St. Peter the Apostle High School

Mathematics Dept.

N5 Practice Prelim Four Paper 1

Duration: 1 Hour   **Marks: 40**

1. Attempt ALL questions.

2. You **<u>MAY NOT</u>** use a calculator.

3. Write your solutions on the blank paper provided.

4. Full credit will be given only where the solution contains appropriate working.

5. Square-ruled paper will be provided if necessary.

Formula Sheet

The roots of $\qquad$ $ax^2 + bx + c = 0$ $\qquad$ are $\qquad$ $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule: $\qquad$ $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule: $\qquad$ $a^2 = b^2 + c^2 - 2bc \cos A$ $\qquad$ or $\qquad$ $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle: $\qquad$ Area = ½ ab sin C

Volume of a sphere: $\qquad$ Volume = $\dfrac{4}{3} \pi r^3$

Volume of a cone: $\qquad$ Volume = $\dfrac{1}{3} \pi r^2 h$

Volume of a pyramid: $\qquad$ Volume = $\dfrac{1}{3} Ah$

Standard deviation: $\quad s = \sqrt{\dfrac{\sum(x - \bar{x})^2}{n-1}} = \sqrt{\dfrac{\sum x^2 - (\sum x)^2/n}{n-1}}$, where n is the sample size.

1. Evaluate: $\left(\dfrac{3}{4} + \dfrac{5}{6}\right) \div 2\dfrac{1}{2}$

   3

2. Factorise: $3x^2 + 4x - 4$

   2

3. Find the equation of the line which passes through the point (4, 6) and
   is **parallel** to the line with equation $y = \dfrac{3}{4}x$.

   2

4. Find the nature of the roots of the quadratic equation $2x^2 - 3x + 8 = 0$
   Give a reason for your answer.

   3

5. Simplify $\dfrac{4x^2 \times 5x^6}{2x^{-1}}$

   2

6. Find the magnitude of the vector which has components $\begin{pmatrix} 3 \\ -5 \\ \sqrt{14} \end{pmatrix}$
   leaving your answer as a surd in its simplest form.

   4

7. Express as a single fraction in its simplest form: $\dfrac{3}{(x-3)} - \dfrac{4}{x}$

   3

8. Multiply the brackets and simplify $(x-3)(2x^2 + 3x - 7)$

   3

9. A quadratic function has equation $f(x) = x^2 - 6x + 1$.

   a) Write $f(x)$ in the form $(x+a)^2 + b$ and write down the values of a and b.

   3

   b) From $y = f(x)$ in part (a)

   (i) What is the turning point of the graph?

   2

   (ii) What is the equation of the axis of symmetry of the graph?

   1

10. Anne has baked 30 cakes to sell at the school fayre.

Some have a cream filling (*c*) and some have a jam filling (*j*).

a) Write down an equation using *c* and *j* to illustrate this information. **1**

She sells the cream ones for 40p and the jam ones for 32p each and makes a total of £11.20.

b) Write down another equation using *c* and *j* to illustrate this information. **1**

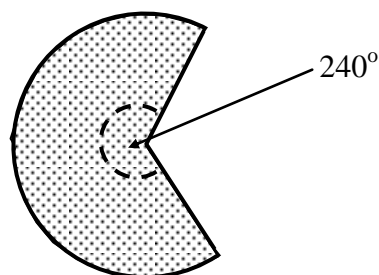**c)** Find **algebraically** the number of each kind of cake that Anne made. **4**

11. The logo for Carol's Coats is shown below.

The logo is a sector of a circle of radius 12 cm.

The reflex angle at the centre is 240°.
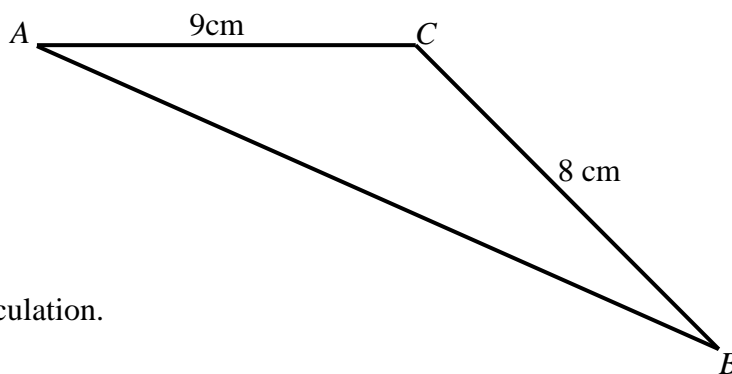
Taking $\pi = 3 \cdot 14$, calculate the area of the logo. **3**

240°

12. The area of triangle ABC is 18cm².

Callum calculated that the exact value of sin ACB is $\frac{1}{4}$.

Is he correct?
You must justify your answer by calculation.

A ——— 9cm ——— C

8 cm

B

3

End of question Paper