

Name:

Result:

1. A ship is moving towards a vertical cliff. The angle of elevation from the ship to the top of the cliff changes from  $10^\circ$  to  $13^\circ$  as the ship moves 120 metres towards the cliff. Calculate the height of the cliff. [3 *points*]

2. Tomasz starts at point  $A$  and walks 2 km on a bearing of  $110^\circ$ . He then turns right by an angle of  $42^\circ$  and moves a further 3 km to arrive at point  $B$ . Find the distance between  $A$  and  $B$  and the bearing of  $A$  from  $B$ . [4 *points*]

**3.** Points  $A$  and  $B$  are observation points on level ground. From point  $A$  the tower is directly North. From point  $B$  the bearing of the tower is  $340^\circ$ . The angles of elevation from points  $A$  and  $B$  to the top of the tower are  $21^\circ$  and  $29^\circ$  respectively. Given that the distance from  $A$  to  $B$  is 150 metres, find the height of the tower. [6 *points*]

4. Two circles of radii 4 and 5 intersect at points  $P$  and  $Q$ . Given that  $|PQ| = 6$ , find the area of the region that lies inside both circles. [6 points]

**5.** In a triangle  $ABC$  we have  $|AB| = 12$ ,  $|BC| = 7$  and  $\angle BAC = 25^\circ$ . Two triangles satisfy the above conditions, triangle  $ABC$  is the one with larger area. Point  $D$  is chosen on the side  $AC$  such that  $AD : DC = 3 : 1$ . Find the length of the line segment  $BD$ . [6 points]