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0580/22

October/November 2019

1 hour 30 minutes

Additional Materials: Electronic calculator Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

For π , use either your calculator value or 3.142.

The total of the marks for this paper is 70.

This document consists of **11** printed pages and **1** blank page.

- 1 The lowest temperature recorded at Scott Base in Antarctica is -57.0°C .
The highest temperature recorded at Scott Base is 63.8°C more than this.

What is the highest temperature recorded at Scott Base?

..... $^{\circ}\text{C}$ [1]

- 2 Calculate.

$$\frac{5}{8} + \sqrt[3]{340}$$

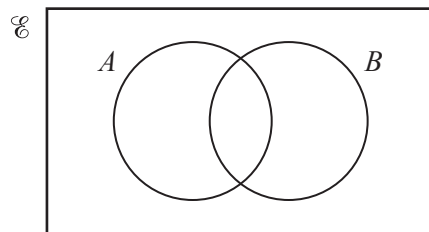
..... [1]

- 3 Expand.

$$a(a^3 + 3)$$

..... [1]

- 4 On the Venn diagram, shade the region $(A \cap B)'$.



[1]

- 5 The mass, correct to the nearest kilogram, of each of 11 parcels is shown below.

24 23 23 26 25 27 18 96 16 17 32

- (a) Find the mode.

..... kg [1]

- (b) Give a reason why the mean would be an unsuitable average to use.

..... [1]

- 6 The table shows how children in Ivan's class travel to school.

Travel to school	Number of children
Walk	12
Car	7
Bicycle	9
Bus	4

Ivan wants to draw a pie chart to show this information.

Find the sector angle for children who walk to school.

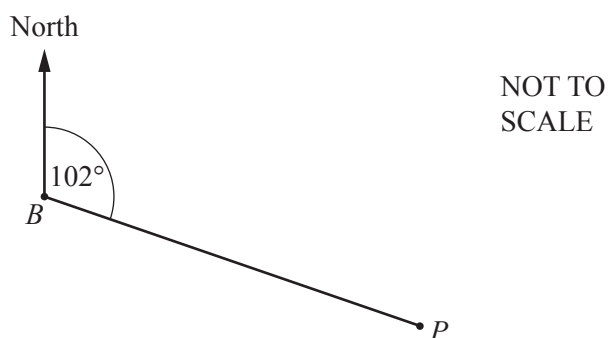
..... [2]

- 7 Rashid changes 30 000 rupees to dollars when the exchange rate is $\$1 = 68.14$ rupees.

How many dollars does he receive?

\$ [2]

8



The bearing of P from B is 102° .

Find the bearing of B from P .

..... [2]

- 9 Solve the inequality.

$$\frac{x}{2} - 13 > 12 + 3x$$

..... [2]

- 10 Write the recurring decimal $0.6\dot{7}$ as a fraction.
Show all your working and give your answer in its simplest form.

..... [2]

- 11 **Without using a calculator**, work out $3\frac{5}{8} - 1\frac{2}{3}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

- 12 A regular polygon has an interior angle of 176° .
Find the number of sides of this polygon.

..... [3]

- 13** Two mathematically similar containers have heights of 30 cm and 75 cm.
The larger container has a capacity of 5.5 litres.

Calculate the capacity of the smaller container.
Give your answer in millilitres.

..... ml [3]

- 14** Show that the line $4y = 5x - 10$ is perpendicular to the line $5y + 4x = 35$.

[3]

- 15** Esme buys x magazines at \$2.45 each and y cards at \$3.15 each.

