Trigonometry - Practice test 3

Name: _____ Date: _____

10 questions | 58 marks | 75 minutes

Connect representations and justify choices, including diagrams, tables and inverse problems.

A scientific calculator may be used.

1. A triangle has $A = 35^\circ$, $a = 12$ cm and $b = 8$ cm. [6 marks]

(a) Find B to one decimal place. [3 marks]

(b) Explain why there is only one triangle, then find C. [3 marks]

2. Work with angle units. [5 marks]

(a) Convert 315° and -135° to radians. [2 marks]

(b) List all angles coterminal with $\frac{\pi}{4}$ in $-2\pi \leq x \leq 2\pi$. [3 marks]

3. A sector has radius r and angle 2 radians. Its area is 25 cm². [6 marks]

(a) Find r and its arc length. [3 marks]

(b) Find the full boundary length and compare it with the arc. [3 marks]

4. A triangle has sides 10 cm,11 cm and 17 cm. [6 marks]

(a) Find its largest angle to one decimal place. [3 marks]

(b) Explain why the result must be obtuse without calculating inverse cosine. [3 marks]

5. A chord subtends 120° at the centre of a circle of radius 6 cm. [6 marks]

(a) Find chord length exactly. [3 marks]

(b) Find the minor arc and explain why it exceeds the chord. [3 marks]

6. The table records height at equal time intervals during one smooth repeating cycle. [6 marks]

Height observations during one cycle

Time t (h)	Height h (m)
0	8
2	5
4	2
6	5
8	8

(a) Give a cosine rule consistent with the smooth cycle shown by these values. [3 marks]

(b) State one assumption needed to predict h at 10 h, and give that prediction. [3 marks]

7. Let $g(x) = 4 - 2\cos(2x - \frac{\pi}{3})$. [6 marks]

(a) Find its amplitude, period and horizontal shift. [3 marks]

(b) Solve $g(x) = 3$ on $0 \leq x < \pi$. [3 marks]

8. Solve $2\sin^2 x - 3\sin x + 1 = 0$. [5 marks]

(a) Find possible sine values. [2 marks]

(b) Find every root for $0 \leq x < 2\pi$. [3 marks]

9. Two survey rays from O have bearings 020° and 140°. Points P,Q are respectively 30 m and 50 m along the rays. [6 marks]

(a) Find the interior angle POQ and distance PQ exactly. [3 marks]

(b) Find the area OPQ exactly. [3 marks]

10. A triangular frame uses sides 6 m and 10 m with a flexible joint. [6 marks]

(a) Find the greatest possible enclosed area and corresponding angle. [3 marks]

(b) Find both included angles giving area 15 m², and explain why the frames have different third sides. [3 marks]