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MATH TOPICAL WORKSHEETS

IGCSE- Int. Mathematics (0607)

Sets,Statistics,Probability and vector Transformations

Q.1

PAPER-2

Bag A

Bag B

Bag A contains 4 white balls and 3 black balls.
Bag B contains 5 white balls and 4 black balls.

(a) Ranjit picks a ball at random from Bag A and replaces it.
Ranjit also picks a ball at random from Bag B and replaces it.

Find the probability that the two balls are the same colour.

..... [3]

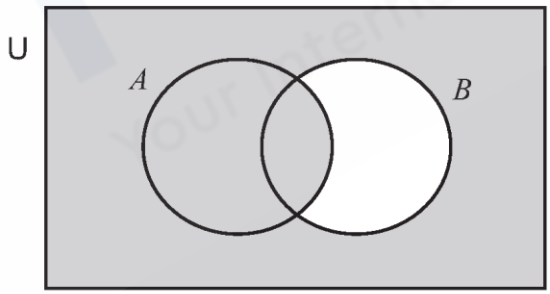
(b) Leyla picks a ball at random from Bag A.
She places it into Bag B.
She then picks a ball at random from Bag B.

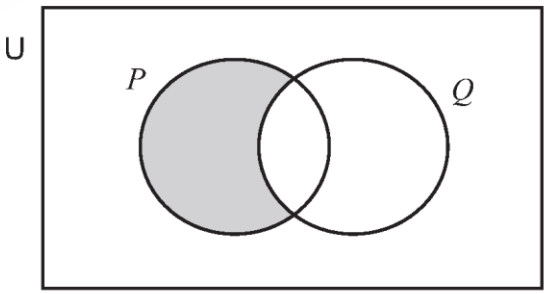
Find the probability that the ball she picks from Bag B is black.

..... [3]

Q.2

Use set notation to describe each of the shaded regions.





.... [2]

Q.3

PAPER-2

The mean of 9 numbers is 8.
When an extra number is included, the mean is 7.7 .

Find the extra number.

..... [2]

Q.4

120 students are each asked the time it takes them to complete an online game.

(a) Circle the word that describes the type of data collected.

continuous discrete random

[1]

(b) The table shows the sector angles for a pie chart using the times collected.

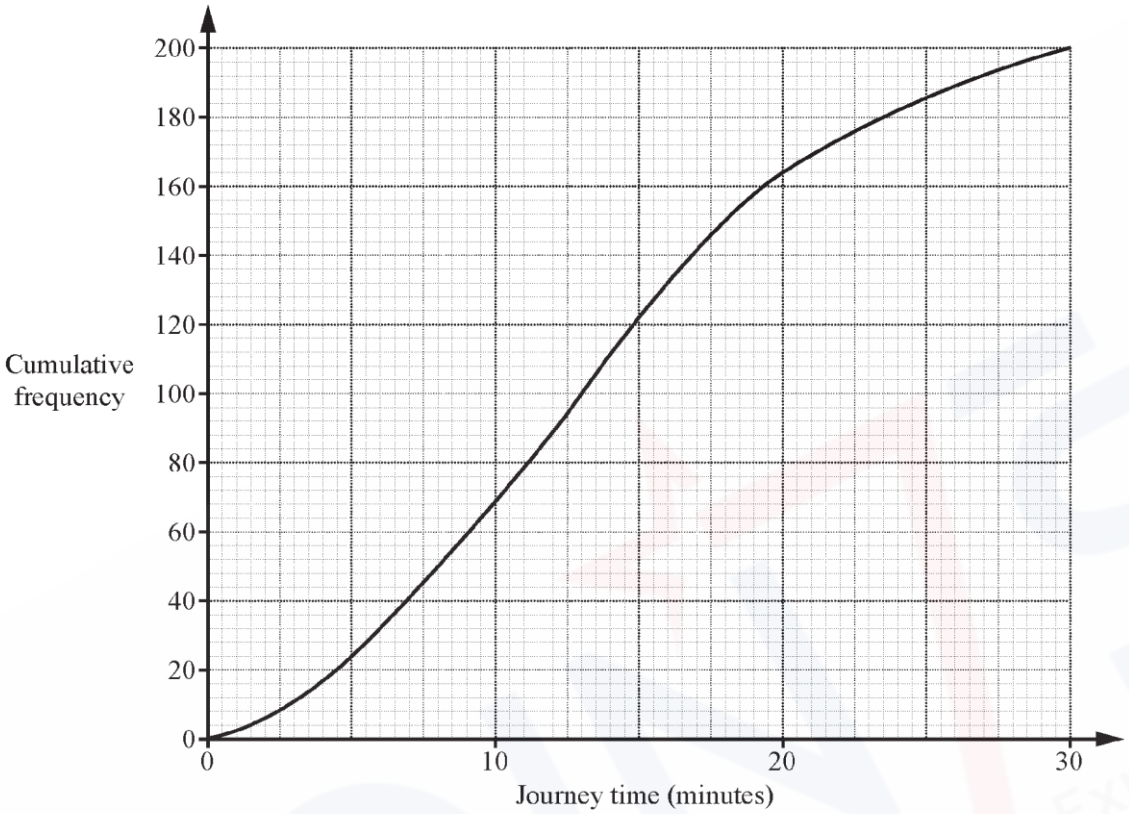
Time (t hours)	Frequency	Angle (degrees)
$0 < t \leqslant 1$	5	15
$1 < t \leqslant 2$		120
$2 < t \leqslant 3$		180
$3 < t \leqslant 4$		45
Total	120	360

