N5

Mαthematics

National 5 Practice Paper I

Paper 1

Duration – 1 hour

Total marks – 40

- You may NOT use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

FORMULAE LIST

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

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

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

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

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

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

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

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.

MARKS | DO NOT WRITE IN THIS MARGIN

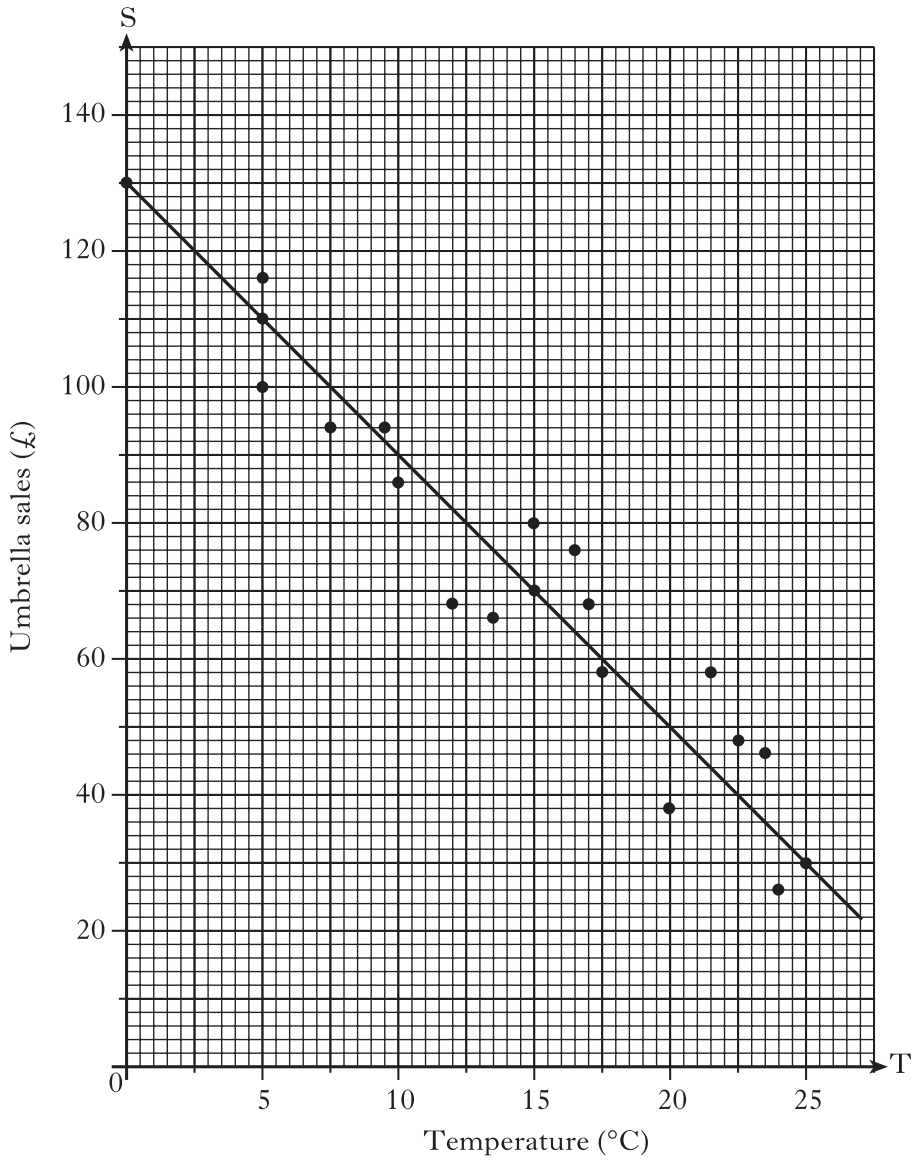
1. Evaluate $2\frac{1}{3}+\frac{5}{6}of1\frac{2}{5}$. 3

2. Solve the inequality $5-x>2(x+1)$. 2

3. Factorise $2p^2-5p-12$. 2

4. The temperature, in degrees Celsius, at mid-day in a seaside town and the sales, in pounds, of umbrellas are shown in the scattergraph below.

A line of best fit has been drawn.

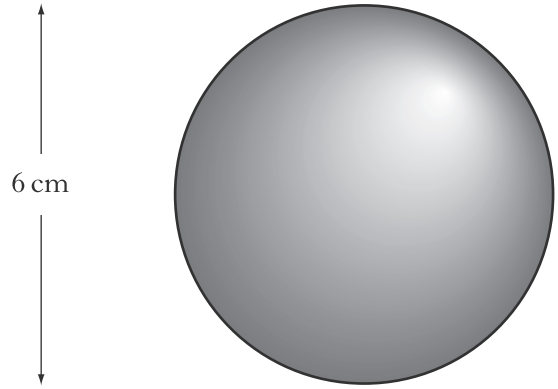


(a) Find the equation of the line of best fit. 3

(b) Use your answer to part (a) to predict the sales for a day when the temperature is 30 degrees Celsius. 1

Total marks 4

5. The diagram below represents a sphere.



The sphere has a diameter of 6 centimetres.

Calculate its volume.

