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N5

National
Qualifications
SPECIMEN ONLY

Mark

S847/75/01

Mathematics
Paper 1 (Non-calculator)

Date — Not applicable

Duration — 1 hour

S8477501

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 must 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. 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 ©

S8477501 01

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

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. Evaluate $2\frac{1}{3}+\frac{4}{5}$. **2**

2. Find the resultant vector $2\boldsymbol{u}-\boldsymbol{v}$ when $\boldsymbol{u}=\begin{pmatrix}-2\\3\\5\end{pmatrix}$ and $\boldsymbol{v}=\begin{pmatrix}0\\-4\\7\end{pmatrix}$.

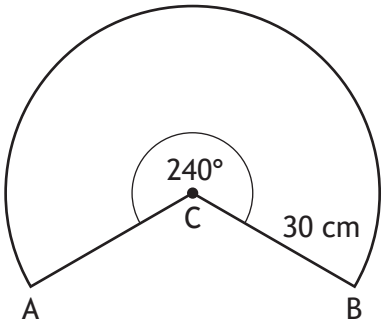
Express your answer in component form. **2**

3. Solve, algebraically, the system of equations

$$4x + 5y = -3$$
$$6x - 2y = 5.$$

3

4. The diagram below shows a sector of a circle, centre C.

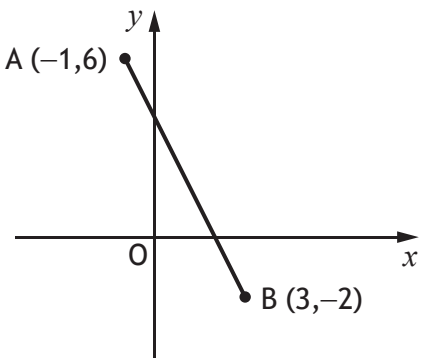


The radius of the circle is 30 centimetres.

Calculate the length of the major arc AB.

Take $\pi = 3.14$. **3**

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



Find the equation of the line AB.

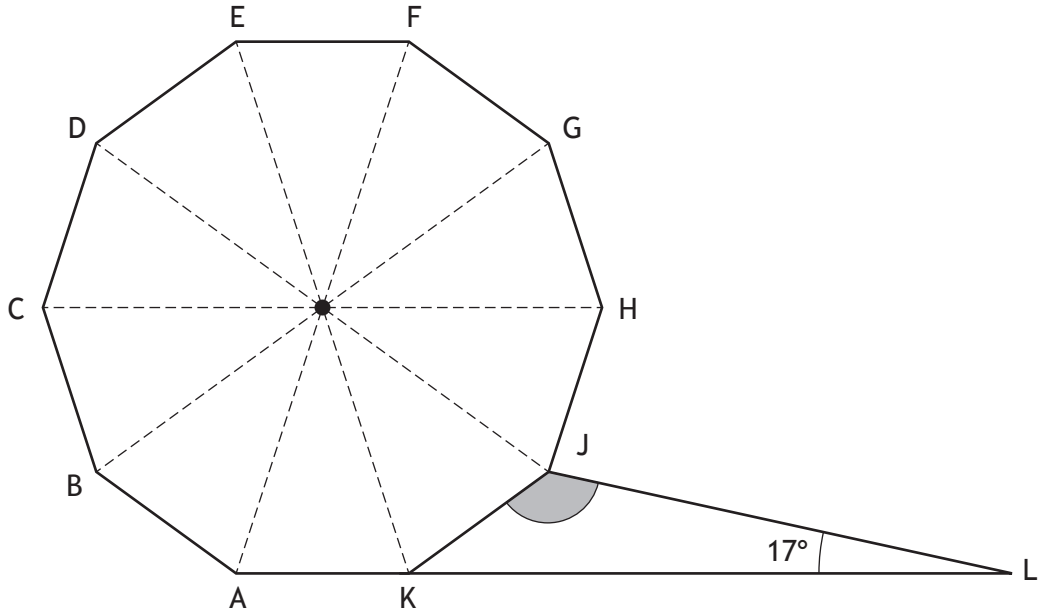
Give the equation in its simplest form. **3**

6. Change the subject of the formula $D = \frac{B+4}{C^2}$ to B. **2**

7. Determine the nature of the roots of the function $f(x) = x^2 + 4x - 7$. **2**

8. In the diagram shown below, ABCDEFGHJK is a regular decagon.

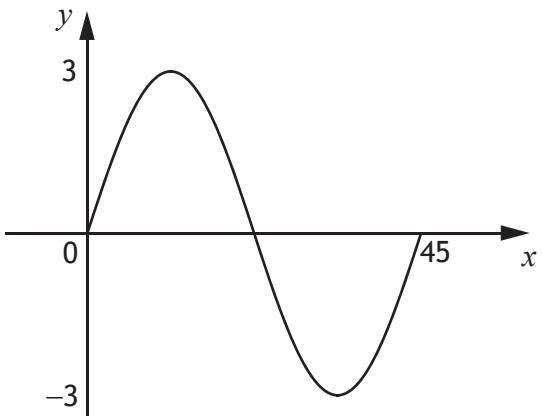
- Angle KLJ is 17°.
- AKL is a straight line.



