C

2500/405

MATHEMATICS
STANDARD GRADE
Credit Level
Paper 1
(Non-calculator)

1 **You may NOT use a calculator.**

2 Answer as many questions as you can.

3 Full credit will be given only where the solution contains appropriate working.

4 Square-ruled paper is provided.

FORMULAE LIST

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 $= \frac{1}{2} ab \sin C$

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. Evaluate

$$7 \cdot 18 - 2 \cdot 1 \times 3.$$

2. Evaluate

$$1\tfrac{1}{8} \div \tfrac{3}{4}.$$

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

4. Given that $f(x) = x^2 + 5x$, evaluate $f(-3)$.

5. (*a*) Factorise $p^2 - 4q^2$.

    (*b*) Hence simplify
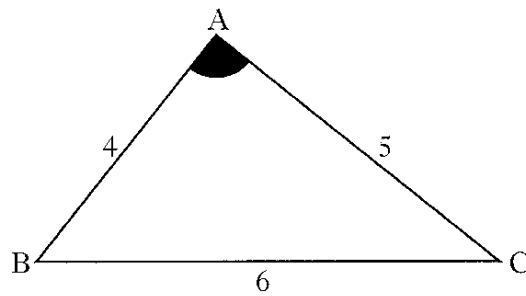
    $$\frac{p^2 - 4q^2}{3p + 6q}.$$

6. $L = \tfrac{1}{2}(h - t)$.

    Change the subject of the formula to h.

[Turn over

7. In triangle ABC,

AB = 4 units
AC = 5 units
BC = 6 units.

Show that $\cos A = \frac{1}{8}$.

8. Fifteen medical centres each **handed out** a questionnaire to fifty patients.
The numbers who replied to each centre are shown below.

11	19	22	25	25
29	31	34	36	38
40	46	49	50	50

Also, they each **posted** the questionnaire to another fifty patients.
The numbers who replied to each centre are shown below.

15	15	21	22	23
25	26	31	33	34
37	39	41	46	46

Draw an appropriate statistical diagram to compare these two sets of data.

9. Two functions are given below.

$$f(x) = x^2 + 2x - 1$$
$$g(x) = 5x + 3$$

Find the values of x for which $f(x) = g(x)$.

10. Simplify
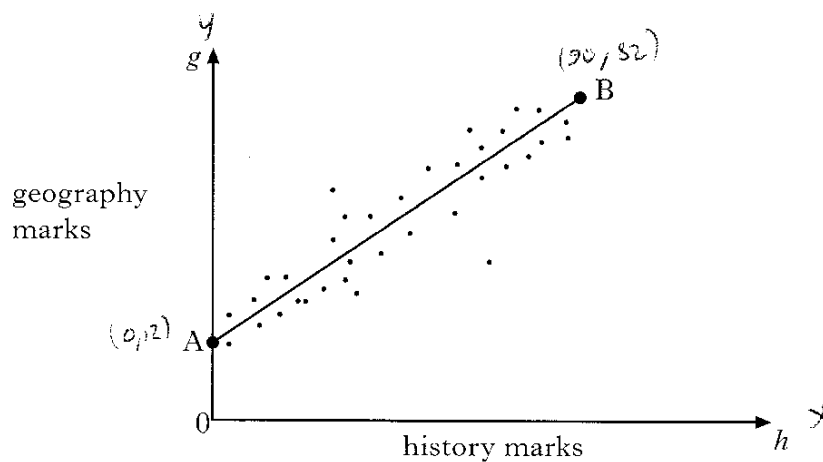
$$\sqrt{27} + 2\sqrt{3}.$$

2

11. Express in its simplest form

$$y^8 \times (y^3)^{-2}.$$

2

12. The graph below shows the relationship between the history and geography marks of a class of students.

A best-fitting straight line, AB has been drawn.

Point A represents 0 marks for history and 12 marks for geography.
Point B represents 90 marks for history and 82 marks for geography.

Find the equation of the straight line AB in terms of h and g.

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[Turn over for Question 13 on *Page six*

13. (*a*) 4 peaches and 3 grapefruit cost £1·30.

Write down an algebraic equation to illustrate this.

(*b*) 2 peaches and 4 grapefruit cost £1·20.

Write down an algebraic equation to illustrate this.

(*c*) Find the cost of 3 peaches and 2 grapefruit.

[END OF QUESTION PAPER]