St. Peter the Apostle High School

Mathematics Dept.

N5 Practice Prelim Two Paper 2

Duration: 1 Hr 30 Mins   **Marks: 50**

1. Attempt ALL questions.

2. You **MAY** 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. A painting was valued at £40 000 in 2012. The owner plans to sell it in 2015 and hopes that it will be worth at least £50 000.

If the painting increases in value at the rate of 8% per annum, will it be worth at least £50 000 in 2015?

You must show all your working and give a reason for your answer. **3**

2. Write as a single fraction in its simplest form: $\dfrac{4b}{7x} \div \dfrac{b}{x^3}$ **3**

3. A conical container has a capacity of 5 litres and height 18 cm. Calculate its radius. **3**

4. Find the point of intersection of the lines which have equations: $\begin{array}{l} 3x - 4y = 17 \\ 5x - 2y = 19 \end{array}$ **3**

5. **a)** The number of calls made to a call centre in week 1 were as follows:

59   44   55   56   46   50   54

Calculate the mean and standard deviation for week 1. **3**

b) In week 2 the number of calls received at the call centre gave a mean of 75 and a standard deviation of 4·6.

Make two comparisons between the number of calls received at the call centre during week 1 compared to week 2. **2**

6. The diagram below shows a square based pyramid *PQRST*.

Express $\overrightarrow{RP}$ in terms of $\underline{f}$, $\underline{g}$ and $\underline{h}$. **3**

7. The graph in the diagram has equation

$$y = 3x^2 + 2x - 3$$

and cuts the *x*-axis at *A* and *B*.

Find the coordinates of the points *A* and *B* giving your
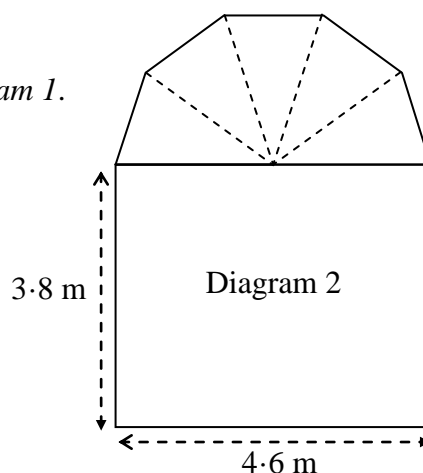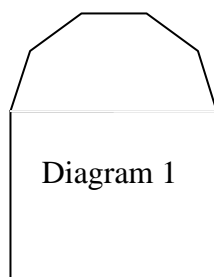answers correct to 1 decimal place.
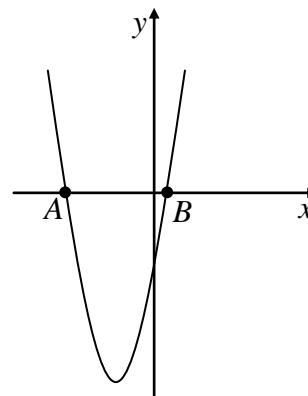
5

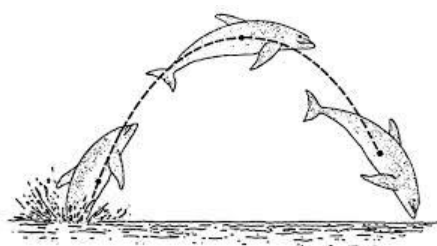**8.** The gable end of a building is shaped as shown in *Diagram 1*.

It consists of a rectangle and
five congruent isosceles
triangles and has dimensions
as shown in *Diagram 2*.
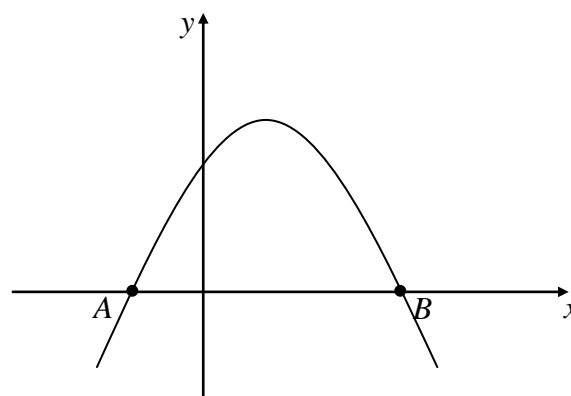
Calculate the area of the gable end.

