# St. Peter the Apostle High School

# **Mathematics Dept.**



# PracticePrelim NinePaper 2

### **Duration: 1 Hr 30 Mins**

Marks: 50

- **1.** Attempt ALL questions.
- 2. You <u>MAY</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:

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

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

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



This second set of results had a mean of 42 and a standard deviation of 9.21.

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Make **two** valid comparisons between the two sets of results.

#### **3.** The diagram below shows a steel plate ABCD.



a)	Calculate the length of BD correct to 1 decimal place.	2
b)	Find the size of angle BDC correct to the nearest degree.	3

- c) Hence calculate the length of BC given that DC = 25 cm.
- 4. A formula is given as  $E = n^2 + an + b$ .
  - a) When n = 2, E = 6. Use this information to write down an equation connecting *a* and *b* in its simplest form 2
  - **b**) Also when n = 6, E = 48. Form a second equation and use both equations to find the values of *a* and *b*.
  - c) Hence find *E* when n = 10.

Given that the original cylinder had a **diameter** of 8cm, calculate the **volume** of the prism in cubic centimetres.

- 6. Look at the cuboid shown in the diagram. Point *E* has coordinates (5, 3, 1)
  - **a**) Write down the coordinates of the points *C* and *D*.
  - **b**) Calculate the shortest distance between C and D



- 7. Consider the diagram below. All units are in centimetres.
  - a) Show clearly that the shaded area, A, in the diagram can be expressed as  $A = 4x^2 + 7x + 6$



- b) Given that the shaded area is 20 square centimetres, show that the equation  $4x^2 + 7x 14 = 0$  can now be formed.
- c) Hence solve the equation  $4x^2 + 7x 14 = 0$  to find the value of *x*, giving your answer correct to 1 decimal place.

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8. The tangent SV touches the circle with centre O at the point T.

Angle *PTQ* is 37° Angle *VTR* is 68°

Calculate the size of Angle PQR.



The diagram below, which is not drawn to scale, 9. represents the positions of three mobile phone masts. Mast Q is on a bearing of 100° from mast P and is 40km away. The bearing of mast R from mast Q is 150°. Masts P and R are 66km apart. Ν Ν Р 40 km Q 66 km Ν Use the information in the diagram to establish the size of angle PQR. a) Hence find the bearing of mast P from mast R. b)

#### **End of question Paper**

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