



# Mathematics

## 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.

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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.

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

Compare the results of the two groups.

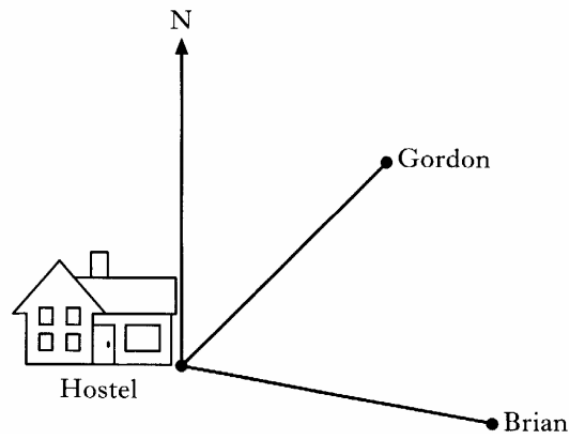
2

3. Multiply out the brackets and collect like terms.

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

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



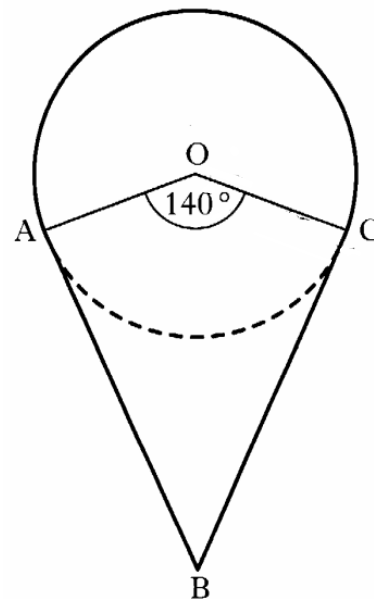
If they both walk at steady speeds, how far apart will they be after 2 hours?

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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 =  $140^\circ$
- AB and CB are tangents to the circle at A and C respectively.

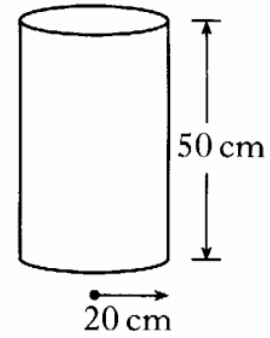


Find the perimeter of the mirror.

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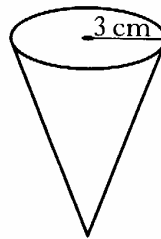
6. A drinks container is in the shape of a cylinder with radius 20 centimetres and height 50 centimetres.

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



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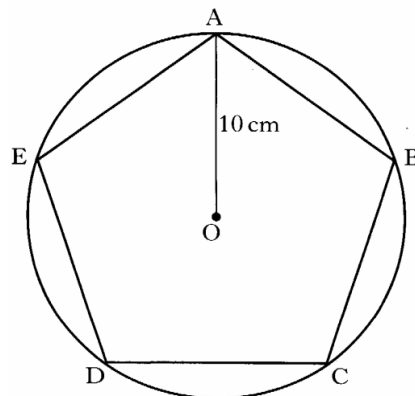
- (b) Liquid from the full container can fill 800 cups, in the shape of cones, each of radius 3 centimetres.



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.

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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

$$4 \tan x^\circ + 5 = 0, \quad 0 \leq x \leq 360. \quad 3$$

(b) Show that

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

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.

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**[End of question paper]**