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0580/31

May/June 2016

2 hours

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 104.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

1 Joel spins a fair five-sided spinner numbered 2, 3, 4, 5 and 6.

(a) Write down the probability that the spinner lands on

(i) an odd number,

..... [1]

(ii) a prime number,

..... [1]

(iii) the number 7.

..... [1]

(b) Here are the results of his first 20 spins.

Number	2	3	4	5	6
Frequency	3	2	6	4	5

(i) Write down the mode.

..... [1]

(ii) Calculate the mean.

..... [3]

(iii) Joel wants to draw a pie chart to show the results in the table.

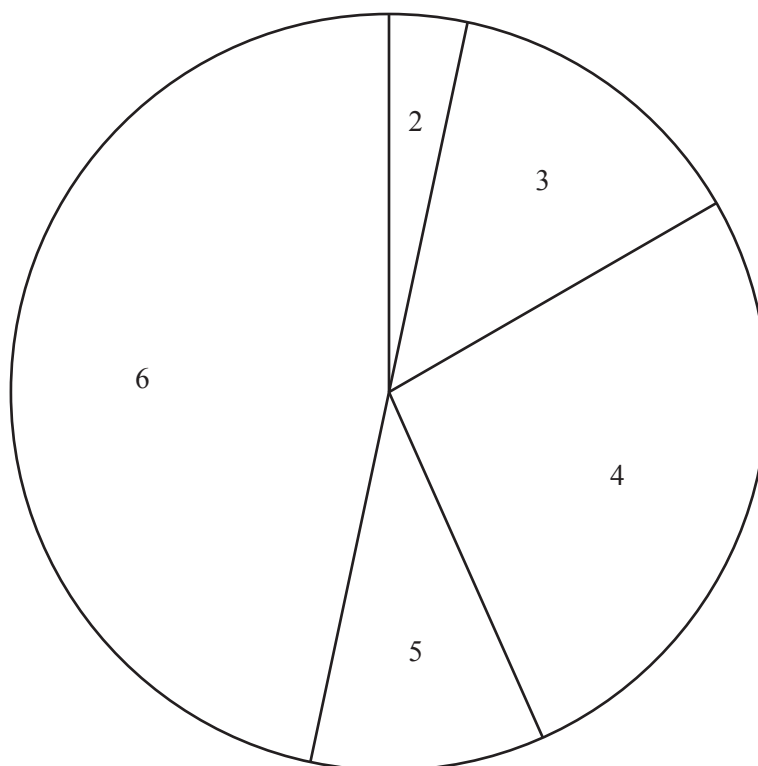
(a) Show that the sector angle for the number 2 is 54° .

[1]

(b) Find the sector angle for the number 6.

..... [2]

- (c) Joel asks 30 students to guess the number that the spinner will next land on. The results are shown in this pie chart.



- (i) The sector angle for the number 6 is 168° .

How many students guessed the number 6?

..... [2]

- (ii) Find the percentage of the students who guessed a number **less than 5**.

.....% [3]

- (iii) Joel spins the spinner.
10% of the 30 students guessed correctly.

Which number did the spinner land on?

..... [2]

2 (a) 3 6 19 20 24 27 30 32 35 36 48 49 51

From this list of numbers write down

(i) a factor of 15,

..... [1]

(ii) a multiple of 18,

..... [1]

(iii) an odd square number,

..... [1]

(iv) a cube number.

..... [1]

(b) Write as a percentage.

(i) 0.43

.....% [1]

(ii) $\frac{1}{2}$

.....% [1]

(c) Write $\frac{28}{42}$ in its lowest terms.

..... [1]

(d) (i) Write 45 as a product of its prime factors.

..... [2]

(ii) Find the highest common factor (HCF) of 45 and 105.

..... [2]

3 Paul and Mary go on a 14 night cruise in the Mediterranean.

- (a) The price of the cruise is \$237 per person per night.
A tax of 6% is added to this price.

Find the total amount Paul and Mary pay for this cruise.

\$..... [3]

- (b) At a port Mary buys 2 bottles of sun cream.
Each bottle costs \$7.89 .

Work out the change she receives from \$20.

\$..... [2]

- (c) Paul and Mary leave the ship at 09 23 to tour Pisa.
The tour lasts for $6\frac{3}{4}$ hours.

Find the time when the tour finishes.

..... [2]

- (d) The ship leaves at 18 40 to sail to the next port.
It sails 270 km at an average speed of 32.4 km/h.

Find the time when the ship arrives.

..... [3]

- (e) There are 1800 passengers on the ship.
They are in the ratio males : females = 5 : 4.

Work out the number of male passengers.

..... [2]

- 4 (a) The table shows the temperature at noon each day for one week in a city.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
5 °C	2 °C	−3 °C	−1 °C	0 °C	1 °C	−2 °C

- (i) Which day had the lowest noon temperature?