Diagram 1

Diagram 2

3·8 m

4·6 m

5

9. When a fish 'leaps' from the water
its path is in the shape of a parabola.

The parabola can be represented
by the equation $y = 5 + 4x - x^2$.

This cartesian diagram shows the parabola.

a) If one unit on the graph represents a distance of 20cm,
calculate how far the fish travels horizontally during one 'leap'.

3

b) Does the fish reach a height of 1·75 metres on this leap?
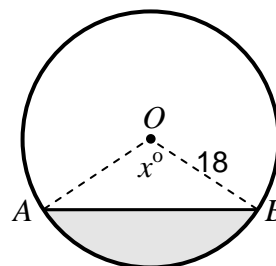You must show all your working to justify your answer.

4

10. The diagram below shows the cross section of a
cylindrical tank with radius 18cm.

There is liquid in the tank and its surface, *AB*,
measures 27cm.

It is thought that angle *AOB* **might be 90°**.

Without using trigonometry, decide whether
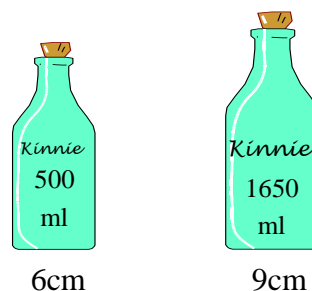or not this is the case.

4

11. The national soft drink of Malta is
called "Kinnie" and it is sold in various
bottle sizes. Two are shown here:

The smaller bottle has a base diameter
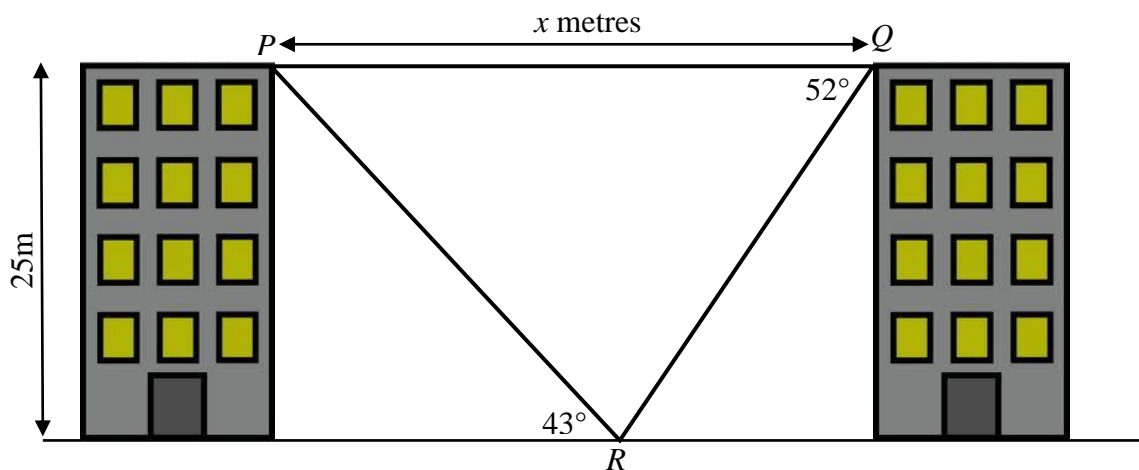of 6cm and holds 500ml.

The larger bottle has a base diameter of
9cm and it holds 1650ml.

The bottles look alike but could they actually be **mathematically** similar?

4

12. The diagram shows 2 blocks of flats of equal height, each **25m** tall.

P and **Q** represent points on the top of the flats and
R represents a point on the ground between them.

From **Q**, the angle of depression is **52°**.
From **R**, the angle of elevation to **P** is **43°**.

Calculate the distance, *x* **metres,** between the 2 flats**.**
Give your answer correct to 2 decimal places

5

End of question Paper