St. Peter the Apostle High School

Mathematics Dept.



PracticePrelim ThreePaper 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
$$ax^2 + bx + c = 0$$
 are $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Cosine rule:

$$a^{2} = b^{2} + c^{2} - 2bc \cos A$$
 or $\cos A = \frac{b}{c}$

$$=\frac{b^2+c^2-a^2}{2bc}$$

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

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

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

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

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

- **1.** Factorise fully each of the following:
 - a) $12x^2 + 16x 3$ b) $5x^2 - 45$ 2
- 2. Solve the inequality: 5-x > 2(3x-8)
- **3.** Find the equation of the line which passes through the points (4, 6) and (-2, 3).
- **4.** Evaluate: $3\frac{3}{8} \div 2\frac{1}{4}$ **3**
- 5. Evaluate: $81^{\frac{3}{4}}$
- 6. AD is a diameter of a circle, centre O. B and C are points on the circumference of the circle. Angle $CAD = 25^{\circ}$ and angle $BDA = 46^{\circ}$ Calculate the size of angle BAC.



3

3

2

3

4

The equation $3x^2 - kx + 3 = 0$ has equal roots. 7. Find the value of *k* given that k > 0.

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

b) Hence or otherwise express
$$(x-2)(x^2+3x+7)-x^3$$
 in the form $(x+a)^2+b$. **3**

9. Vectors \underline{a} and \underline{b} have components as follows:

$$\underline{a} = \begin{pmatrix} 2\\2\\-1 \end{pmatrix}$$
 and $\underline{b} = \begin{pmatrix} -2\\4\\0 \end{pmatrix}$

Calculate the magnitude of the resultant vector $2\underline{a} - \underline{b}$ leaving your answer as a surd in its simplest form.

Express $\frac{5}{3\sqrt{5}}$ with a rational denominator in its simplest form. 10. 3

11. Simplify:
$$\frac{x^5 \times x^3}{x^{-2}}$$
 2

12. Triangle ABC has dimensions as shown. 9cm AGiven that the exact value of $\cos x^o$ is $-\frac{1}{6}$. x^{o} 8 cm Calculate the length *AB*. 3 В

Total Marks: 40

End of question Paper



4

