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0580/31

October/November 2013

2 hours

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

The total of the marks for this paper is 104.



[Turn over

1 Pedro is on a cruise ship.

(a) The ship has a climbing wall.

These are the number of attempts that each of 30 people made at climbing the wall.

29 27 11 3 12 4 29 9 16 17 30 29 38 36 18
2 15 24 36 3 33 26 21 9 38 4 28 23 19 27

(i) Find the range.

Answer(a)(i) [1]

(ii) Complete the frequency table.

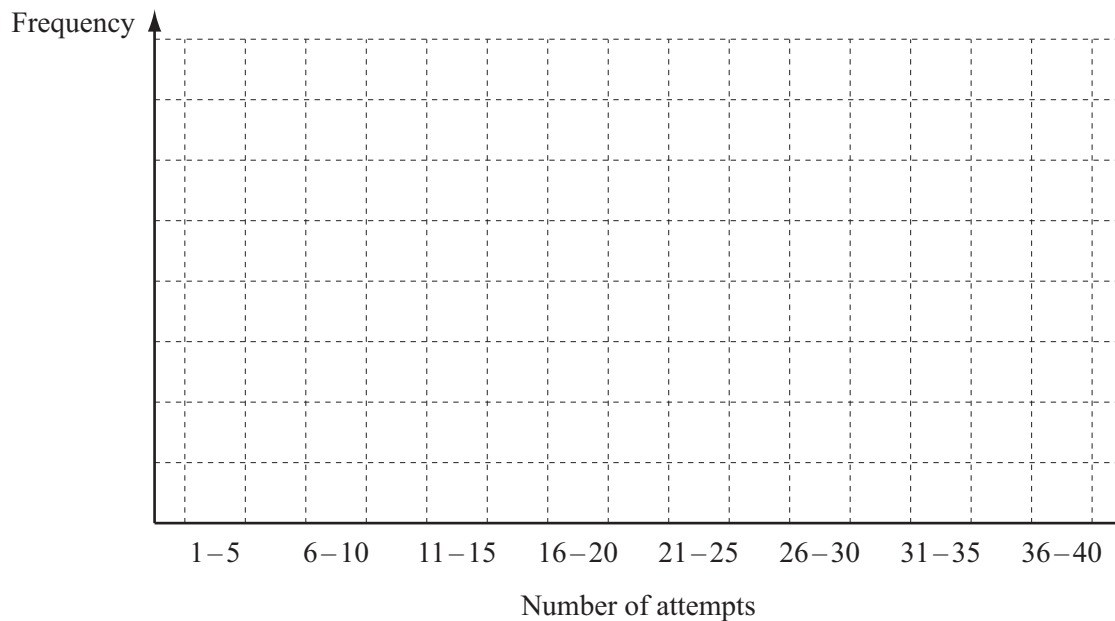
You may use the tally column to help you.

Number of attempts	Tally	Frequency
1–5		
6–10		
11–15		
16–20		
21–25		
26–30		
31–35		
36–40		

[2]

(iii) Draw a bar chart to show this information.

Complete the scale on the frequency axis.



[3]

- (iv) Write down the modal group.

Answer(a)(iv) [1]

- (b) Pedro left the ship in Cadiz at 08 45.
He returned to the ship at 16 10.
Find how long Pedro was in Cadiz.

Answer(b) hours minutes [1]

- (c)

Exchange Rate

$$\text{\$1} = \text{€1.428}$$

- (i) Pedro changed \\$167 into euros (€).

Calculate how many euros Pedro received.
Give your answer correct to 2 decimal places.

Answer(c)(i) € [2]

- (ii) Later, Pedro changed €107.10 back into dollars (\$) using the same exchange rate.

Calculate how many dollars Pedro received.

Answer(c)(ii) \\$ [2]

- 2 (a) (i) 1 and 120 are factors of 120.

Write down another factor of 120.

Answer(a)(i) [1]

- (ii) Find the highest common factor of 120 and 900.

Answer(a)(ii) [2]

- (b) 2 5 15 24 49 60 258 512

From the list, write down

- (i) a multiple of 30,

Answer(b)(i) [1]

- (ii) a square number,

Answer(b)(ii) [1]

- (iii) the cube root of 8.

Answer(b)(iii) [1]

- (c) Give an example to show that the following statements are **not** true.

- (i) An odd number multiplied by an even number gives an odd number.

Answer(c)(i) [1]

- (ii) The cube of a negative number is positive.

