FOR OFFICIAL USE

N5

National Qualifications 2017

Mark

X747/75/01

Mathematics Paper 1 (Non-Calculator)

FRIDAY, 5 MAY

1:00 PM – 2:00 PM

X7477501

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 book to the Invigilator; if you do not, you may lose all the marks for this paper.

SQA ©

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

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: $s = \sqrt{\dfrac{\Sigma(x - \bar{x})^2}{n - 1}}$

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

Total marks — 40

Attempt ALL questions

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

2. The number of calls received by the police was recorded over 10 days. The results are shown below.

198 216 218 230 232 247 248 250 265 267

Find the semi-interquartile range of this data. **2**

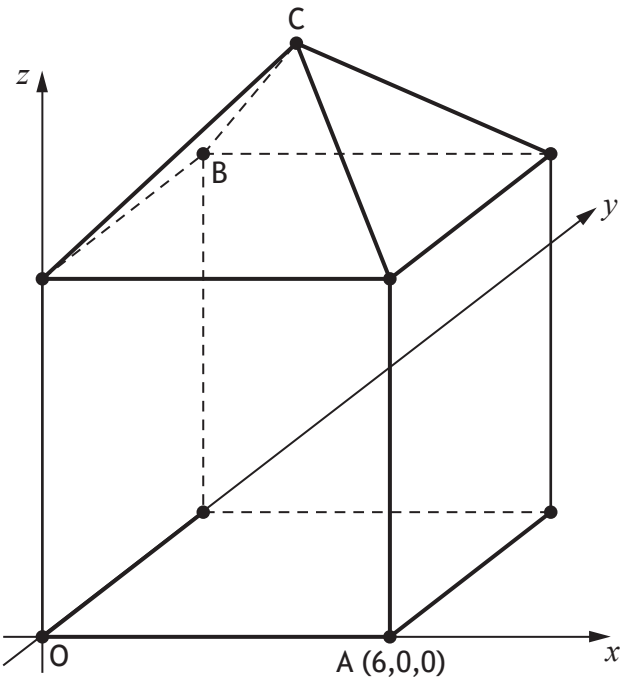
[Turn over

3. Evaluate $1\frac{5}{6} \div \frac{3}{4}$.

Give your answer in its simplest form. **2**

4. Expand and simplify $(2x+3)(x^2-4x+1)$. **3**

5. The diagram shows a square-based pyramid placed on top of a cube, relative to the coordinate axes.



The height of the pyramid is half of the height of the cube.

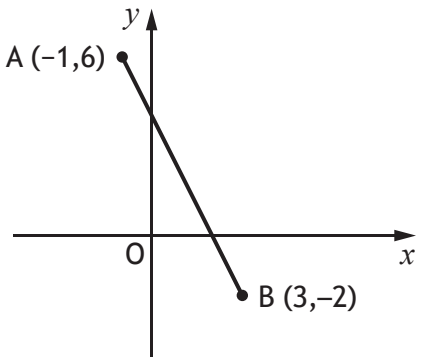
A is the point (6,0,0).

The point C is directly above the centre of the base.

Write down the coordinates of B and C. **2**

[Turn over

6. The diagram below shows the straight line joining points A and B.

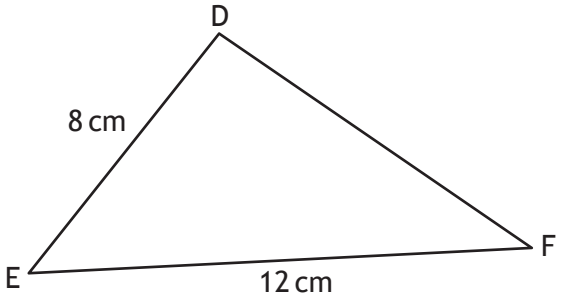


Find the equation of the line AB.

