N5

Essential Skills

National 5

Mathematics

Practice Exam 2025

Paper 1 (Non-calculator)

Time 1 hour

Total marks – 40

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.

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

Marks available are harsh but I wanted as much course coverage as possible.

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

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

Attempt ALL questions
Total marks – 40

1. Simplify

$$\frac{3}{8}\left(\frac{2}{5}+1\frac{1}{3}\right)$$

3

2. Simplify

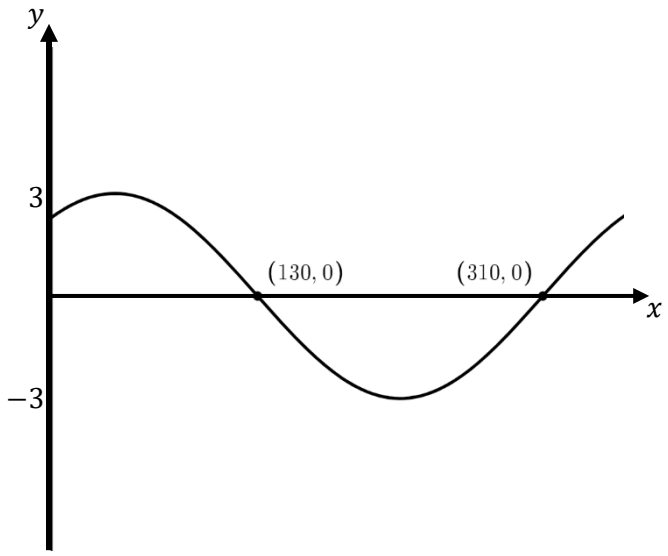
$$3x(2x+3)+(x-5)^2$$

3

3. Express $\frac{6}{\sqrt{8}}$ with a rational denominator.

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

4. The graph of $y = a \sin (x + b)°$ is shown.



State the values of a and b. **2**

5. Express

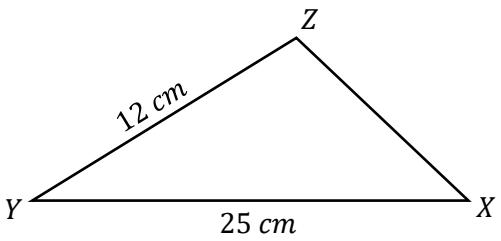
$$\frac{3}{x} - \frac{2}{x^2}, x \neq 0$$

as a fraction in its simplest form. **2**

6. Change the subject of the formula $V = 3p^2q - r$ to q. **2**

7. The area of the triangle shown is 90 cm^2.

Calculate the value of angle $sinXYZ$ as a fraction in its simplest form. **3**



8. A function is defined as $f(x) = x^2 - 1$.

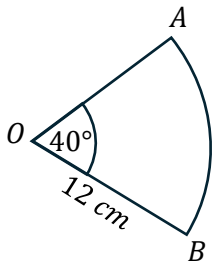
It is known that $f(p) = 15$. Find the value(s) of p. **3**

9. Simplify

$$\frac{2x^{\frac{1}{2}} \times 6x^3}{3x^5}.$$

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

10. Calculate the area of sector AOB, taking π as 3·14. **3**



11. The standard deviation of 11, 14, 15, 7, 13 is $\sqrt{a}$. Calculate the value of a. **4**

12. Two vectors are given by $\boldsymbol{u} = \begin{pmatrix} 1 \\ -3 \\ 2 \end{pmatrix}$ and $2\boldsymbol{u} + \boldsymbol{v} = \begin{pmatrix} 4 \\ -2 \\ -1 \end{pmatrix}$.

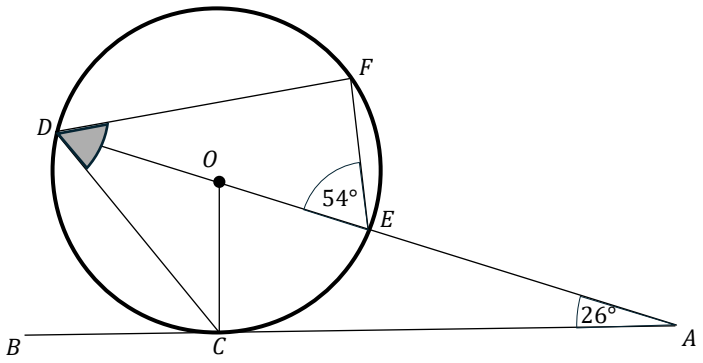
Find vector $\boldsymbol{v}$.

Express your answer in component form. **3**

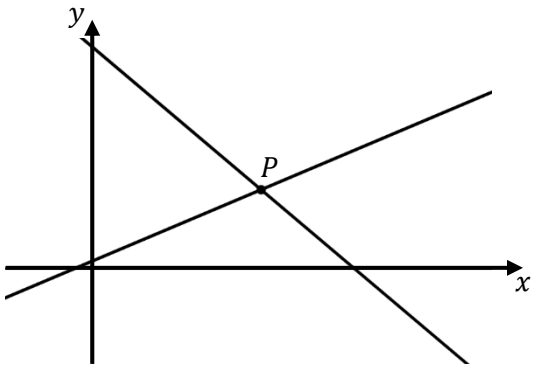
13. In the diagram shown below

- AB is a tangent at C
- DE is a diameter
- Angle CAE is 26°
- Angle DEF is 54°

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



14. The diagram shows the straight lines $2x - 4y = -1$ and $x + y = 7$ intersecting at point P.



Establish the coordinates of point P. **4**

[END OF QUESTION PAPER]