Answer(c)(ii) [1]

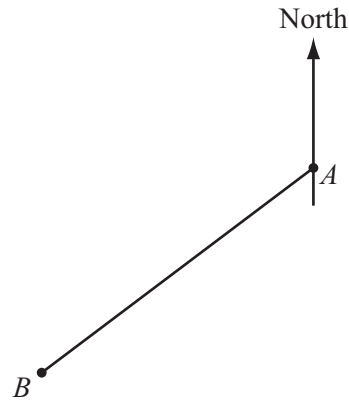
- (d) Use $<$, $>$, or $=$ to complete the following statements.
Each symbol may be used more than once.

(i) $0.5 \dots\dots\dots \frac{3}{8}$ [1]

(ii) $1.5 \dots\dots\dots 105\%$ [1]

(iii) $0.78 \dots\dots\dots \frac{11}{14}$ [1]

- 3 (a) The diagram shows the position of town A and town B , on a map.



- (i) Measure the length, in millimetres, of the line AB .

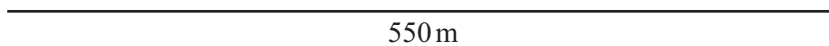
Answer(a)(i) mm [1]

- (ii) Measure the bearing of town B from town A .

Answer(a)(ii) [1]

- (b) A triangular field has sides of length 550 m, 300 m and 400 m.

- (i) Construct the triangle, **using a ruler and compasses only**.
Use a scale of 1 cm to represent 50 m.
The side of length 550 m has been drawn for you.

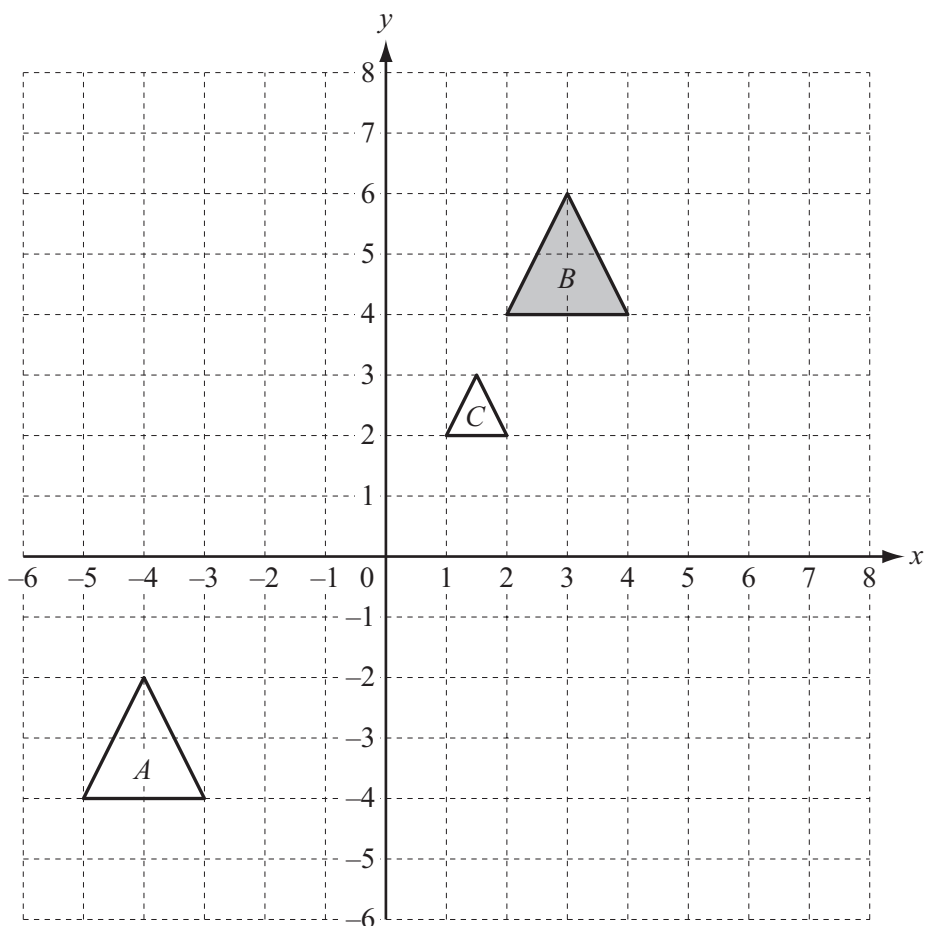


550 m

[3]

- (ii) By making a suitable measurement on your diagram, calculate the area of the field.
Give your answer in square metres.

Answer(b)(ii) m² [3]



- (a) (i) Describe fully the **single** transformation which maps shape *B* onto shape *A*.