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

7. In triangle DEF:

- DE = 8 centimetres
- EF = 12 centimetres
- $\sin E = \frac{2}{3}$



Calculate the area of triangle DEF. **2**

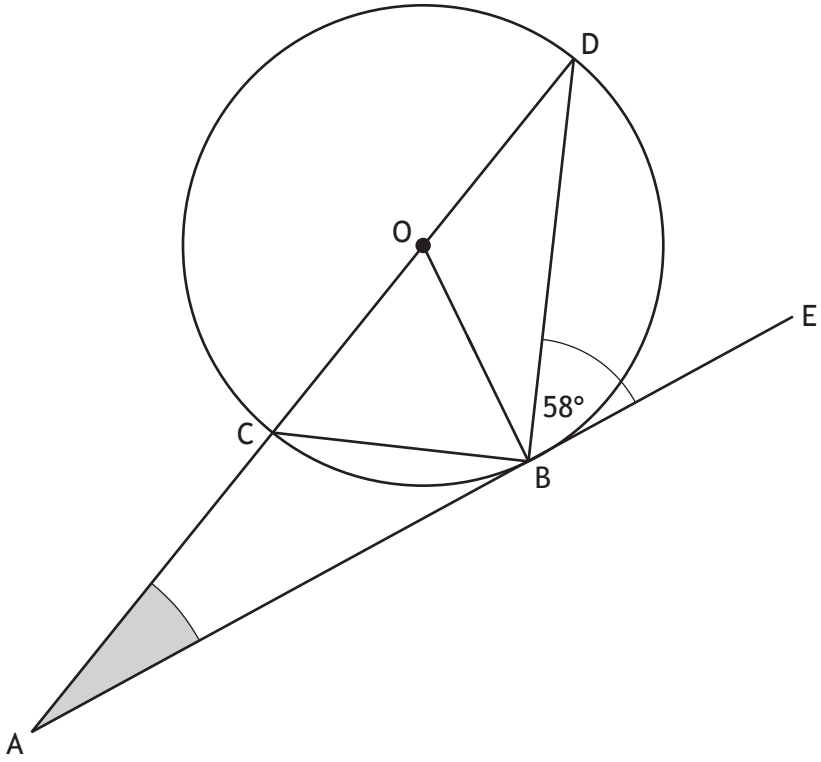
[Turn over

8. Solve, algebraically, the inequality

$$19 + x > 15 + 3(x - 2).$$ **3**

9. In the diagram shown below:

- ABE is a tangent to the circle centre O
- Angle DBE is 58°



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

[Turn over

10. Change the subject of the formula $F = \dfrac{t^2 + 4b}{c}$ to b. **3**

11. Express $\dfrac{3}{a^2} - \dfrac{2}{a}$, $a \neq 0$, as a single fraction in its simplest form. **2**

12. Gym members are asked to fill out a questionnaire to rate the quality of service provided.

They are asked to give a rating on a scale of 1 to 6.

The ratings given by five members were as follows:

1 4 6 3 6

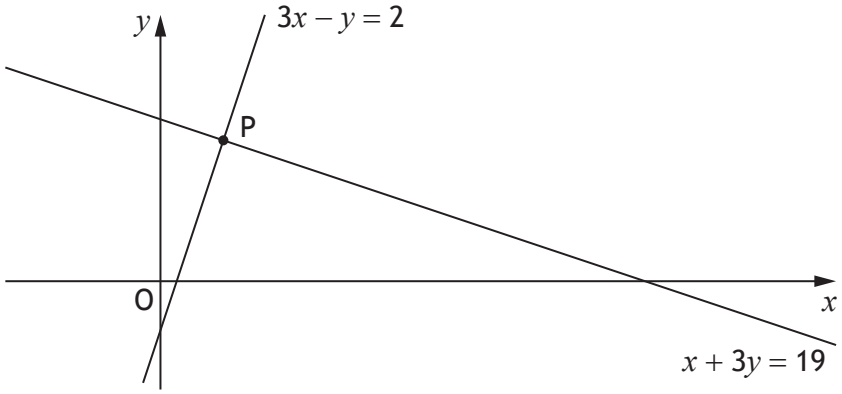
In its simplest form, the standard deviation of these ratings can be written as $\frac{a\sqrt{b}}{2}$.

