# Applications of Trigonometry
Conventional Questions

1.   [13-14 Final Exam, #8]

In **Figure 4**, there are two birds staying at the tops of two trees PA and QB respectively.   The bird at Q sees the other bird at P with an angle of depression of 35°.   The height of tree PA is 3 m.   The angle of depression of B from P is 29°.
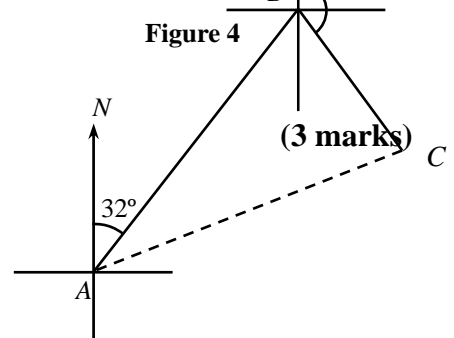
(a) Find the horizontal distance between the two birds.

(2 marks)

(b) Find the height of tree QB.   **(2 marks)**
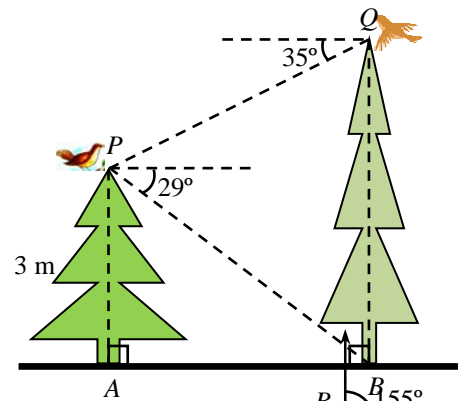
Figure 4

2.   [13-14 Final Exam, #15]

In **Figure 9**, the bearing of town B from town A is N32°E and the bearing of town C from town B is 155°.   If the distance between towns A and B is twice of the distance between towns B and C, find the true bearing of town A from town C.

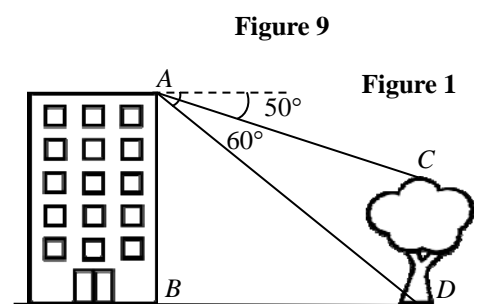**(3 marks)**

Figure 9

3.   [14-15 Final Exam, #2]

In **Figure 1**, AB and CD are the vertical heights of a building and a tree respectively. The angles of depression of C and D from A are 50° and 60° respectively and $AB =$ 60 m.

Figure 1

(a) Find the horizontal distance between the building and the tree.   **(2 marks)**

(b) Find the height of the tree.   **(2 marks)**

4.   [14-15 Final Exam, #12]

Alice and Kitty walk from town A to town C by two different routes. Alice first walks 80 m to B in a direction of 300°, then she walks 130 m to C in a direction of 200°. Kitty first walks due south to D, then she walks due west to C.

(a) Sketch the routes of Alice and Kitty in **Figure 6**.   **(1 mark)**

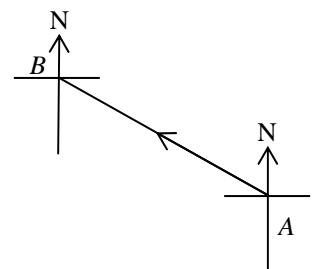**(b)** Find the distance travelled by Kitty.   **(3 marks)**

Figure 6

5.   [15-16 Final Exam, #7]
In **Figure 2**, the scale of the map is 1 : 5 000. *AB* is a straight road and is measured to be 2.5 cm long on the map.
(a) Find the gradient of *AB*.   **(2 marks)**
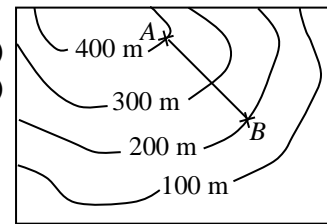**(b)** Find the inclination of *AB*.   **(1 mark)**

