N5

Essential Skills
National 5
Mathematics
Practice Exam 2026

Paper 2 (Calculator)

Time 1 hour 30 minutes

Total marks – 50

Attempt ALL questions.

You may 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 – 50

1. Pauline bought a new campervan costing £44300.

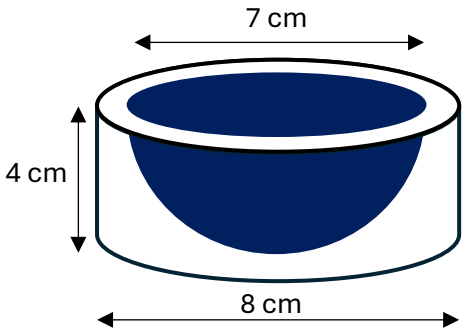
The value will depreciate by 20% in the first year.

Each year thereafter it decreases by 8%.

Calculate the value of the campervan 3 years after being purchased. **3**

Give your answer to 2 significant figures.

2. A paperweight is in the shape of a cylinder with a hemisphere removed.



The cylinder is 4 centimetres in height and has a diameter of 8 centimetres. The hemisphere has a diameter of 7 centimetres.

Calculate the volume of the paperweight.

Give your answer to 2 significant figures. **4**

3. (a) Factorise $4b^2 - 2b$. **1**

(b) Hence simplify $\frac{4b^2-2b}{2b^2+5b-3}$. **2**

4. The mean height of a sample of sunflowers is 13·5 centimetres, with a standard deviation of 3·2 centimetres.

A week later each sunflower is 7 centimetres taller. What effect with this have on the mean and standard deviation? **2**

5. Show that

$$\sin x - \cos x \tan x = 0$$

2

6. Solve the equation $2x^2 - 5x - 4 = 0$.

Give you answer to 2 decimal places. **4**

7. Change the subject of the formula $d = \frac{4f-3}{h^2}$ to f. **3**

8. Scotland fan, Craig Ferguson, is walking from Los Angeles to Boston to raise money for Charity.

He averages 2356 steps per mile.

He plans to walk 30 miles per day for 104 consecutive days.

How many steps will he take in total?

Write your answer in scientific notation to 3 significant figures. **3**

9. James buys a projector for a gazebo party for Scotland's World Cup opener.

2·4 m

3 m

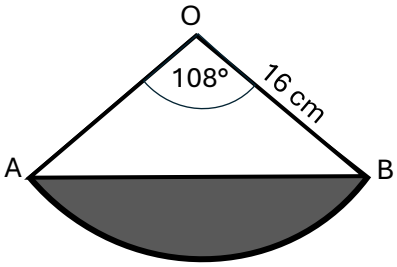
The projector set up with a width of 2·4 metres produces an image that has an area of 3·24 square metres.

James wants the area to be at least 5 square metres so adjusts the projector to a width of 3 metres.

Will this provide his desired area? **3**

10. The diagram shows a sector with centre, O, and radius 16 centimetres. Angle AOB is 108°.

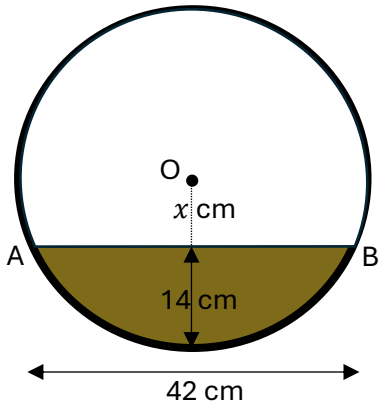
AB splits the sector into triangle OAB and a shaded segment.



Calculate the area of the shaded segment. **4**

11. Solve the equation $5\sin x + 13 = 11$, for $0 \leq x \leq 360$. **3**

12. A cylindrical tank has oil in it as shown.



At its deepest point there is 14 centimetres of oil.

The oil surface, AB, is 42 centimetres.