Calculate the size of shaded angle KJL. **2**

9. Express $\sqrt{50}+\sqrt{45}-\sqrt{2}$ in its simplest form. **3**

10. Part of the graph of $y = a\sin bx^\circ$ is shown in the diagram.



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

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

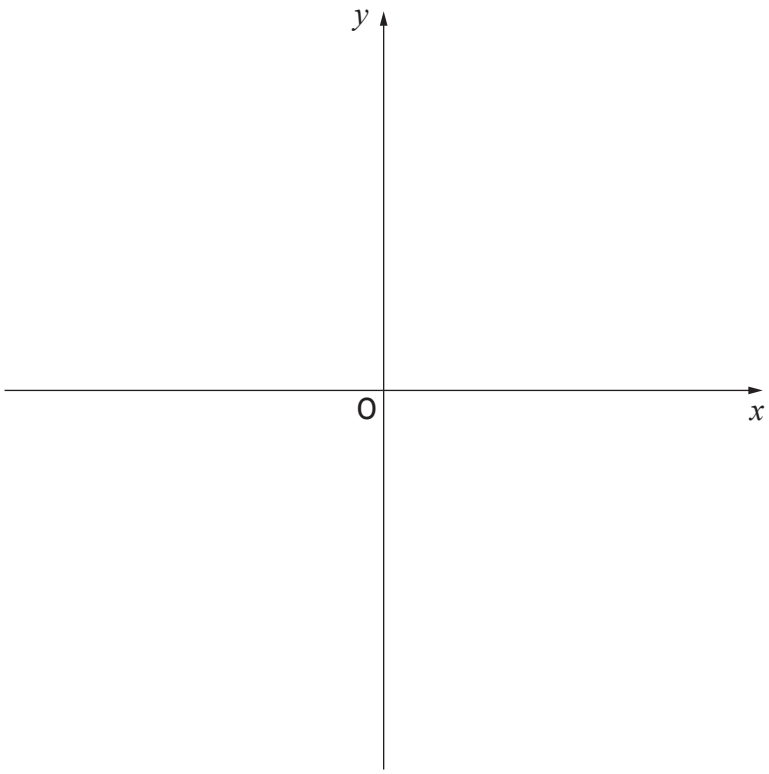
11. Simplify $\left(m^{-2}\right)^4 \times m^{-5}$.

Give your answer with a **positive** power. **3**

12. Sketch the graph of $y = (x-6)(x+4)$.

On your sketch, show clearly the points of intersection with the x-axis and the y-axis, and the coordinates of the turning point. **3**

(Additional axes, if required, can be found on *page 15*.)



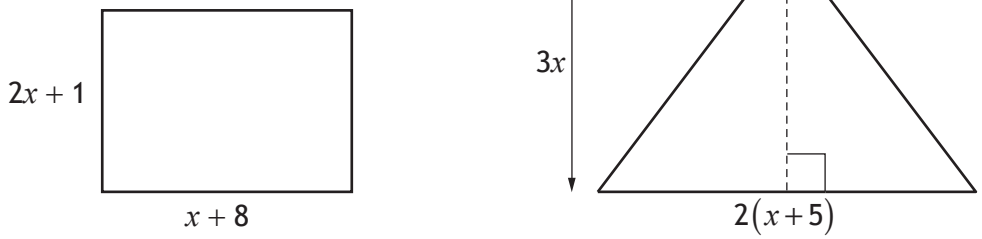
13. Solve the equation

$$\frac{2x}{3} - \frac{5}{6} = 2x.$$

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

14. The diagrams below show a rectangle and a triangle.

All measurements are in centimetres.



(a) Find an expression for the area of the **rectangle**. **1**

(b) Given that the area of the rectangle is equal to the area of the triangle, show that $x^2 - 2x - 8 = 0$. **3**

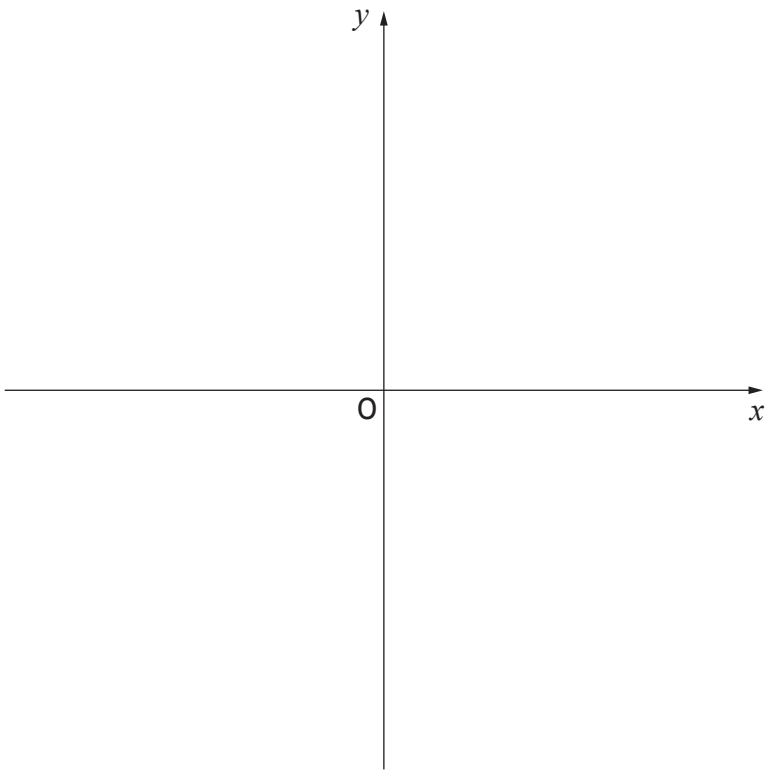
14. (continued)

(c) Hence find, **algebraically**, the length and breadth of the rectangle. **3**

[END OF SPECIMEN QUESTION PAPER]

ADDITIONAL SPACE FOR ANSWERS

Additional axes for use with question 12



MARKS | DO NOT WRITE IN THIS MARGIN

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