Find the values of a and b. **4**

[Turn over

13. The graph below shows two straight lines with the equations:

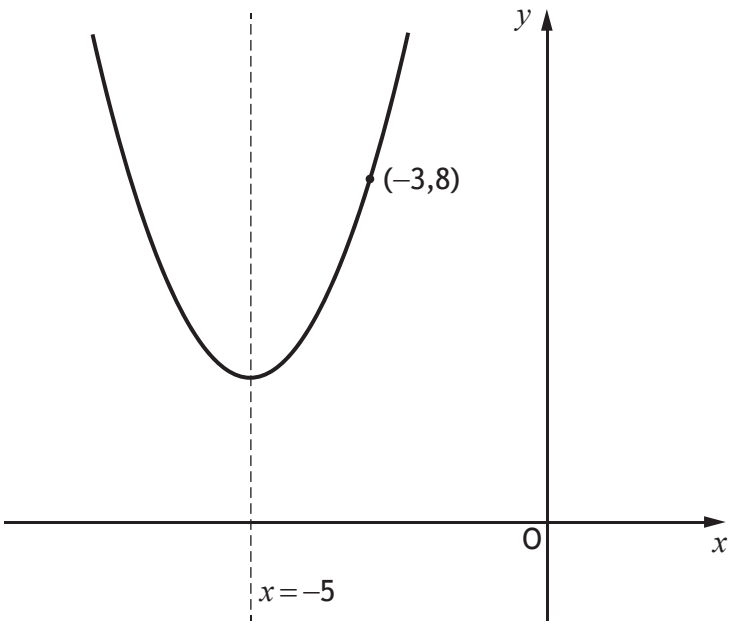
- $3x - y = 2$
- $x + 3y = 19$



The lines intersect at the point P.

Find, **algebraically**, the coordinates of P. **3**

14. The graph below shows a parabola with equation of the form $y = (x + a)^2 + b$.



The equation of the axis of symmetry of the parabola is $x = -5$.

(a) State the value of a. **1**

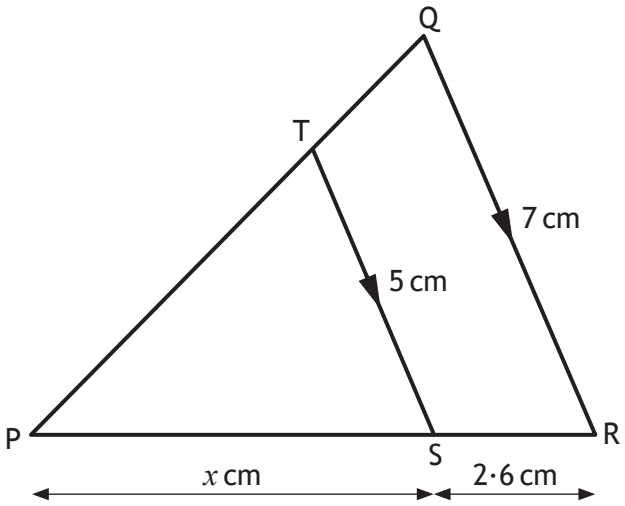
The point (–3,8) lies on the parabola.

(b) Calculate the value of b. **2**

[Turn over for next question

15. In the diagram below:

- TS is parallel to QR
- TS = 5 centimetres
- QR = 7 centimetres
- SR = 2·6 centimetres



The length of PS is x centimetres.

Calculate the value of x. **3**

[END OF QUESTION PAPER]

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

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ADDITIONAL SPACE FOR ANSWERS