Trigonometry - Practice test 1

Name: _____ Date: _____

10 questions | 59 marks | 75 minutes

A balanced paper from triangle ratios to periodic applications. Give exact values where requested and retain precision in calculations.

A scientific calculator may be used.

1. A right triangle has legs 5 cm and 12 cm. θ is opposite 5 cm. [5 marks]

(a) Find its hypotenuse and all three ratios. [3 marks]

(b) Find θ to one decimal place. [2 marks]

2. In triangle ABC, $A = 45^\circ$, $B = 75^\circ$ and $a = 6$ cm. You may use $\sin 75^\circ = \frac{\sqrt{6}+\sqrt{2}}{4}$. [6 marks]

(a) Find C and b exactly. [3 marks]

(b) Find c exactly. [3 marks]

3. Given $A = 30^\circ$, $a = 10$ cm and $b = 10\sqrt{3}$ cm. [6 marks]

(a) Find every possible angle B. [3 marks]

(b) Find the corresponding C values and justify the number of triangles. [3 marks]

4. Sides 4 cm and 9 cm enclose 60°. [6 marks]

(a) Find the third side exactly. [3 marks]

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

5. A sector has radius 9 cm and angle 80°. [6 marks]

(a) Find its arc length and area exactly. [4 marks]

(b) Find its full perimeter. [2 marks]

6. Work with exact trigonometric values. [6 marks]

(a) Find sine, cosine and tangent of 240°. [3 marks]

(b) Solve $\sin x = -\frac{\sqrt{2}}{2}$ on $0 \leq x < 2\pi$. [3 marks]

7. Let $y = 2 + 3\cos(\frac{x}{2})$. [6 marks]

(a) State the range, period and value at 0. [3 marks]

(b) Find $y = 2$ for $0 \leq x < 4\pi$. [3 marks]

8. Solve each equation over its stated interval. [6 marks]

(a) $2\sin x = 1,\ -\pi \leq x \leq \pi$. [3 marks]

(b) $\cos(2x) = -1,\ 0 \leq x < 2\pi$. [3 marks]

9. A tide varies between 1.5 m and 4.5 m with period 12 h. It is at its maximum at $t = 0$. [6 marks]

(a) Write a cosine model. [3 marks]

(b) Find the first two nonnegative times at mean depth. [3 marks]

10. Two paths from a camp have lengths 40 m and 55 m with angle 120° between them. [6 marks]

(a) Find the distance between their endpoints, to two decimal places. [3 marks]

(b) Find the triangle’s area exactly. [3 marks]