N5

National Qualifications 2015

Mark

X747/75/01

Mathematics Paper 1 (Non-Calculator)

TUESDAY, 19 MAY
9:00 AM – 10:00 AM

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth

Day	Month	Year	Scottish candidate number

Total marks — 40

Attempt ALL questions.

You may NOT use a calculator.

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

State the units for your answer where appropriate.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

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

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

SQA

PB

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: $A = \dfrac{1}{2} ab \sin C$

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: $s = \sqrt{\dfrac{\Sigma(x - \bar{x})^2}{n - 1}} = \sqrt{\dfrac{\Sigma x^2 - (\Sigma x)^2 / n}{n - 1}}$, where n is the sample size.

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

2 (margin)

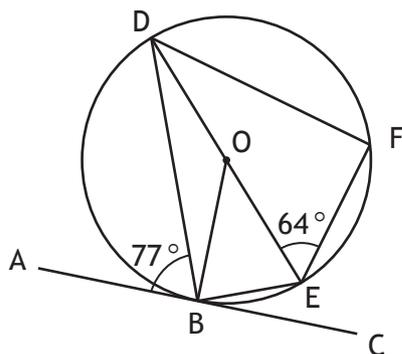**2.** Solve algebraically the inequality

$$11 - 2(1 + 3x) < 39$$

3 (margin)

[Turn over

3.

AC is a tangent to the circle, centre O, with point of contact B.

DE is a diameter of the circle and F is a point on the circumference.

Angle ABD is 77° and angle DEF is 64°.

Calculate the size of angle BDF. **3**

4. Multiply out the brackets and collect like terms

$$(x-4)(x^2+x-2).$$ **3**

5. The standard deviation of 1, 2, 2, 2, 8 is equal to $\sqrt{a}$.

Find the value of a.　　**3**

[Turn over

6. Part of the graph of $y = a \sin bx°$ is shown in the diagram.
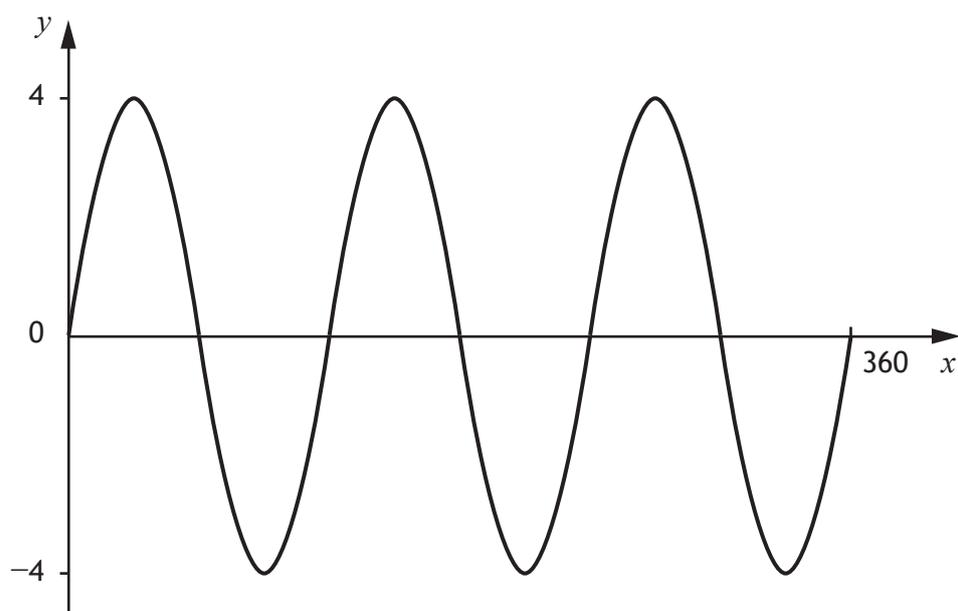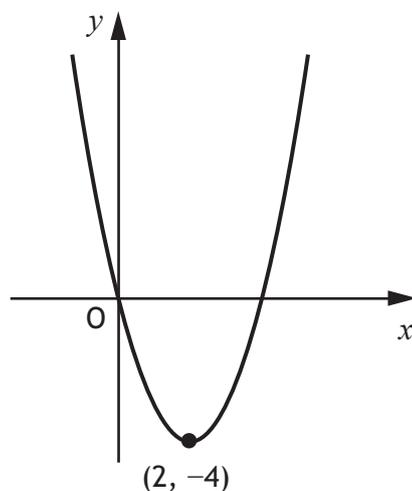
State the values of a and b.   **2**

7. The graph below shows part of the parabola with equation of the form

$$y = (x+a)^2 + b.$$

(2, −4)

The minimum turning point (2, −4) is shown in the diagram.

(a) State the values of

   (i) a 1

   (ii) b.   1

(b) Write down the equation of the axis of symmetry of the graph.   1

[Turn over

8. Find the equation of the line joining the points (−2, 5) and (3, 15).

Give the equation in its simplest form. **3**

9. Write the following in order of size starting with the smallest.

$\cos 90°$ $\qquad$ $\cos 100°$ $\qquad$ $\cos 300°$

Justify your answer. **2**

10. Ten couples took part in a dance competition.

The couples were given a score in each round.

The scores in the first round were

16   27   12   18   26   21   27   22   18   17

(a) Calculate the median and semi-interquartile range of these scores. **3**

(b) In the second round, the median was 26 and the semi-interquartile range was 2·5.

Make two valid comparisons between the scores in the first and second rounds. **2**

[Turn over

11. Solve algebraically the system of equations

$$3x + 2y = 17$$
$$2x + 5y = 4.$$

3

12. Simplify $\dfrac{x^2 - 4x}{x^2 + x - 20}$.

MARKS 3

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[Turn over for Question 13 on *Page twelve*

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Page eleven

13. Express $\dfrac{4}{\sqrt{8}}$ with a rational denominator.

Give your answer in its simplest form. **3**

14. Evaluate $8^{\frac{5}{3}}$. **2**

[END OF QUESTION PAPER]

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