Non right angled trigonometry: exam practice

10 questions · 41 marks · worked solutions and markschemes

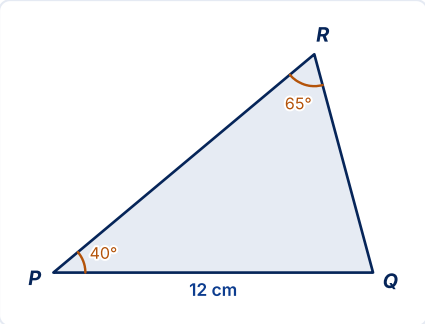
Name _____ Date _____ Score / 41

- Answer every question before you look at the solutions. They start after the last question, with the marks for each line: M for method, A for accuracy, R for reasoning.
- Online, with more practice: ibmathrevision.com/hlaa/non-right-angled-trigonometry-exam-practice

1. **3 marks · Paper 2 style · calculator**

In triangle PQR, $PQ = 12$ cm, $Q\hat{P}R = 40°$ and $P\hat{R}Q = 65°$.

Find QR. **[3]**



PQ = 12 cm, angle P = 40°, angle R = 65°

2. **3 marks · Paper 2 style · calculator**

A triangle has sides 8 cm, 11 cm and 15 cm.

Find the size of the largest angle. **[3]**

3. **3 marks · Paper 1 style · no calculator**

The area of triangle ABC is $18\ \text{cm}^2$, with $AB = 6$ cm, $AC = 12$ cm and $B\hat{A}C$ obtuse.

Find the exact size of $B\hat{A}C$. **[3]**

4. **4 marks · Paper 2 style · calculator**

A triangular field has sides 80 m, 95 m and 110 m.

Find the area of the field. **[4]**

5. **4 marks · Paper 2 style · calculator**

In triangle ABC, $AB = 10$ cm, $BC = 7$ cm and $B\hat{A}C = 38°$.

Find the two possible values of $A\hat{C}B$. **[4]**

6. **4 marks · Paper 1 style · no calculator**

In triangle ABC, $AB = x$, $AC = x + 2$, $BC = 7$ and $B\hat{A}C = 60°$.

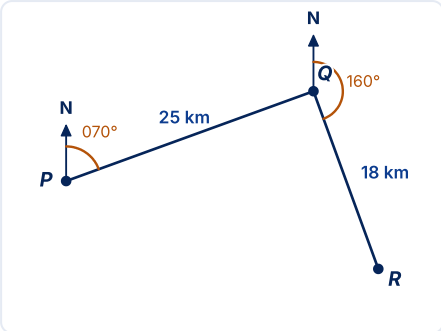
Find x. **[4]**

7. **4 marks · Paper 2 style · calculator**

A ship sails 25 km on a bearing of $070°$ from port P to Q, then 18 km on a bearing of $160°$ to R.

(a) Show that $P\hat{Q}R = 90°$. **[2]**

(b) Find the distance PR. **[2]**



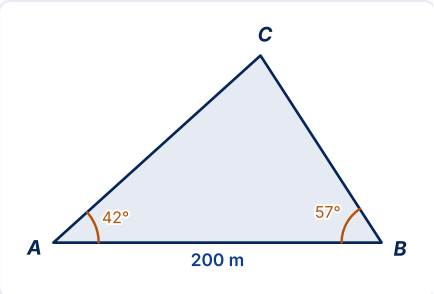
25 km on 070°, then 18 km on 160°

8. **5 marks · Paper 2 style · calculator**

Two points A and B are 200 m apart on level ground. A balloon C is directly above the line AB, between A and B. The angles of elevation of C from A and B are $42°$ and $57°$.

(a) Find AC. **[3]**

(b) Find the height of the balloon. **[2]**



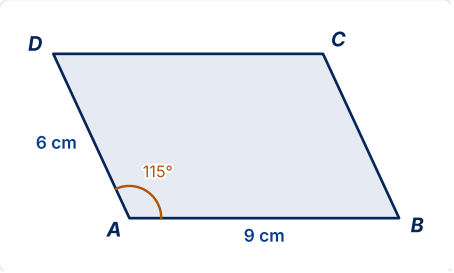
AB = 200 m, elevations 42° and 57°

9. **5 marks · Paper 2 style · calculator**

The parallelogram $ABCD$ has $AB = 9$ cm, $AD = 6$ cm and $D\hat{A}B = 115°$.