..... [1]

- (ii) Find the difference between the noon temperatures on Tuesday and Wednesday.

..... °C [1]

- (iii) Write these seven temperatures in order, starting with the lowest.

..... [1]
lowest

- (iv) On Sunday the noon temperature was −2 °C.
The next day the noon temperature fell by 4 °C.

Find the noon temperature on the next day.

..... °C [1]

- (b) The number of houses in the city is 1 935 364.

Write this number correct to the nearest million.

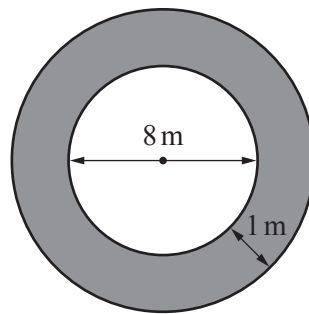
..... [1]

- (c) The height, h metres, of a tower in the city is 120 m, correct to the nearest 10 m.

Complete this statement about the value of h .

..... $\leq h <$ [2]

- (d) The diagram shows the cross section of a circular tunnel in the city.

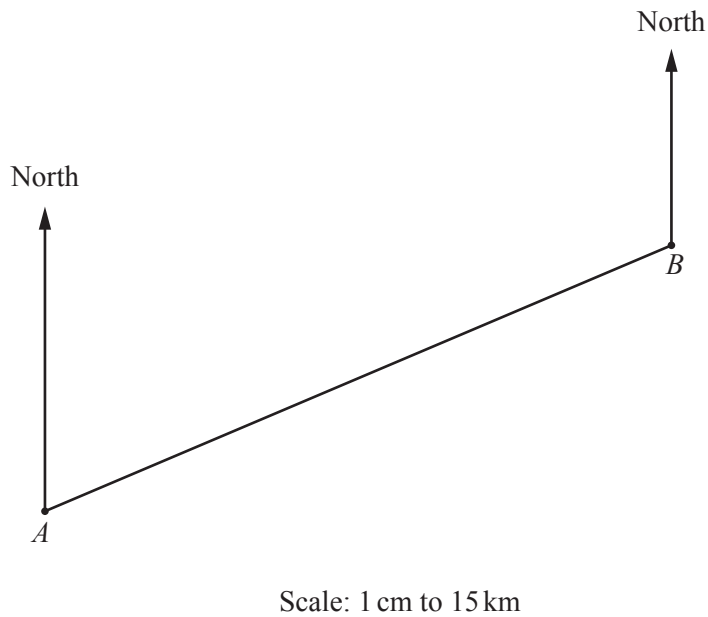


NOT TO
SCALE

Calculate the shaded area.

..... m^2 [4]

- 5 (a) The scale drawing shows port A and port B .
The scale is 1 centimetre represents 15 kilometres.



A ship sails from port A to port B .

- (i) Measure the bearing of port B from port A .

..... [1]

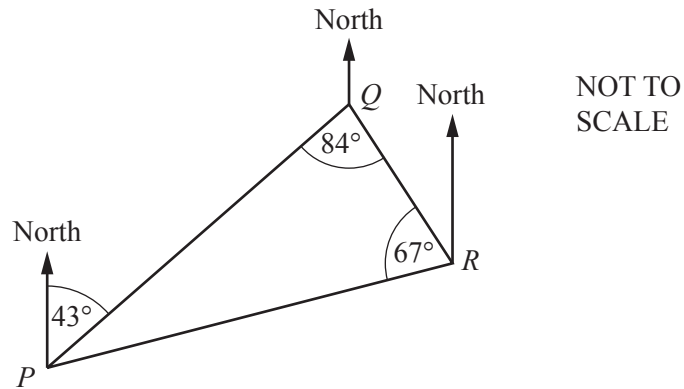
- (ii) Find the actual distance from port A to port B .

..... km [2]

- (iii) The ship then sails from port B to port C .
Port C is 90 km from port B on a bearing of 146° .

On the scale drawing mark the position of port C . [2]

- (b) Another ship sails from port P to port Q .
It then sails from port Q to port R before returning to port P .



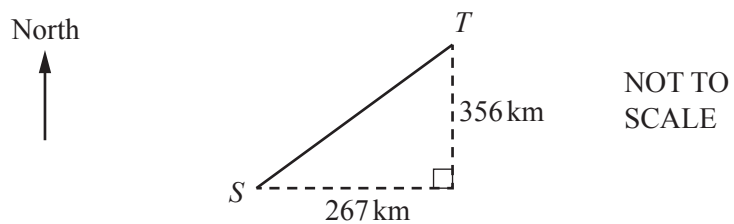
- (i) Find angle RPQ .

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

- (ii) Find the bearing of port P from port R .