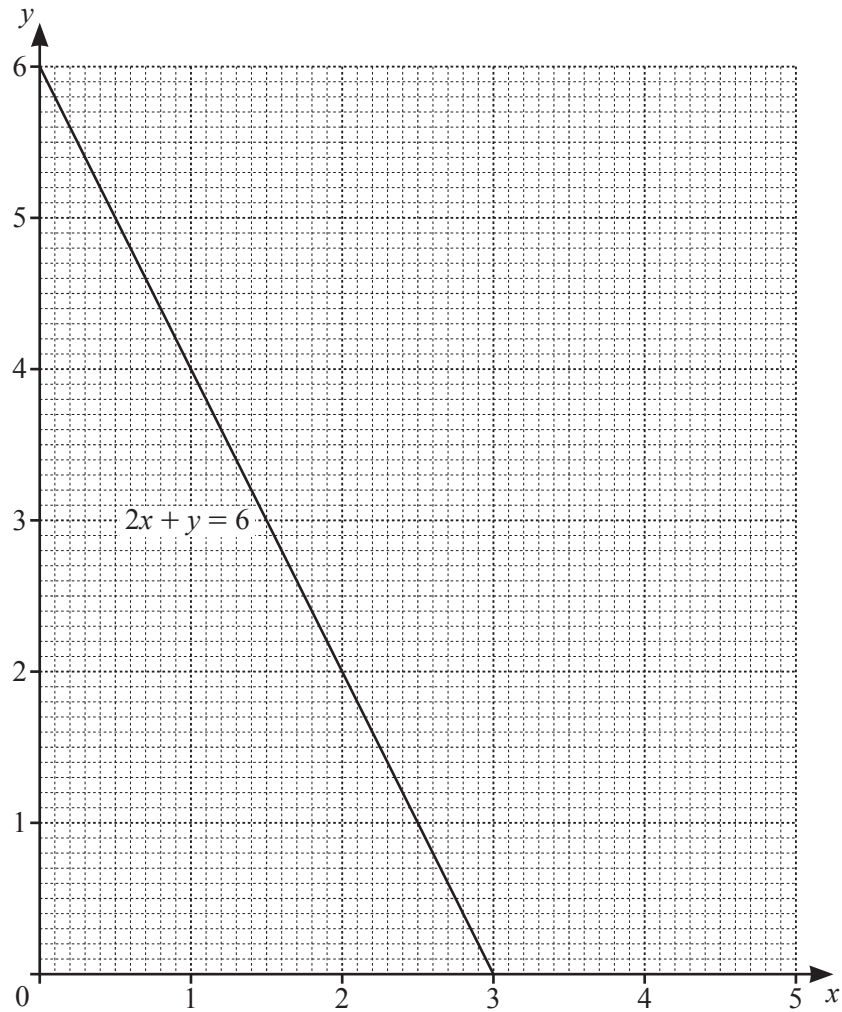
- (a) Write down an expression, in terms of x and y , for the total cost, in dollars, of the magazines and the cards.

\$ [2]

- (b) Esme spends \$60.55 in total.
She buys 8 magazines.

How many cards does she buy?

..... [2]



By shading the **unwanted** regions of the grid, find and label the region R that satisfies the following inequalities.

