

1. A ship leaves port Q on a bearing of 045° . It sails a distance of 30 miles to point R. At R, the ship changes direction to a bearing of 115° . It sails a distance of 50 miles to reach point S. A second ship leaves port Q and sails directly to S.

(a) Find the distance ship 2 will travel (4 marks)

(b) Find the bearing of the course taken by the second ship (3 marks)

Mark scheme:

(a) **** Drawing a picture will be helpful ****

Finding angle QRS = 70° (A1)

Using the Cosine Rule (M1)

Correct substitution into the Cosine Rule (A1)

$$x^2 = 30^2 + 50^2 - 2(30)(50)\cos(70^\circ)$$

$$x^2 = 2373.93957 \dots$$

$$x = 48.7 \text{ km} \quad (\text{A1})$$

(b) Use of the Sine Rule (M1)

$$\frac{\sin Q}{50} = \frac{\sin 70^\circ}{48.7} \quad (\text{A1})$$

$$Q = 074.7^\circ \quad (\text{A1})$$

OR

Use of the Cosine Rule (M1)

$$\cos Q = \frac{30^2 + 48.7^2 - 50^2}{2(30)(48.7)} \quad (\text{A1})$$

$$Q = 074.7^\circ \quad (\text{A1})$$