$\dots\dots\dots$ [2]

- (c)



Port T is 267 km east and 356 km north of port S .

Calculate the distance ST .

$ST = \dots\dots\dots$ km [2]

6 (a) Solve these equations.

(i) $x + 7 = 15$

$x = \dots\dots\dots$ [1]

(ii) $5(3x + 8) = 10$

$x = \dots\dots\dots$ [3]

(b) A club is arranging transport for its members.

Speedy Coaches charge \$625 plus \$15 per member.

The total cost, in dollars, for x members is given by the expression $15x + 625$.

(i) **Sporty Coaches** charge \$117 plus \$19 per member.

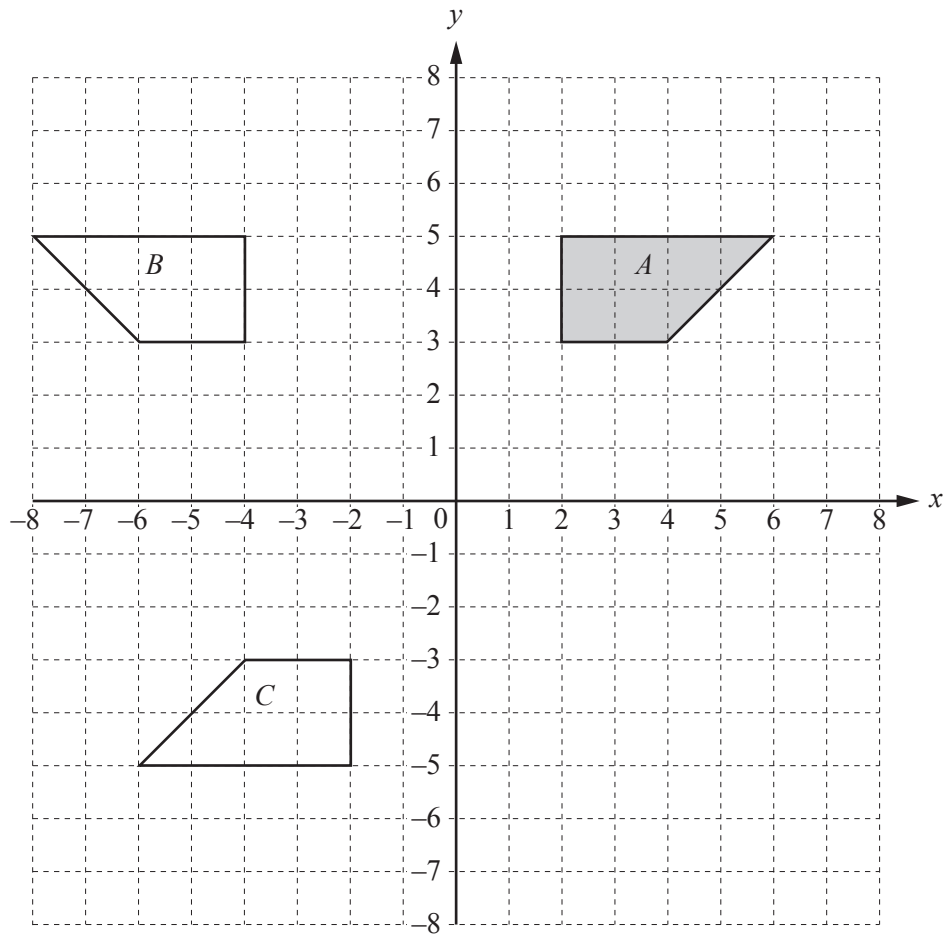
Write an expression for the total cost, in dollars, for x members.

$\dots\dots\dots$ [2]

(ii) The total cost is the same for both **Speedy Coaches** and **Sporty Coaches**.

Write down an equation and solve it to find x .

$x = \dots\dots\dots$ [3]



(a) On the grid, draw the image of shape *A* after a translation by the vector $\begin{pmatrix} -2 \\ -6 \end{pmatrix}$. [2]

(b) (i) On the grid, draw the image of shape *A* after an enlargement, scale factor 2, centre (4, 4). [2]

(ii) Write down the scale factor of the enlargement that maps the image in **part (b)(i)** back onto shape *A*.

..... [1]

(c) Describe fully the **single** transformation that maps shape *A* onto shape *B*.