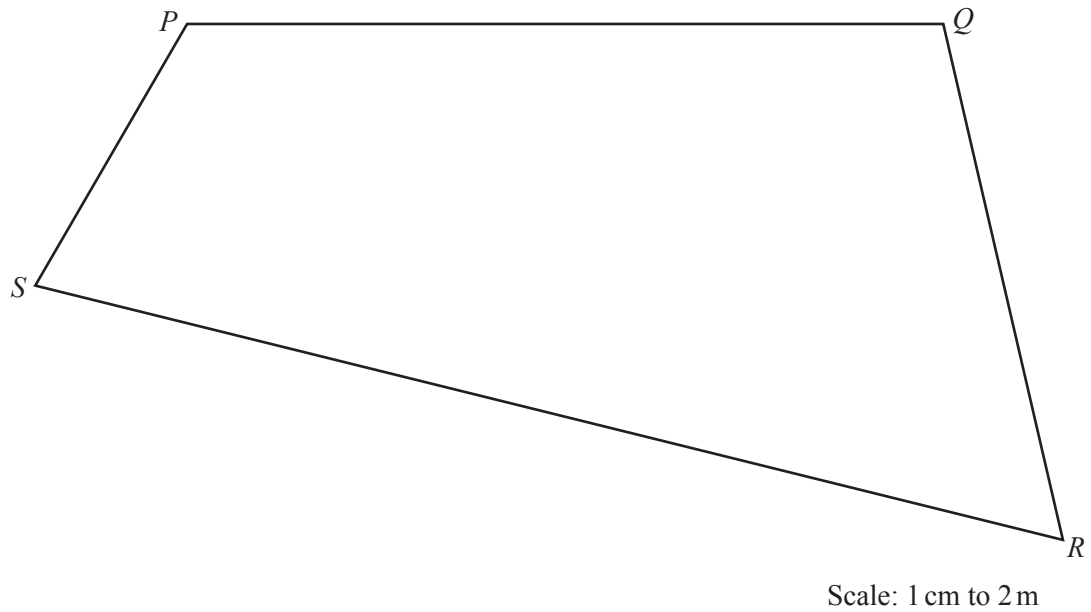
$$y \leq 5$$

$$2x + y \geq 6$$

$$y \geq x + 1$$

[4]

- 17 The diagram shows a scale drawing of Lei's garden, $PQRS$.
The scale is 1 centimetre represents 2 metres.



Lei has a bird table in the garden that is

- equidistant from PQ and QR
- and
- 13 m from R .

On the diagram, construct the position of the bird table.

Use a ruler and compasses only and show all your construction arcs.

[4]

- 18 Harris is taking a driving test.

The probability that he passes the driving test at the first attempt is 0.6 .
If he fails, the probability that he passes at any further attempt is 0.75 .

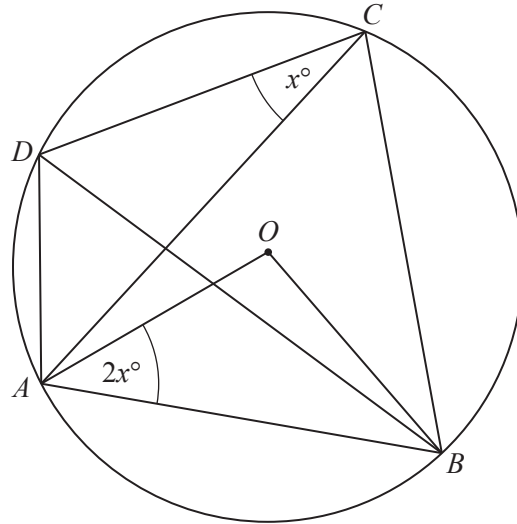
Calculate the probability that Harris

- (a) passes the driving test at the second attempt,

..... [2]

- (b) takes no more than three attempts to pass the driving test.

..... [2]



NOT TO
SCALE

In the diagram, A , B , C and D lie on the circumference of a circle, centre O .
Angle $ACD = x^\circ$ and angle $AOB = 2x^\circ$.

Find an expression, in terms of x , in its simplest form for

(a) angle AOB ,

Angle $AOB = \dots\dots\dots$ [1]

(b) angle ACB ,

Angle $ACB = \dots\dots\dots$ [1]

(c) angle DAB .

Angle $DAB = \dots\dots\dots$ [2]

20 (a) Factorise.

$$18y - 3ay + 12x - 2ax$$

..... [2]

(b) Factorise.

$$3x^2 - 48y^2$$

..... [3]

21 (a) $3^{-2} \times 3^x = 81$

Find the value of x .

$x =$ [2]

(b) $x^{-\frac{1}{3}} = 32x^{-2}$

Find the value of x .