Answer(a)(i)
..... [2]

- (ii) Describe fully the **single** transformation which maps shape *B* onto shape *C*.

Answer(a)(ii)
..... [3]

- (b) (i) Reflect shape *B* in the *y*-axis. Label the image *D*. [1]

- (ii) Rotate shape *B* through 90° anticlockwise about the origin. Label the image *E*. [2]

- 5 (a) The cost, \$ C , of a party for n people is calculated using the following formula.

$$C = 130 + 4n$$

- (i) Calculate C when $n = 25$.

Answer(a)(i) [2]

- (ii) Eurdley has a party which costs \$1138.
How many people is this party for?

Answer(a)(ii) [2]

- (b) Solve the following equations.

(i) $3x = 27$

Answer(b)(i) $x =$ [1]

(ii) $8y - 4 = 24$

Answer(b)(ii) $y =$ [2]

(iii) $4(5q - 2) = 72$

Answer(b)(iii) $q =$ [3]

- (c) Solve the simultaneous equations.

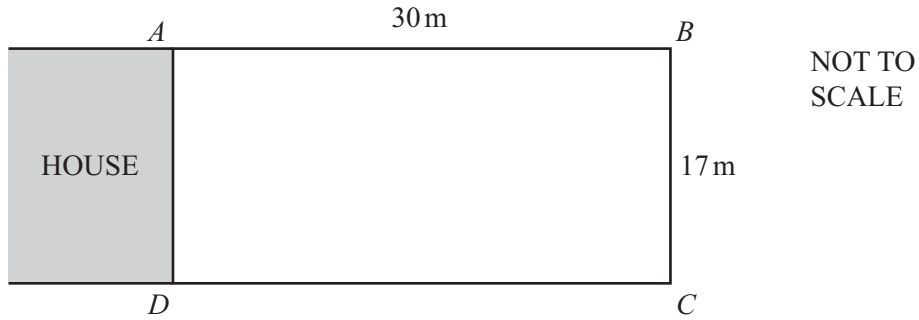
$$6x + 8y = -31$$

$$14x - 5y = 46$$

Answer(c) $x =$

$y =$ [4]

6



The rectangle $ABCD$ shows Mr Liu's garden.

- (a) Mr Liu puts a fence around three sides of his garden, AB , BC and CD .
The fence costs \$3.28 per metre.

Calculate the cost of the fence.

Answer(a) \$ [2]

- (b) (i) Calculate the area of Mr Liu's garden.

Answer(b)(i) m^2 [2]

- (ii) Mr Liu uses an area of 408 m^2 in his garden for a lawn, flowers and vegetables.
He divides this area into three parts, in the ratio

$$\text{lawn} : \text{flowers} : \text{vegetables} = 5 : 3 : 4.$$

Calculate the area used for each part.

Answer(b)(ii) Lawn m^2

Flowers m^2

Vegetables m^2 [3]

- (c) Mr Liu walks in a straight line across his garden from A to C .

Calculate the distance Mr Liu walks.

Answer(c) m [3]

- (d) Mr Liu has a circular pond, radius 4.5 m, in his garden.

- (i) Calculate the area of the pond.

Answer(d)(i) m^2 [2]

- (ii) The pond is filled with water to a depth of 2 metres.

Calculate the volume of water in the pond.