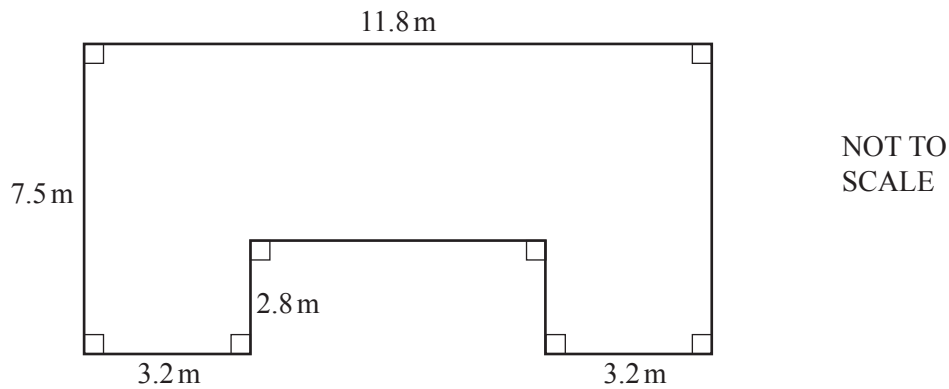
..... [2]

(d) Describe fully the **single** transformation that maps shape *A* onto shape *C*.

..... [3]

- 8 Jared is building a house.

(a)



The diagram shows the plan of the floor of the house.

- (i) Find the area of the floor.

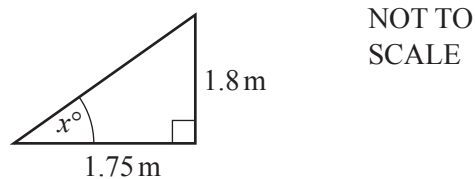
..... m² [3]

- (ii) For every square metre of floor area, it costs \$2175 to build the house.

Calculate the cost of building the house.
Give your answer correct to 3 significant figures.

\$..... [2]

(b)



The diagram shows a section of the roof.

Using trigonometry, calculate the value of x .

$x =$ [2]

- (c) Jared invests \$50 000 for three years at a rate of 2% per year compound interest.

Calculate the total amount Jared receives at the end of the three years.

\$..... [3]

- (d) Jared also built an apartment for \$180 000.
He sells it for \$198 000.

Calculate the percentage profit that he makes.

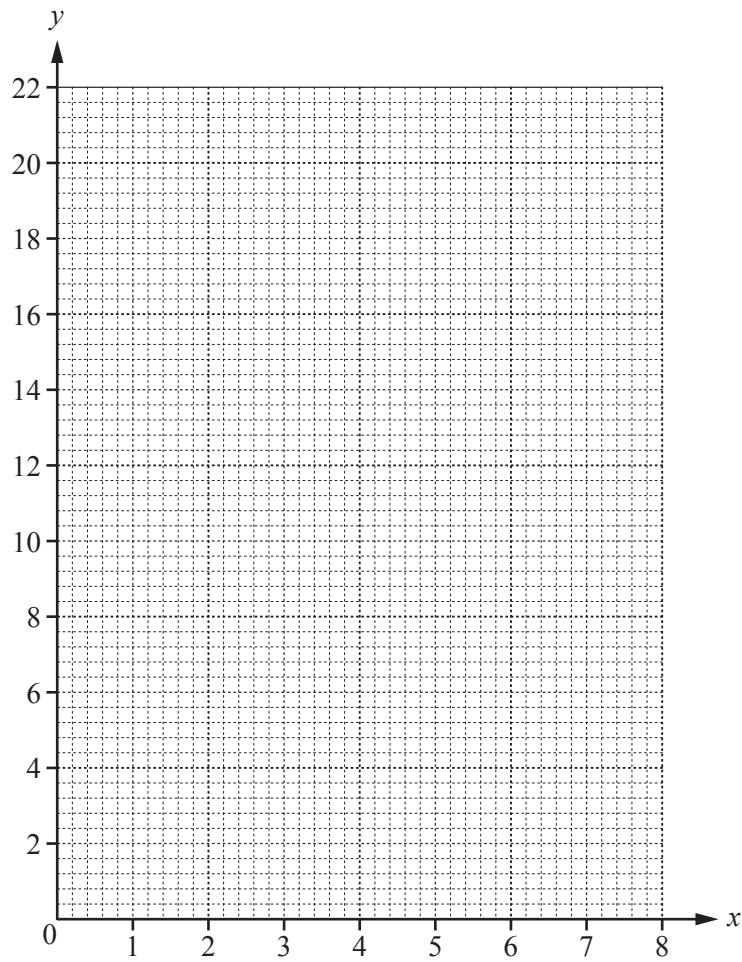
.....% [3]

- 9 (a) Complete the table of values for $y = 8 + 7x - x^2$.

x	0	1	2	3	4	5	6	7	8
y	8		18			18		8	

[3]

- (b) On the grid, draw the graph of $y = 8 + 7x - x^2$ for $0 \leq x \leq 8$.



[4]

- (c) Write down the co-ordinates of the highest point of the curve.

(..... ,) [1]

- (d) (i) On the grid, draw the line $y = 16$. [1]

- (ii) Use your line to solve the equation $8 + 7x - x^2 = 16$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

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