



Name \_\_\_\_\_

Teacher \_\_\_\_\_

## Mathematics

### Paper 1

#### National 5 **Booster Paper A1**

Duration: 1 hour 15 minutes

**Total Marks - 50**

Attempt **ALL** questions.

**You may NOT use a calculator**

To earn full marks, you must show your working in your answers.

State the units for your answer where appropriate.

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

Use **blue** or **black** ink.

#### Notes:

- This is a **Booster Paper**. Your May exam will be (a bit) harder than this.
- The Booster Papers get **more challenging** as you work through them.
- The final Booster Paper will be as challenging as your May exam.
- The number of marks indicated beside each question is intended as a guide and may differ slightly from SQA marking instructions.
- These original papers are **produced independently of the SQA** and are **free of charge**.
- All Booster Papers papers & answers can be found at [www.maths180.com/BoosterPapers](http://www.maths180.com/BoosterPapers)

## 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.

Total marks - 50

Attempt ALL questions

MARKS

1. Multiply the brackets and simplify

$$(3x - 1)(x^2 - 2x + 3)$$

3

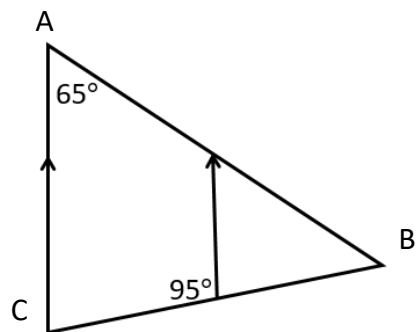
2. Evaluate  $17\frac{2}{3} - 8\frac{2}{5}$  Leave your answer as a mixed number.

3

3. Decrease 840 by 13%

3

4. Calculate the size of angle ABC in the diagram below.



3

5. (a) Factorise  $12x - 18$  1

(b) Factorise  $x^2 - 25$  2

6. Express  $x^2 - 6x + 11$  in the form  $(x - a)^2 + b$  by completing the square. 2

7. Change the subject of the formula to  $k$

$$\sqrt{\frac{k+7}{9}} = y$$

3

8. Fish food is on special offer.  
Each jar on offer contains 30% more than the standard jar.  
A jar on offer contains 390 grams of fish food.



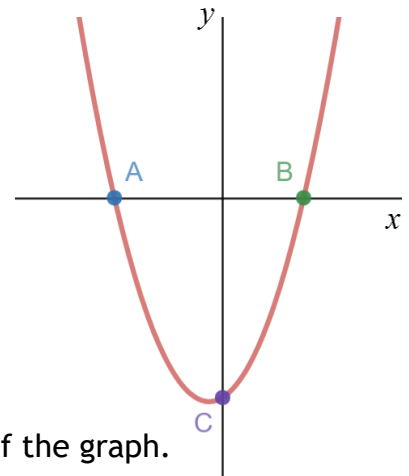
How much does the standard jar contain?

3

9. Simplify  $(2x^5)^3$

2

10. The diagram shows part of the graph of a quadratic function with equation  $y = x^2 + x - 20$ .



(a) Calculate the **coordinates** of A and B, the roots of the graph.

3

(b) Find the **coordinates** of C, the  $y$ -intercept of the graph.

1

11. Point A(-3,7) and point B(1,-3) are joined by a straight line

(a) Determine the gradient of this line. 2

(b) Determine the equation of the line. 2

(c) Give the coordinates of the point where this line crosses the  $y$ -axis. 1



12. (a) Fully simplify  $\sqrt{27} - \sqrt{12}$ .

3

(b) Write  $\frac{15}{\sqrt{3}}$  with a rational denominator in its simplest form.

2

13. At a florist shop, Steve buys 3 roses and 2 tulips for £9.40

(a) Write an equation to represent this information. 1

At the same florist shop, Natalie buys 2 roses and 4 tulips for £8.40

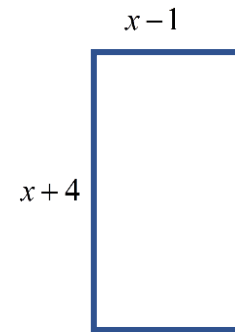
(b) Write an equation to represent this information. 1

(c) Find, algebraically, the cost of 1 rose and the cost of 1 tulip. 3

14. This rectangle has length given by  $x + 4$  and breadth given by  $x - 1$ .

(a) Show that the area can be written as  $x^2 + 3x - 4$ .

2



The actual area of the rectangle measures 6 square centimetres.

(b) Find, algebraically, the value(s) of  $x$ .

4

**End of Booster Paper**