N5 Mathematics Practice Exam 2023

Mark

Mathematics
Essential Skills (1 hour 30 minutes) Paper 2

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.

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.

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.

MARKS | DO NOT WRITE IN THIS MARGIN

Total marks – 50
Attempt ALL questions

1. Ava can comfortably run 10 kilometres.
She is aiming to run a marathon, which is 42 kilometres, in 5 months time.
If she increases her distance by 35% per month, will she be able to run a full marathon? **4**

2. Artemis 3 will launch for its journey to The Moon in November 2023.
It will travel at an average speed of $5{\cdot}4 \times 10^2$ km/h.
The distance to The Moon is $3{\cdot}84 \times 10^5$ kilometres.
How many **days** will the journey take? **3**

3. Change the subject of the formula $h = \frac{b^2 - a}{t}$ to b. **2**

4. A train from Motherwell to London has 315 seat which are either first-class or standard.

Let x be first class and y be standard class.

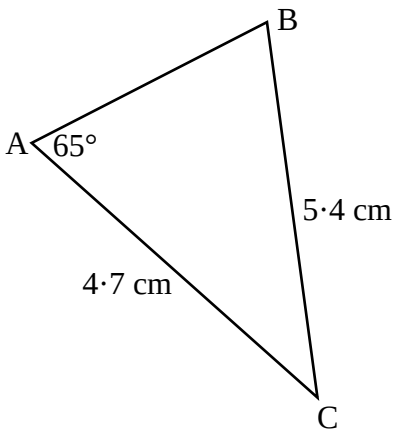
(a) Write an equation to illustrate this information. **1**

(b) A first-class ticket costs £165 and a standard ticket costs £87.
On a fully booked train the total sales are £30525.
Write an equation to illustrate this information. **1**

(c) Calculate how many of each type of seat there are on the train. **4**

5. In the triangle ABC

- AC is 4·7 centimetres
- BC is 5·4 centimetres
- Angle BAC = 65°



(a) Calculate the size of the angle ABC. **3**

(b) Hence, calculate the area of the triangle ABC. **2**

MARKS | DO NOT WRITE IN THIS MARGIN

6. (a) Factorise $5x^2 - 45$. **2**

(b) Hence, simplify $\frac{5x^2-45}{4x-12}$. **2**

7. Solve the equation $5\tan x° + 4 = 7,\ 0 \leq x < 360.$ **3**

8. The monthly rainfall, in millimetres, in Airdrie is shown:

77 87 81 81 62 57 48 50 56 66 73 72

Calculate the median and interquartile range of the rainfall. **3**

9. Expand and simplify

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

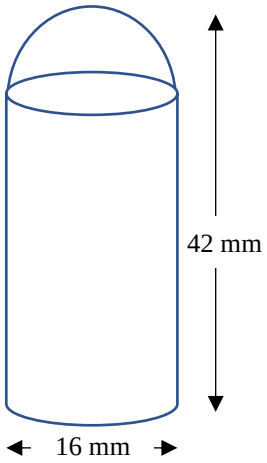
10. Solve the equation $3x^2 - 3x - 1 = 0$.

Give your answers correct to 1 decimal place **4**

11. A toy Nerf gun bullet is the shape of a cylinder with a hemisphere on top.

The bullet has

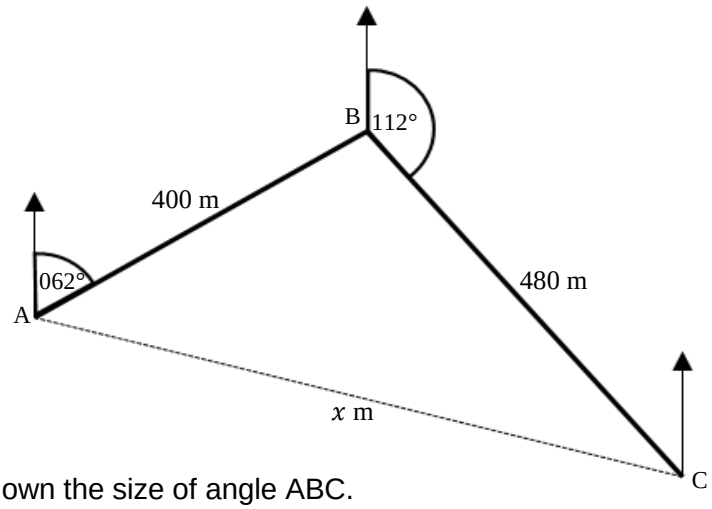
- Diameter 16 millimetres
- Height 42 millimetres



Calculate the volume of the bullet.
Give your answer to 2 significant figures. **5**

12. The diagram shows the flight path of a drone.

It flies from point A on a bearing of 062° for 400 metres to point B. It then flies 480 metres on a bearing of 112° to point C.

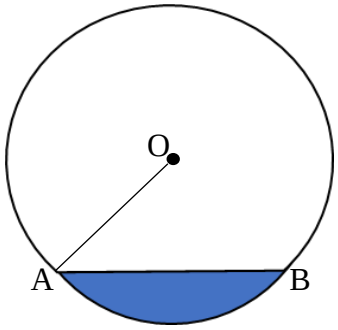


(a) Write down the size of angle ABC. **1**

(b) Calculate the distance C to A **3**

13. The diagram shows the circular cross section of a canal tunnel will water flowing through.

- O represents the centre of the circle
- AB is the surface of the water
- AB is 5 metres
- Radius OA is 4m



Calculate the depth of water in the tunnel. **4**

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