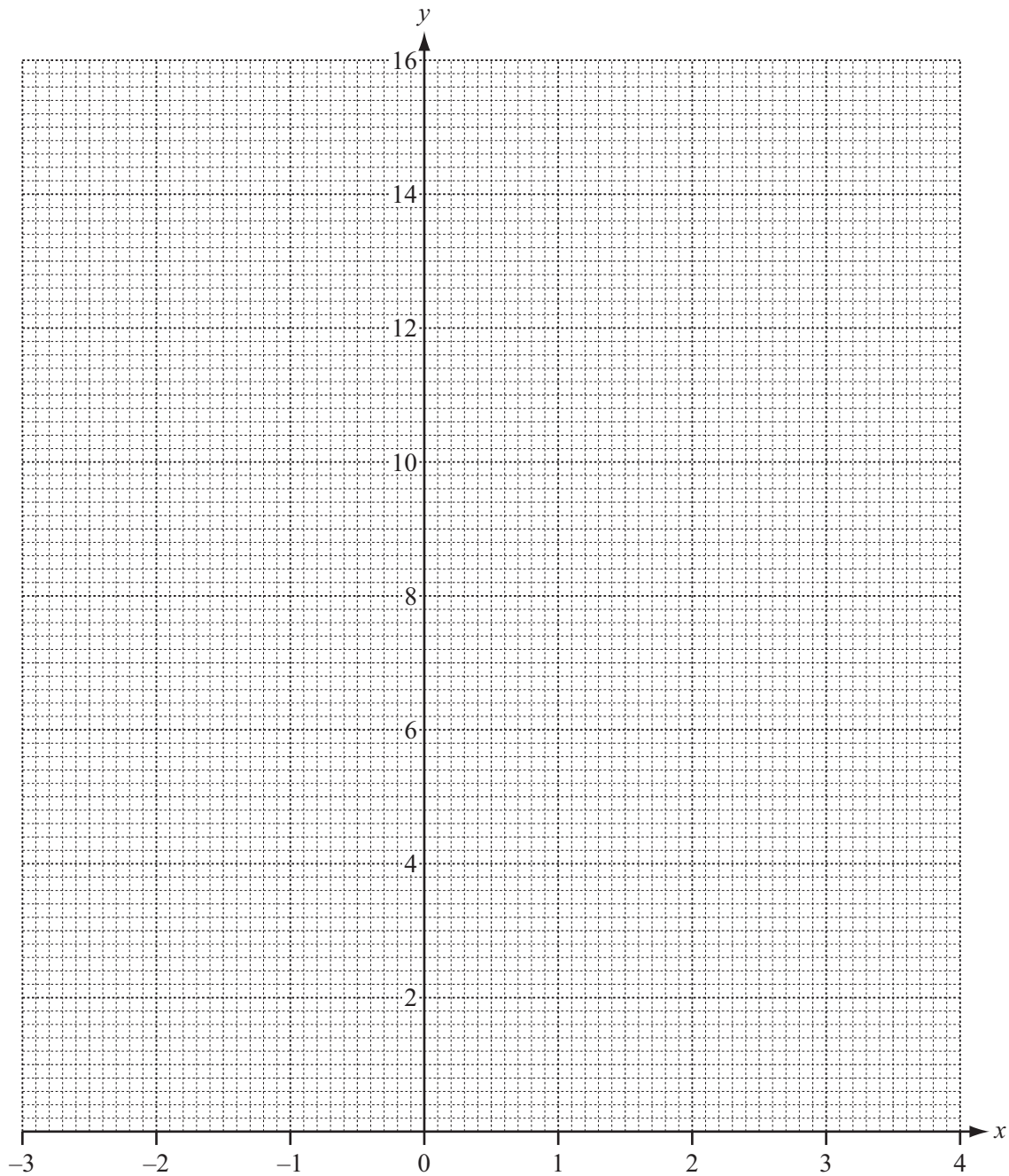
Answer(d)(ii) m^3 [1]

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

x	-3	-2	-1	0	1	2	3	4
y		8		2		4		

[3]

- (b) On the grid, draw the graph of $y = x^2 - x + 2$ for $-3 \leq x \leq 4$.



[4]

For
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- (c) Write down the equation of the line of symmetry of the graph.

For
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Use

Answer(c) [1]

- (d) (i) On the grid, draw the line $y = 9$. [1]

- (ii) Solve the equation $x^2 - x + 2 = 9$.

Answer(d)(ii) $x =$ or $x =$ [2]

8

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temperature in °C	−4.4	−4.2	−2.7	0.3	4.8	9.1	11.8	10.8	6.7	2.7	−1.1	−3.3

The table shows the average temperature for Tromso, Norway each month.

- (a) (i) Write down the month which had the highest average temperature.

Answer(a)(i) [1]

- (ii) How much warmer was it in September than in February?

