Right-Angled Trigonometry: exam practice

10 questions · 27 marks · worked solutions and markschemes

Name _____ Date _____ Score / 27

- 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/hlai/right-angled-trigonometry-exam-practice

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

A ladder 7 m long rests against a wall at an angle of $72°$ to the ground.

Find how high up the wall the ladder reaches. **[2]**

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

Solve $2\sin x = \sqrt{3}$ for $0 \leq x \leq 2\pi$.

Find x. **[2]**

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

A kite string is 60 m long and makes an angle of $41°$ with the horizontal. The string is held 1.5 m above the ground.

Find the height of the kite above the ground. **[2]**

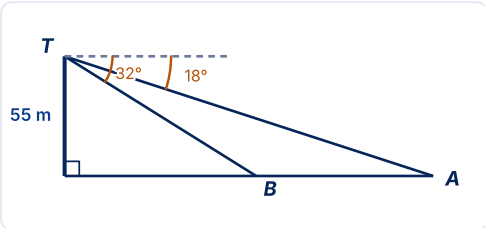
4. **3 marks · Paper 1 style · calculator allowed**

Solve $2\cos x = 1$ for $0 \leq x \leq 2\pi$, giving exact answers.

5. **3 marks · Paper 2 style · calculator allowed**

From the top of a lighthouse 55 m high, the angles of depression of two boats in line with it are $18°$ and $32°$.

Find the distance between the boats. **[3]**



Lighthouse 55 m; depressions 32° and 18°

6. **3 marks · Paper 1 style · calculator allowed**

A ramp rises 0.9 m over a horizontal distance of 7.5 m.

Find the angle of the ramp and its length. **[3]**

7. **3 marks · Paper 2 style · calculator allowed**

An isosceles triangle has equal sides of 13 cm and a base of 10 cm.

Find its height and base angles. **[3]**

8. **4 marks · Paper 2 style · calculator allowed**

Solve $\tan 2x = 1.5$ for $0 \leq x \leq \pi$.

9. **2 marks · Paper 1 style · calculator allowed**

Use the unit circle to write down the exact value of

a. $\sin \frac{5\pi}{6}$; **[1]**

b. $\cos \frac{4\pi}{3}$. **[1]**

10. **3 marks · Paper 1 style · calculator allowed**

Given that $\sin\theta = \frac{3}{5}$ and that θ is obtuse, find the exact values of $\cos\theta$ and $\tan\theta$.

Answers and worked solutions

Question 1 — 2 marks

Answer: $6.66\,m$

$7\sin 72°$ M1

$6.66\,m$ A1

Question 2 — 2 marks

Answer: $x = \frac{\pi}{3}, \frac{2\pi}{3}$

$x = \frac{\pi}{3}$ A1

$x = \frac{2\pi}{3}$ A1

Question 3 — 2 marks

Answer: $40.9\,m$

$60\sin 41° + 1.5$ M1

$40.9\,m$ A1

Question 4 — 3 marks

Answer: $x = \pi/3, x = 5\pi/3$

$\cos x = \frac{1}{2}$ (M1)

$x = \frac{\pi}{3}$ A1

$x = \frac{5\pi}{3}$ A1

Question 5 — 3 marks

Answer: $81.3\,m$

$\frac{55}{\tan 18°} = 169.3$ A1

$\frac{55}{\tan 32°} = 88.0$ A1

$81.3\,m$ A1

Question 6 — 3 marks

Answer: $6.84°$; $7.55\,m$

$\tan\theta = \frac{0.9}{7.5}$ M1

$6.84°$ A1

$7.55\,m$ A1

Question 7 — 3 marks

Answer: 12 cm; $67.4°$

$h = 12$ cm A1

$\cos\theta = \frac{5}{13}$ M1

$67.4°$ A1

Question 8 — 4 marks

Answer: $0.491, 2.06$

$2x = 0.9828$ A1

or $2x = 0.9828 + \pi$ (tan has period π) M1

$x = 0.491$ or $x = 2.06$ A1A1

Question 9 — 2 marks

Answer: (a) $1/2$; (b) $-1/2$

a. $\frac{1}{2}$ A1

b. $-\frac{1}{2}$ A1

Question 10 — 3 marks

Answer: $(\cos\theta)$ $-4/5$; $(\tan\theta)$ $-3/4$

$\cos^2\theta = 1 - \frac{9}{25} = \frac{16}{25}$ M1

θ obtuse, so $\cos\theta = -\frac{4}{5}$ A1

$\tan\theta = \frac{\sin\theta}{\cos\theta} = -\frac{3}{4}$ A1

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