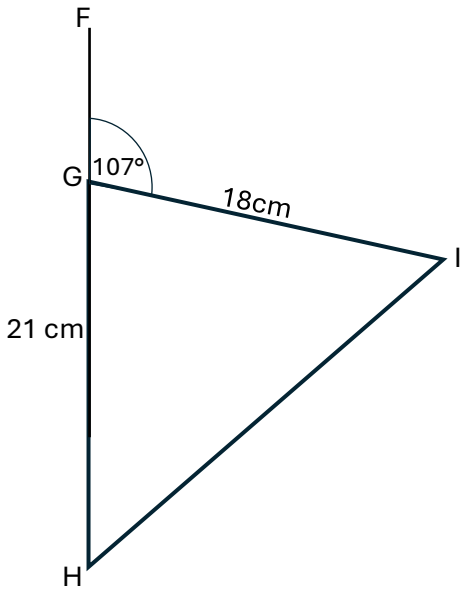
The radius is r centimetres.

(a) Write an expression for x in terms of r. **1**

(b) Calculate the value of r, the radius of the tank. **3**

13. In the diagram.

- Angle FGI = 107º
- GI = 18 centimetres
- GH = 21 centimetres

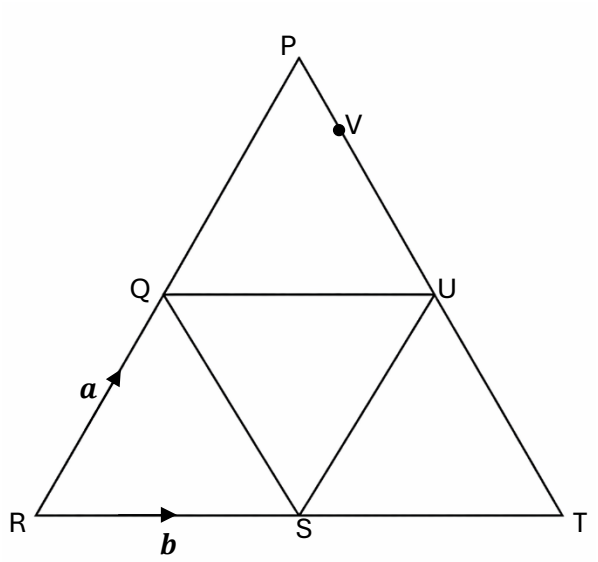


Calculate the length of HI. **4**

14. A diagram is formed with 4 triangles of the same size.

$\overrightarrow{RQ}$ is represented by $\boldsymbol{a}$. $\overrightarrow{RS}$ is represented by $\boldsymbol{b}$.

V splits PU in the ratio 1:3.



(a) Express $\overrightarrow{QS}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$. **1**

(b) Express $\overrightarrow{TV}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$. **2**

Give your answer in its simplest form

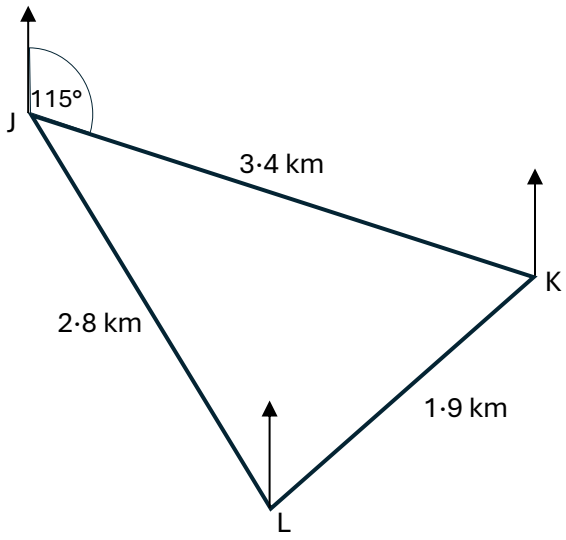
15. The diagram shows 3 checkpoints on a hiking expedition.

K is on a bearing of 115° from J.

JK is 3·4 kilometres.

KL is 1·9 kilometres.

JL is 2·8 kilometres.



Calculate the bearing of L from K. **5**

[END OF QUESTION PAPER]