Take $\pi = 3{\cdot}14$. 2

6. Solve algebraically the system of equations

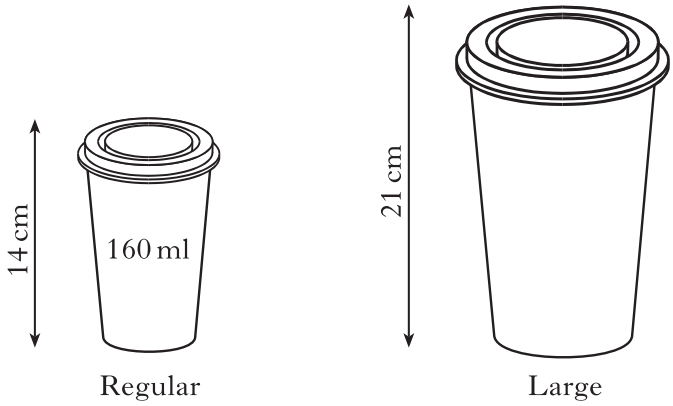
$$2x - 5y = 24$$

$$7x + 8y = 33.$$

3

7. Coffee is sold in regular cups and large cups.

The two cups are mathematically similar in shape.



The regular cup is 14 centimetres high and hold 160 millilitres.

The large cup is 21 centimetres high.

Calculate how many millilitres the large cup holds. 4

8. (a) Show that the standard deviation of 1, 1, 1, 2 and 5 is $\sqrt{3}$. 3

(b) Write down the standard deviation of 101, 101, 101, 102 and 105. 1

Total marks 4

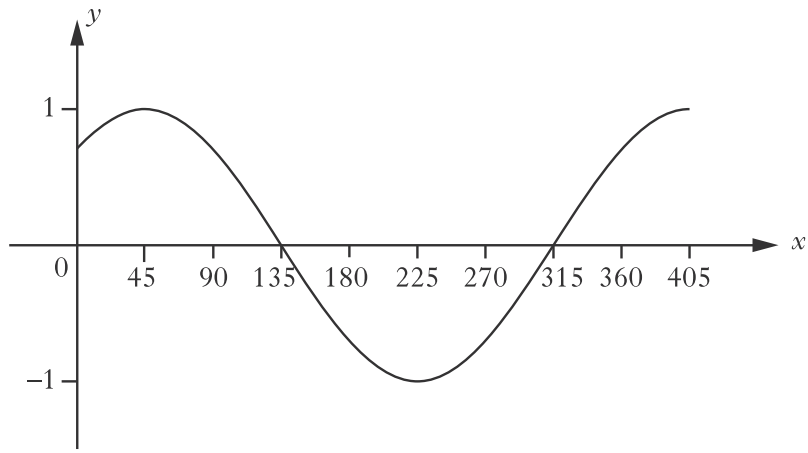
9. Cleano washing powder is on a special offer.

Each box on special offer contains 20% more powder than the standard box.

A box on special offer contains 900 grams of powder.

How many grams of powder does the standard box hold? 3

10. The graph shown below has an equation of the form $y = \cos(x - a)^\circ$.



Write down the value of a. 1

11. Express $\frac{12}{\sqrt{2}}$ with a rational denominator.

Give your answer in its simplest form. 2

12. Each day, Marissa drives 40 kilometres to work.

(a) On Monday, she drives at a speed of x kilometres per hour.

Find the time taken, in terms of x, for her journey. 1

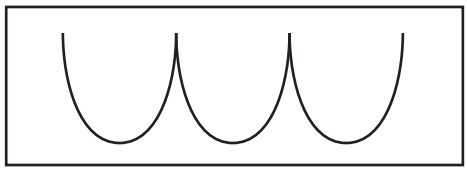
(b) On Tuesday, she drives 5 kilometres per hour faster.

Find the time taken, in terms of x, for this journey. 1

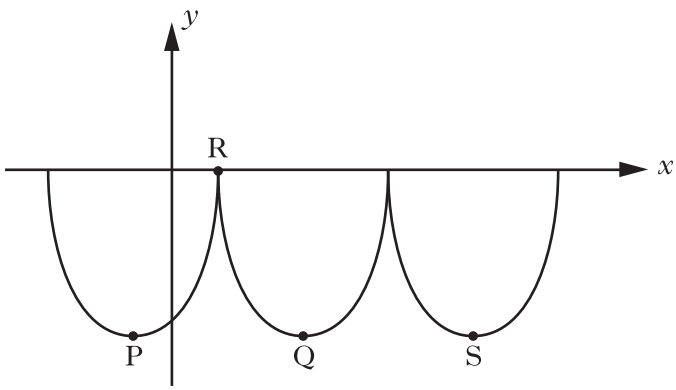
(c) Hence find an expression, in terms of x, for the difference in times of the two journeys. 3

Total marks 5

13. William Watson's fast Foods use a logo based on parts of three identical parabola.



This logo is represented in the diagram below.



The first parabola has turning point P and equation $y=(x+2)^2-16$.

(a) State the coordinates of P. 2

(b) If R is the point (2,0), find the coordinates of Q, the minimum turning point of the second parabola. 1

(c) Find the equation of the parabola with turning point S. 2

Total marks 5

[End of Practice Paper]