$x =$ [3]

22

$$\mathbf{A} = \begin{pmatrix} 3 & 2 \\ -5 & 0 \end{pmatrix}$$

$$\mathbf{B} = \begin{pmatrix} -2 & 5 \\ 4 & 1 \end{pmatrix}$$

$$\mathbf{C} = (-1 \ k)$$

(a) Find $\mathbf{AB}$.

$$\begin{pmatrix} & \\ & \end{pmatrix} \quad [2]$$

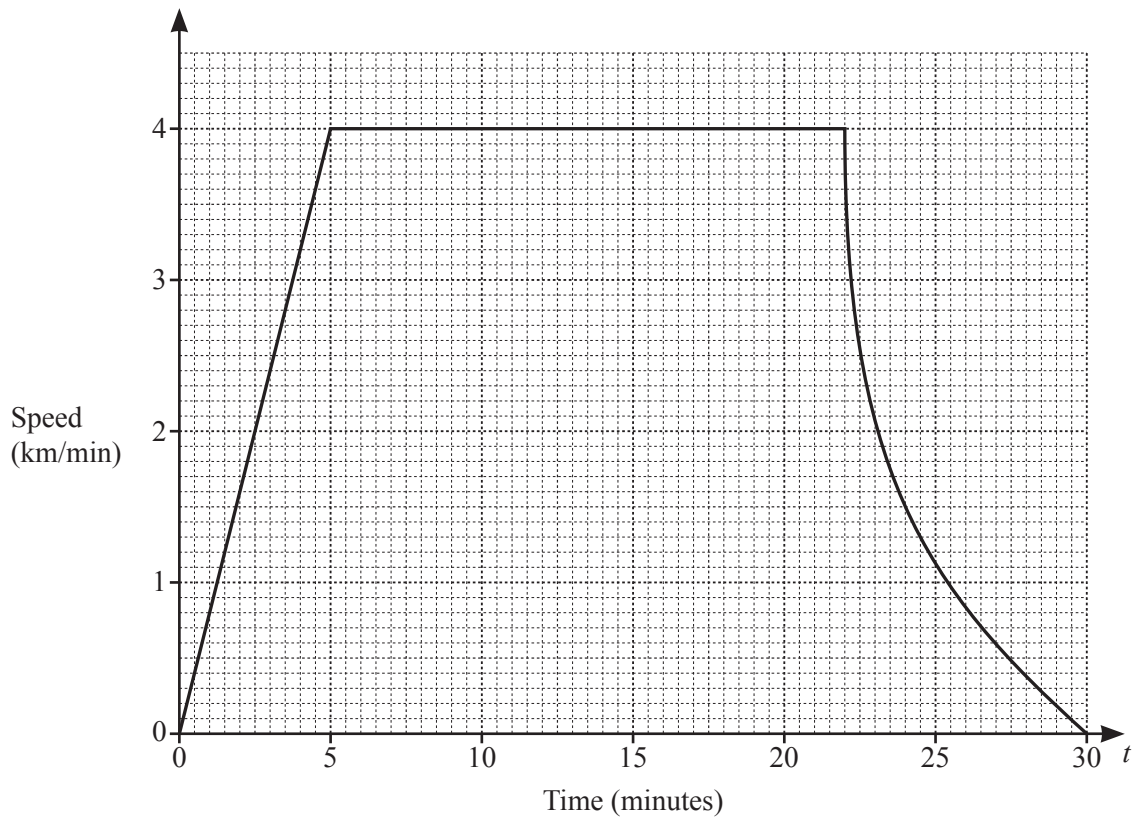
(b) $\mathbf{CA} = (-13 \ -2)$ Find the value of k .

$$k = \dots\dots\dots [2]$$

(c) Find $\mathbf{A}^{-1}$.

$$\begin{pmatrix} & \\ & \end{pmatrix} \quad [2]$$

23



The speed–time graph shows information about a train journey.

- (a) By drawing a suitable tangent to the graph, estimate the gradient of the curve at $t = 24$.

..... [3]

- (b) What does this gradient represent?

..... [1]

- (c) Work out the distance travelled by the train when it is travelling at constant speed.

..... km [2]

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