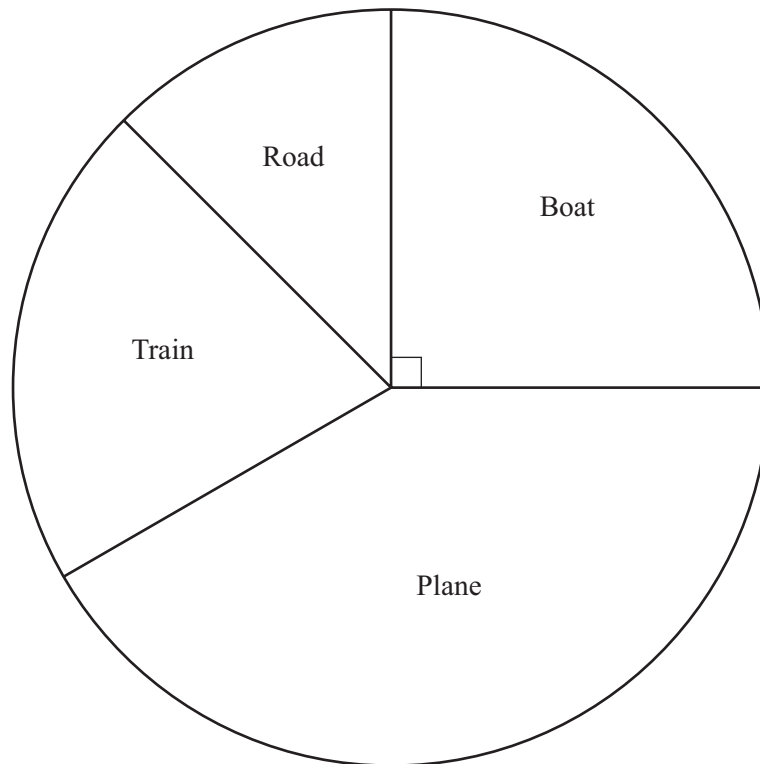
Answer(a)(ii) °C [1]

- (iii) The lowest temperature in October was 12.3°C below the average temperature for that month.

Work out the lowest temperature in October.

Answer(a)(iii) °C [1]

- (b) In a survey, some tourists were asked how they had travelled to Norway.
The pie chart shows the results.



- (i) 150 of these tourists travelled by boat.

Show that 600 tourists took part in the survey.

Answer(b)(i)

[1]

- (ii) Calculate the number of these tourists who travelled by plane.

Answer (b)(ii) [3]

- (c) A train ticket from Oslo to Stavanger costs 885 krone.
There is a discount of 12% on the total cost of the tickets for a group of 10 or more people.

Calculate the cost of tickets for a group of 15 people.

Answer(c) krone [3]

- (d) On 1 January 2000, the population of Norway was 4 480 000, correct to 3 significant figures.

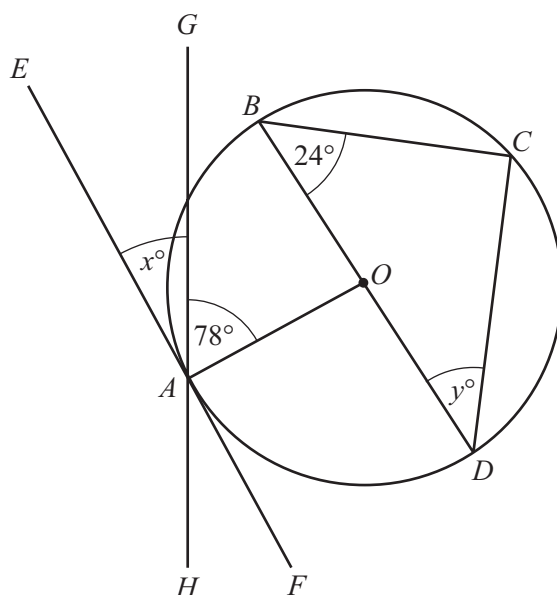
- (i) Write this number in standard form.

Answer(d)(i) [1]

- (ii) On 1 January 2011, the population of Norway was 4 920 000, correct to 3 significant figures.

Calculate the percentage increase in the population.

Answer(d)(ii) % [3]

NOT TO
SCALE

A, B, C and D are points on the circumference of a circle, centre O .
 EF is a tangent to the circle at A .
 GH is a straight line through the point A .
 Angle $CBD = 24^\circ$ and angle $OAG = 78^\circ$.

- (a) (i) Write down the mathematical names of lines BC and OA .

Answer(a)(i) BC is a

OA is a [2]

- (ii) Find the value of x , giving a reason for your answer.

Answer(a)(ii) $x = \dots$ because

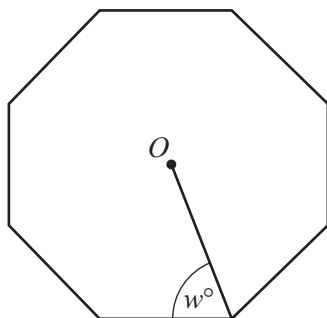
..... [2]

- (iii) Find the value of y , giving a reason for your answer.

Answer(a)(iii) $y = \dots$ because

..... [3]

- (b) The diagram shows a regular polygon, centre O .



NOT TO
SCALE

- (i) Write down the name of this polygon.

Answer(b)(i) [1]

- (ii) Find the value of w .
Show all your working.

Answer(b)(ii) $w =$ [3]

- (c) The exterior angle of another regular polygon is 24° .

Calculate the number of sides this polygon has.

Answer(c) [2]

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