



Practice Paper B

Paper 1 – Non Calculator

Total Marks – 50

Attempt ALL questions.

**You may NOT use a calculator.**

Full credit will only be given to solutions which contain appropriate working.

State the units for your answers where appropriate

Write your answers clearly in the space provided in this booklet.

## FORMULAE LIST

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

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

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

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

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

Standard Deviation  $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$

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

1. Evaluate

$$3\frac{3}{5} \div 5\frac{1}{3}$$

2

2. Expand and Simplify fully:

$$4 - 3(2x - 5)^2$$

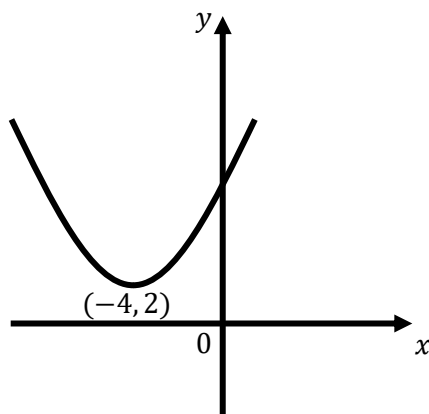
2

3. Solve algebraically:

$$2(3 - 2x) \geq 20$$

3

4. The diagram below shows the graph  $y = (x + p)^2 + q$ .



State the values of  $p$  and  $q$ .

2

5. A function, defined on a suitable domain, is given by

$$f(x) = 3x^2 + 5x + 2.$$

Determine the nature of the roots of this function.

6. Fraser and Christian take their families to a theme park.

Fraser paid for 3 adult and 2 child tickets. The total cost is £173.

(a) Write down an equation to illustrate this information

1

(b) Christian purchases 1 adult and 4 child tickets for a total of £141.

Write down an equation to illustrate this information.

1

(c) Calculate the cost of a ticket for an adult and the cost of a ticket for a child.

4

7. (a) Fully factorise

$$2x^2 - 5x - 3$$

2

(b) Hence, or otherwise, simplify fully

$$\frac{4x^2 - 1}{2x^2 - 5x - 3}$$

2

8. Write the following in its simplest form with a positive index.

$$\frac{6x^5 \times 3x^{-2}}{5x^9}$$

3

9. Sketch the graph of  $y = 3 \cos 2x$  for  $0 \leq x \leq 360^\circ$

3

10. Write  $\frac{12}{\sqrt{5}}$  as a fraction with a rational denominator

2

11. McAnerney Industries profits from the financial year 2018/19 were down 85% from the previous financial year. Given that they made profits of £300, 000 in the year 2018/19, calculate their profits from the previous year.

3



12. Find the components of the resultant vector of  $2u - v$  where  $u = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$  and  $v = \begin{pmatrix} -3 \\ 3 \end{pmatrix}$ .

2

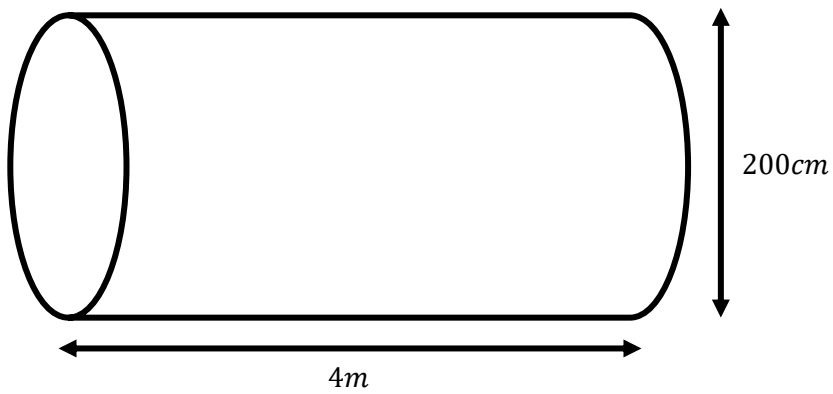
13. Express

$$\frac{5}{x-4} - \frac{6}{x+3}, \quad x \neq 4, x \neq -3$$

As a single fraction in its simplest form.

3

14. A cylindrical tank is filled with water.

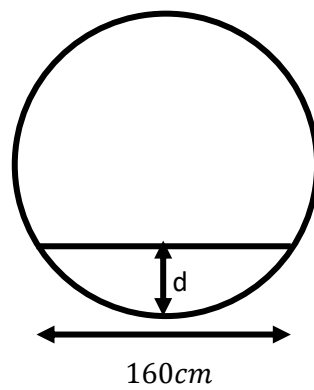


(a) Calculate the volume of the of the cylinder. Give your answer in litres.

Take  $\pi = 3.14$

4

(b) Calculate the depth (d) of the water currently in the tank.



4

15. A parabola has the equation  $y = x^2 - 2x - 15$ .

(a) Find the roots of this parabola

3

(b) State the axis of symmetry

1

(c) Hence, or otherwise, state the turning point of this parabola

1

**END OF PAPER**