PURE MATHS 1 EXAM 1 REVISION PAPER 1

ANSWER ALL THE QUESTIONS **TIME ALLOWED: 1 hour**

INSTRUCTIONS: You must show your method. **TOTAL MARKS = 40**

Formulae

Algebra

Quadratic Equation:

The roots of the equation $ax^2 + bx + c = 0$ where $a \neq 0$ are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometry

$$\frac{a}{\sin} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area of a triangle} = \frac{1}{2}ab\sin C$$

Questions

1 (a) Simplify $\sqrt{48}$ (You must show your method.) [3 marks]

(b) Rationalise and simplify $\frac{1}{2-\sqrt{3}}$

2 Simplify $\frac{(3m^2)^3}{6m^4}$ [2 marks]

3 Fully factorise [4 marks]

(a) $2x^2 + 3x - 20$

(b) $2x^2 - 8$

4 Transpose $T = 2\pi\sqrt{\frac{l}{g}}$ for l [2 marks]

5 Solve $\frac{12}{x} = \frac{x}{3}$ [2 marks]

6 Use the quadratic formula to find the roots of $2x^2 - 5x + 1 = 0$ giving your correct to 3 decimal places. [3 marks]

7 Use Pascal's triangle to find the expansion of $(3-4x)^4$ [2 marks]

8 Solve the simultaneous equations [3 marks]

$$2x+3y=4$$
$$5x-2y=-9$$

9 (a) Convert 120° to radians giving your answer as a multiple of π. [2 marks]

(b) Convert 2.5 radians into degrees giving your answer correct to 1 decimal place.

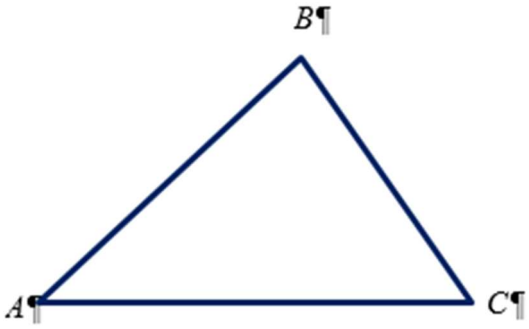
10 Find the two angles in the range 0° to 360° whose tangent is -0.4 [1 mark]

11 In triangle ABC, AB = 15cm, BC = 12cm and angle A = 40°. [7 marks]

(a) Find angle B

(b) Find the length of AC

(c) Find the area of the triangle.



12 If $y=\frac{6}{\sqrt{x}}$ find $\frac{dy}{dx}$ [4 marks]

13 If $y=3x^2+6x-2$ find the co-ordinates of the point where $\frac{dy}{dx}=0$ [5 marks]

Answers:

1)(a) $4\sqrt{3}$, (b) $2+\sqrt{3}$, **2)** $\frac{9}{2}m^2$,

3)(a) $(2x-5)(x+4)$, (b) $2(x+2)(x-2)$, **4)** $g=\frac{lT^2}{4\pi^2}$

5) $x=\pm 6$ **6)** 0.219 and 2.281,

7) $81-432x+864x^2-768x^3+256x^4$,

8) $x=-1, y=2$, **9)**(a) $\frac{2}{3}\pi$, (b) 143.2°

10) 158.2° and 338.2°, **11)**(a) 86.5°, (b) 18.6 cm, (c) 89.8 cm^2

12) $-3x^{-\frac{3}{2}}$ or $\frac{-3}{\sqrt{x^3}}$ **13)** $(-1,-5)$