N5

Mαthematics

National 5 Practice Paper A

Paper 2

Duration – 1 hour and 30 minutes

Total marks – 50

- You may use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

1. The population of a city is increasing at a steady rate of 2.4% per annum.
The current population is 528 000.

What is the expected population in 4 years?

Give your answer to the nearest thousand. 3

2. Two groups of 6 students are given the same test.

(a) The marks of Group A are:

73 47 59 71 48 62.

Use an appropriate formula to calculate the mean and the standard deviation.

Show clearly all your working. 4

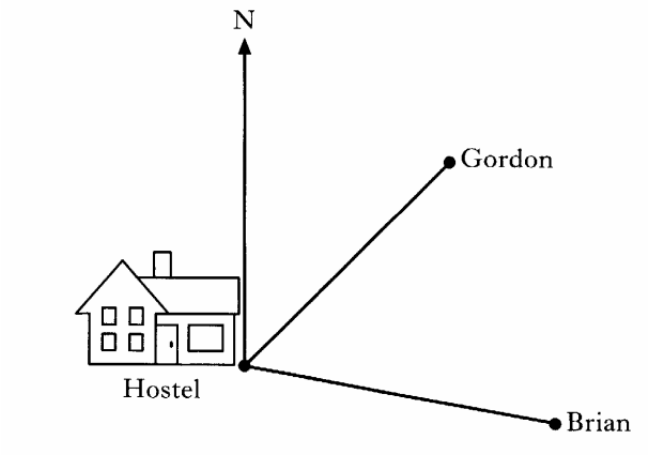
(b) In Group B, the mean is 60 and the standard deviation is 29.8.

Compare the results of the two groups. 2

3. Multiply out the brackets and collect like terms.

$(x + 4)(2x^2 + 3x - 1)$ 3

4. Gordon and Brian leave a hostel at the same time.
Gordon walks on a bearing of 045° at a speed of 4.4 kilometres per hour.
Brian walks on a bearing of 100° at a speed of 4.8 kilometres per hour.

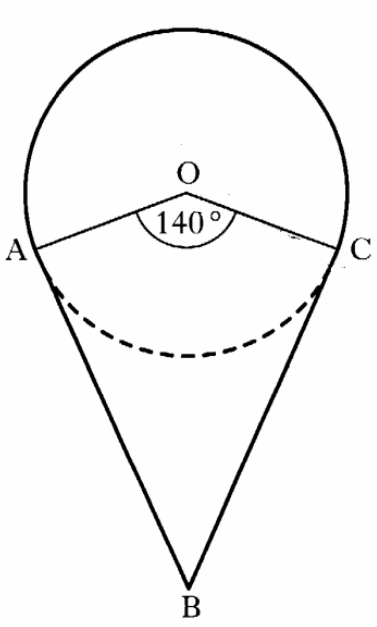


If they both walk at stead speeds, how far apart will they be after 2 hours? 5

5. The diagram shows a mirror which has been designed for a new hotel.

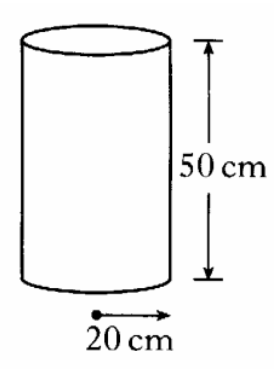
The shape consists of a sector of a circle and a kite AOCB.

- The circle, centre O, has a radius of 50 centimetres.
- Angle AOC = 140°
- AB and CB are tangents to the circle at A and C respectively.



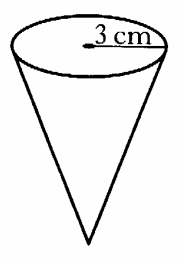
Find the perimeter of the mirror. 5

6. A drinks container is in the shape of a cylinder with radius 20 centimetres and height 50 centimetres.



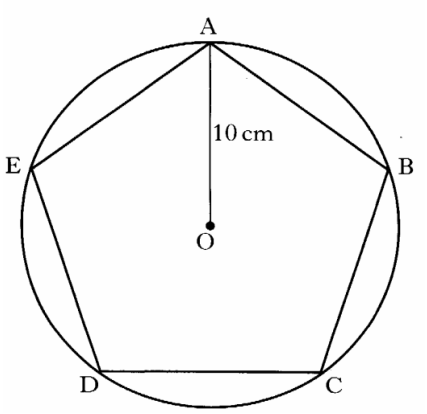
(a) Calculate the volume of the drinks container.
Give your answer in cubic centimetres, correct to two significant figures. 3

(b) Liquid from the full container can fill 800 cups, in the shape of cones, each of radius 3 centimetres.



What will be the height of liquid in each cup? 4

7.



A regular pentagon $ABCDE$ is drawn in a circle, centre O, with radius 10 centimetres.

Calculate the area of the regular pentagon. 5

8. (a) Express $a^2\left(2a^{-\frac{1}{2}}+a\right)$ in its simplest form. 2

(b) Use an appropriate formula to solve the quadratic equation

$$3x^2+3x-7=0.$$

Give your answers correct to 1 decimal place. 4

9. (a) Solve the equation

$$4\tan x°+5=0, \qquad 0\leq x\leq 360.$$ 3

(b) Show that

$$\tan x\cos x=\sin x.$$ 2

10. A rectangular wall vent is 30 centimetres long and 10 centimetres wide.

It is to be enlarged by increasing both the length and the width by x centimetres.

(a) Show that the area, A square centimetres, of the new vent is given by

$$A = x^2 + 40x + 300.$$

The area of the new vent must be at least 75% more than the original area.

(b) Find the minimum dimensions of the new vent. 5

[End of question paper]