(a) Find the area of the parallelogram. **[2]**

(b) Find the length of the longer diagonal. **[3]**



AB = 9 cm, AD = 6 cm, angle A = 115°

10. **6 marks · Paper 1 style · no calculator**

In triangle ABC, $AB = 5$, $AC = 8$ and $\cos B\hat{A}C = \frac{1}{5}$.

(a) Find BC. **[3]**

(b) Find the exact area of the triangle. **[3]**

Answers and worked solutions

Question 1 — 3 marks

Answer: 8.51 cm

$\frac{QR}{\sin 40°} = \frac{12}{\sin 65°}$ $M1A1$

$QR = 8.51$ cm **A1**

Question 2 — 3 marks

Answer: $103°$

largest angle is opposite 15 cm

R1

$\cos\theta = \frac{64 + 121 - 225}{2(8)(11)}$ **M1**

$103°$ **A1**

Question 3 — 3 marks

Answer: $\frac{5\pi}{6}$

$\frac{1}{2}(6)(12)\sin A = 18$ **M1**

$\sin A = \frac{1}{2}$ **A1**

$A = \frac{5\pi}{6}$ **A1**

Question 4 — 4 marks

Answer: $3710\ \text{m}^2$

angle opposite 110:

$\cos C = \frac{80^2 + 95^2 - 110^2}{2(80)(95)}$

M1

$C = 76.6°$ **A1**

$\frac{1}{2}(80)(95)\sin C$ **M1**

$3710\ \text{m}^2$ **A1**

Question 5 — 4 marks

Answer: $61.6°$ or $118°$

$\frac{\sin C}{10} = \frac{\sin 38°}{7}$ $M1A1$

$C = 61.6°$ **A1**

$C = 118°$ **A1**

Question 6 — 4 marks

Answer: $x = -1 + \sqrt{46}$

$49 = x^2 + (x+2)^2 - x(x+2)$

$M1A1$

$x^2 + 2x - 45 = 0$ **A1**

$x = -1 + \sqrt{46}$ **A1**

Question 7 — 4 marks

Answer: (b) 30.8 km

(a)

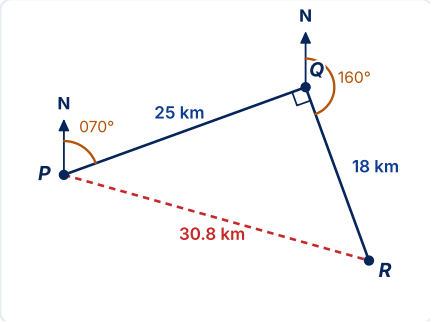
bearing of P from Q is $250°$ **A1**

$250° - 160° = 90°$ **A1 AG**

(b)

$\sqrt{25^2 + 18^2}$ **M1**

30.8 km **A1**



Right angle at Q, so $PR = 30.8$ km

Question 8 — 5 marks

Answer: (a) $170\,m$; (b) $114\,m$

(a)

$A\hat{C}B = 81°$ **A1**

$\frac{AC}{\sin 57°} = \frac{200}{\sin 81°}$ **M1**

$AC = 170\,m$ **A1**

(b)

$AC\sin 42°$ **M1**

$114\,m$ **A1**

Question 9 — 5 marks

Answer: (a) $48.9\ \text{cm}^2$; (b) 12.8 cm

(a)

$9 \times 6\sin 115°$ **M1**

$48.9\ \text{cm}^2$ **A1**

(b)

$BD^2 = 81 + 36 - 108\cos 115°$

$M1A1$

12.8 cm **A1**

Question 10 — 6 marks

Answer: (a) $\sqrt{73}$; (b) $8\sqrt{6}$

(a)

$BC^2 = 25 + 64 - 2(5)(8)\left(\frac{1}{5}\right)$

$M1A1$

$BC = \sqrt{73}$ **A1**

(b)

$\sin A = \frac{\sqrt{24}}{5}$ **A1**

$\frac{1}{2}(5)(8)\frac{2\sqrt{6}}{5}$ **M1**

$8\sqrt{6}$ **A1**

Every solution is also on ibmathrevision.com/hlaa/non-right-angled-trigonometry-exam-practice
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