Complete the frequency column.

[2]

Q.5

PAPER-2



The cumulative frequency curve shows information about the journey times to school of 200 students.

(a) Find the median.

Answer(a) ..... min [1]

(b) Find the number of students with a journey time of more than 20 minutes.

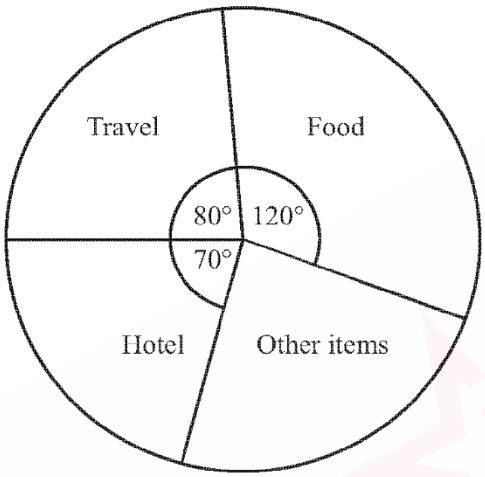
Answer(b) ..... [2]

Q.6

PAPER-2

The total cost of a holiday was $720.

The pie chart shows how this money was spent.



NOT TO SCALE

Find the amount of money spent on

(a) food,

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

(b) other items.

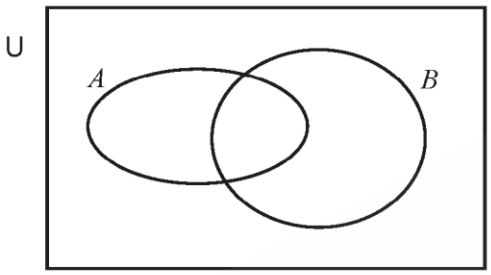
Answer (b) $ ..... [2]

PAPER-2

Q.7

Shade the region indicated in each of these Venn diagrams.