Figure 2

6.   [15-16 Final Exam, #16]
Peter walks 150 m to the library *B* in a direction of 300° from his home *A*, and then walks 250 m in a direction of 225° to a church *C*.
(a) Sketch the route.   **(1 mark)**

(b) Find the shortest distance between his home *A* and the church *C*.   **(3 marks)**

7.   [16-17 Final Exam, #16]
In **Figure 6**, a car travels from town *P* in a direction of S32°W towards town *Q* which is 45 km away. Several hours later, the car leaves *Q* and goes to town *R*. The bearings of *R* from *P* and *Q* are S9°E and S58°E respectively. Find the distance between town *Q* and town *R*? **(3 marks)**
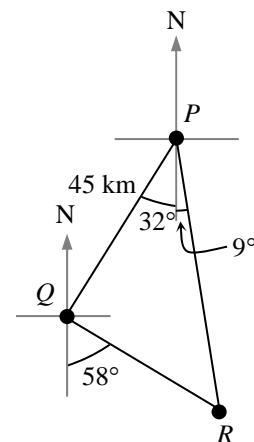
Figure 6

8. [17-18 Final Exam, #15]
Ben is playing a mobile phone game in which monsters can be detected within a distance of   200 m. The compass bearing of a fixed monster *P* from Ben's home *Q* is S68°W. After walking due west for 400 m to the library *R*, the compass bearing of monster *P* from Ben is S24°W. Ben continues walking due west and he is nearest to monster *P* at *T*. Can he detect monster *P* at *T*? Explain your answer.   **(3 marks)**
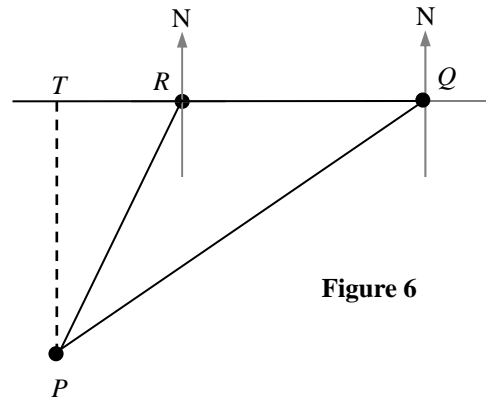
Figure 6

9. [17-18 Final Exam, #16]
In **Figure 7a**, *O*, *A* and *B* are 3 points on the horizontal ground. It is given that $OA = 6$ m and $OB = 6\sqrt{3}$ m. The true bearings of *O* from *A* and *B* are 340° and 250° respectively.

(a) Write down $\angle AOB$. Hence find *AB*.

(b) In **Figure 7b**, *OP* is a vertical lamp with height 3 m which is located at *O* and *AB* is a road. *C* is a point on *AB* such that it has the shortest distance from the lamp.

   (i) Name the angle between *AP* and $\triangle OAB$. **(1 mark)**

   (ii) Name the angle between $\triangle PAB$ and $\triangle OAB$.

   (1 mark)

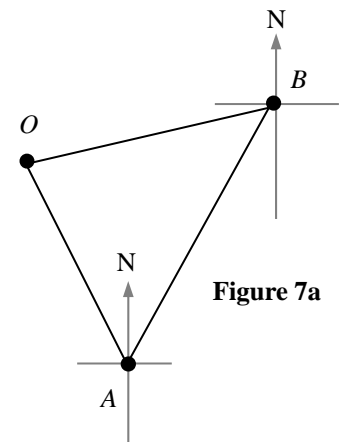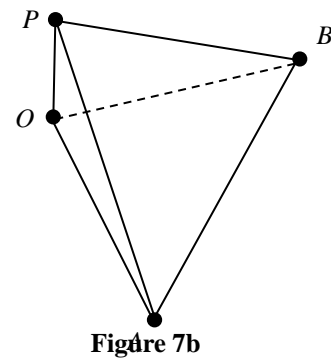   **(iii)** Hence, find the angle between $\triangle PAB$ and $\triangle OAB$.

Figure 7a

Figure 7b