St. Peter the Apostle High School

Mathematics Dept.

N5 Practice Prelim Nine 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 $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

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

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

Area of a triangle: Area = ½ *ab* sin C

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

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

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

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

**1.** Solve **algebraically** the inequality: $3x + 5 \leq 7x - 19$. **3**

2. Evaluate: $2\frac{1}{4} - 1\frac{2}{3}$ **2**

3. The probability that a bus arrives on time is $\frac{4}{7}$.

Out of a sample of 210 buses how many would you expect to be **late**? **2**

4. **a)** Remove the brackets and simplify: $p^{\frac{1}{2}}(p^{\frac{5}{2}} - 2)$ **2**

b) Hence, or otherwise, find the value of $p^{\frac{1}{2}}(p^{\frac{5}{2}} - 2)$ when $p = 4$. **2**

5. John is looking to buy a new rug for his main room.
The two rugs below are **mathematically similar** in shape.
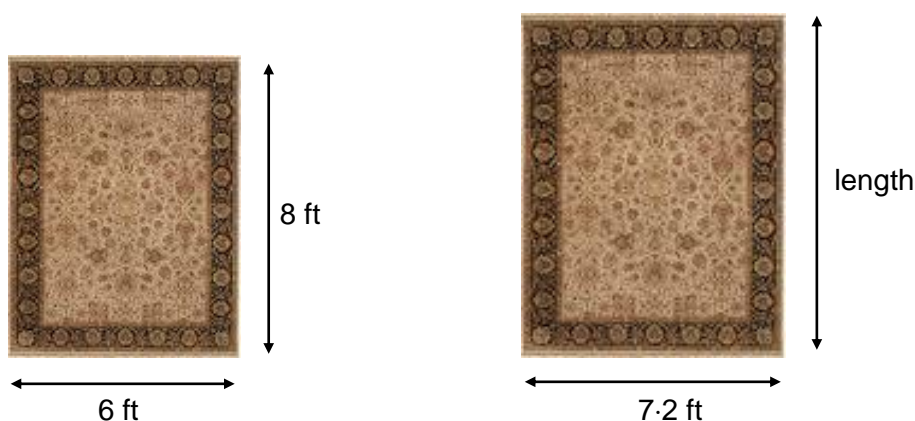
He is hoping that the length of the large rug will be enough to make the
area of the large rug **at least 72 square feet**.
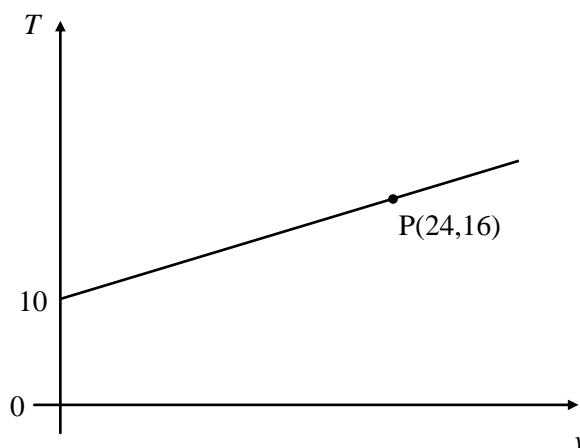
Does the large rug have the required area? **4**
You must show appropriate working with your answer.

6. Change the subject of the formula to p: $E = \dfrac{V - p}{m}$. **2**

7. The relationship between variables v and T produces a straight line graph as shown below.

The line passes through the point P(24,16) as shown.

a) Find the gradient of the line. **2**

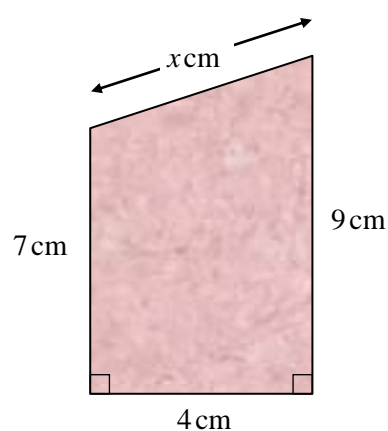b) Hence, write down the equation of the line in terms of v and T **1**

8. The diagram below shows the end view of a scale model of a garden shed.

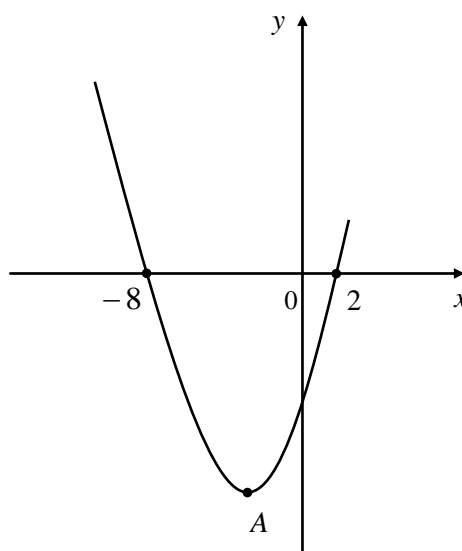Calculate the exact value of x, giving your answer as a surd in its simplest form

4

9. Solve the equation: $x(x-3) = 10$ **4**

10. The diagram below, **which is not drawn to scale**, shows part of the graph of $y = x^2 + 6x + c$

a) Find the value of c **2**

b) Hence find the coordinates of the the point A **3**

11. A TV is reduced in a sale by 20%.

If it costs £480 in the sale how much
did it cost before the sale?

3

12. The following number pattern can be used to find the sum of
consecutive square whole numbers.

$$1^2 + 2^2 = \frac{4 \times 3 \times 5}{12}$$

$$1^2 + 2^2 + 3^2 = \frac{6 \times 4 \times 7}{12}$$

$$1^2 + 2^2 + 3^2 + 4^2 = \frac{8 \times 5 \times 9}{12}$$

$$1^2 + 2^2 + 3^2 + ... + 8^2 = \frac{16 \times 9 \times 17}{12}$$

Write out $1^2 + 2^2 + 3^2 + ... + 12^2$ in the same way **and calculate** the sum of the
first twelve square whole numbers.

4

End of question Paper