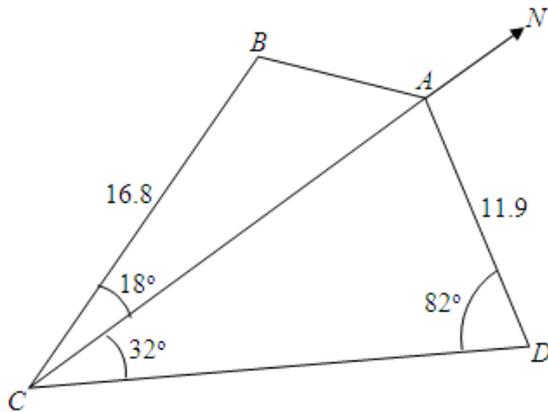


In the diagram, the base of the pyramid  $VPQR$  is a right-angled triangle  $PQR$  and it lies on a horizontal plane. Given that  $QR = 8$  cm,  $VR = 7$  cm,  $\angle PQR = 50^\circ$  and the edge  $VR$  is vertical.

- Calculate
- (a)  $PQ$ ,
  - (b)  $QV$ ,
  - (c)  $\angle VQR$ .

Ans: (a) 12.4 cm (3 sf) (b) 10.6 cm (3 sf) (c)  $41.2^\circ$  (1 dp)

Question 4

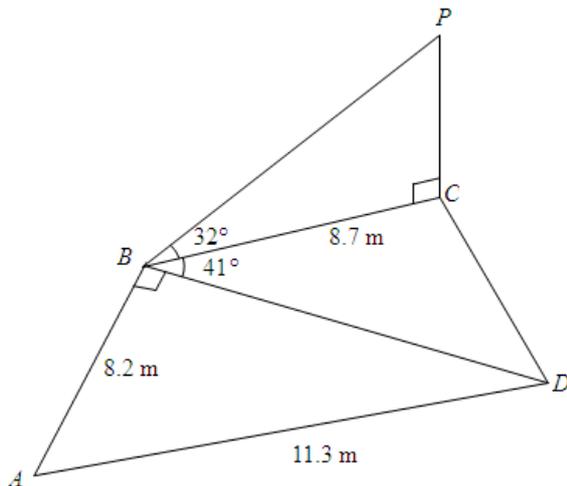


The diagram shows a horizontal field  $ABCD$  where  $C$  is due south of  $A$ .  $BC = 16.8$  m,  $AD = 11.9$  m,  $\angle ACD = 32^\circ$ ,  $\angle ADC = 82^\circ$  and  $\angle ACB = 18^\circ$ .

- (a) Show that  $AC$  is approximately 22.24 m.
- (b) Calculate
  - (i) the bearing of  $C$  from  $D$ .
  - (ii)  $AB$ .
  - (iii) how far  $D$  is south of  $A$ .
- (c) A vertical mast is erected at  $D$ , such that the greatest angle of elevation of the top of the mast from  $A$  is  $35^\circ$ . Calculate the height of the mast.

Ans: (b) (i)  $212^\circ$       (ii) 8.13 m (3sf)      (iii) 4.84 m (3 sf)      (c) 8.33 m (3 sf)

Question 5

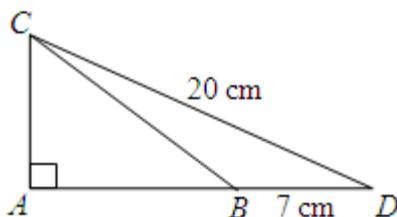


In the diagram,  $A, B, C$  and  $D$  are four corners of a horizontal field.  $PC$  represents a vertical flagpole. A path runs from point  $B$  to point  $D$ .  $\angle ABD = 90^\circ$ ,  $\angle CBD = 41^\circ$ ,  $BC = 8.7$  m,  $AB = 8.2$  m,  $AD = 11.3$  m and the angle of elevation of the top of the flagpole from  $B$  is  $32^\circ$ .

- Calculate
- (a) the length of the path  $BD$  and hence show that  $CD = 5.83$  m,
  - (b) the height of the flagpole,
  - (c) the size of  $\angle BAD$ ,
  - (d) the shortest distance from  $C$  to the path  $BD$ ,
  - (e) the greatest angle of depression from the top of the flagpole to a point on the path  $BD$ .

Ans: (a) 5.83 m (3 sf)    (b) 5.44 m (3 sf)    (c)  $43.5^\circ$  (1 dp)    (d) 5.71 m (3 sf)    (e)  $43.6^\circ$  (1 dp)

Question 6



In the diagram above,  $ABD$  is a straight line.  $\angle CAB = 90^\circ$ ,  $CD = 20$  cm,  $BD = 7$  cm and the area of  $\triangle BCD = 42$  cm<sup>2</sup>. Find

- (a)  $\sin \angle CDB$ ,
- (b) the length of  $AC$ ,
- (c) the length of  $AB$ ,
- (d)  $\cos \angle CBD$ .

Ans: (a)  $\frac{3}{5}$       (b) 12 cm      (c) 9 cm      (d)  $-\frac{3}{5}$