BEARINGS & TRIGONOMETRY

Mastery Worksheet

I DO

Point B is on a bearing of 075° from point A.
Work out the bearing of A from B.

WE DO

Point D is on a bearing of 130° from point C.
Work out the bearing of C from D.

YOU DO 1

Point F is on a bearing of 042° from point E.
Work out the bearing of E from F.

YOU DO 2

Point H is on a bearing of 295° from point G.
Work out the bearing of G from H.

CHALLENGE 1 (SOHCAHTOA)

Town Y is 12 km East and 5 km North of Town X.
Work out the bearing of Town Y from Town X.
Give your answer to 1 decimal place.

CHALLENGE 2 (SOHCAHTOA)

A boat sails 8 km on a bearing of 120° from a port.
Work out how far East the boat has travelled from the port.
Give your answer to 2 decimal places.

GRADE 9 CHALLENGE (SINE & COSINE RULES)

Ship A leaves port P and sails 15 km on a bearing of 040°.
Ship B leaves the same port P and sails 22 km on a bearing of 115°.

(a) Work out the distance between Ship A and Ship B. Give your answer to 3 significant figures.

(b) Work out the bearing of Ship B from Ship A. Give your answer to 1 decimal place.

ANSWERS & WORKED SOLUTIONS

I Do

Step 1: Add 180° to the original bearing.
Step 2: 075 + 180 = 255.
Answer: 255°

We Do

Step 1: Add 180° to the original bearing.
Step 2: 130 + 180 = 310.
Answer: 310°

You Do 1

Step 1: Add 180° to the original bearing.
Step 2: 042 + 180 = 222.
Answer: 222°

You Do 2

Step 1: Subtract 180° because the original bearing is greater than 180°.
Step 2: 295 − 180 = 115.
Answer: 115°

Challenge 1

Step 1: Draw a right-angled triangle. The opposite side is East (12), adjacent side is North (5).
Step 2: $\tan(\theta) = 12 \div 5 = 2.4$.
Step 3: $\theta = \tan^{1}(2.4) = 67.38...°$
Answer: 067.4°

Challenge 2

Step 1: Draw a right-angled triangle. Angle from North is 120°. The Eastward component is opposite the 120° bearing angle from North.
Step 2: East = $8 \times \sin(120°)$.
Step 3: East = 6.928...
Answer: 6.93 km

Grade 9 Challenge

(a) Distance

Step 1: Angle APB = 115° − 040° = 75°.

Step 2: Use the Cosine Rule: $a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$

Step 3: $a^2 = 15^2 + 22^2 - 2(15)(22)\cos(75°) = 225 + 484 - 660(0.2588) = 538.18...$

Step 4: $a = \sqrt{538.18...} = 23.19...$

Answer: 23.2 km

(b) Bearing

Step 1: Use the Sine Rule to find angle PAB. $\sin(A) / 22 = \sin(75°) / 23.2$.

Step 2: $\sin(A) = 0.916...$ so Angle PAB = 66.35...°

Step 3: Bearing of P from A (return bearing) = 040° + 180° = 220°.

Step 4: Bearing of B from A = 220° − 66.35° = 153.65°.

Answer: 153.7°