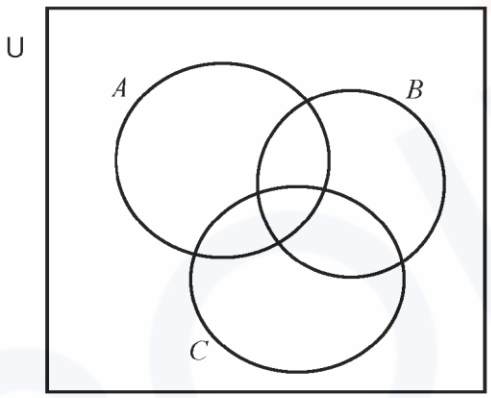
(a)



$A' \cap B'$

[1]

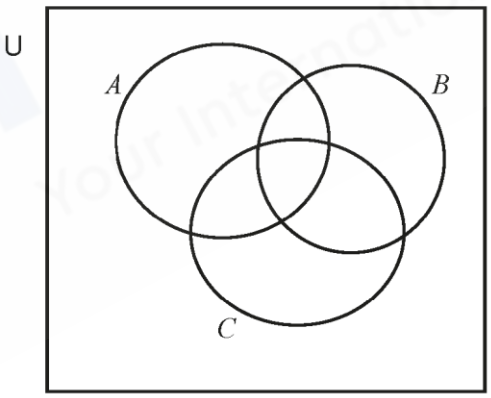
(b)



$A \cup (B \cap C)$

[1]

(c)



$A \cap B \cap C'$

[1]

Q.8

PAPER-2

Jakob draws a scatter diagram which shows that two quantities, x and y, are correlated.
He calculates the equation of the regression line as $y = 32 - 1.5x$.

(a) What type of correlation is there between x and y?

..... [1]

(b) The mean of the y values is 14.

Find the mean of the x values.

..... [2]

Q.9

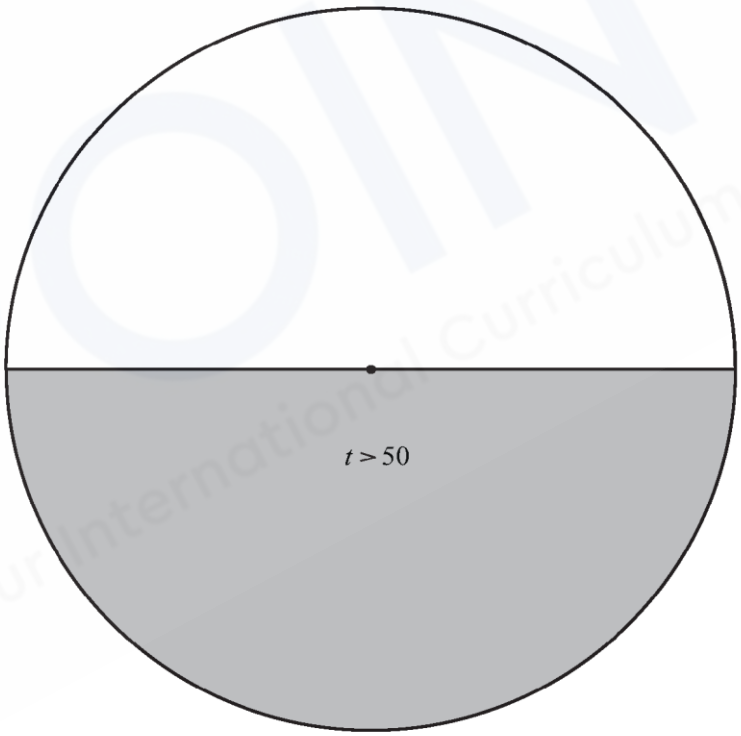
PAPER-2

Raphael is drawing a pie chart for the time, t minutes, that 90 students spend on the internet each day.

Time (t minutes)	Frequency	Sector Angle
$0 < t \leqslant 10$	10	
$10 < t \leqslant 30$	15	
$30 < t \leqslant 50$	20	
$t > 50$	45	180°

(a) Complete the table to show the sector angles in the pie chart. [2]

(b) Complete the pie chart to show this information.
Label each sector.



[2]

PAPER-4

Q.1

The frequency table shows the length of time, t seconds, of 60 telephone calls answered by a doctor's receptionist.

Time (t seconds)	Frequency
$0 < t \leqslant 15$	2
$15 < t \leqslant 30$	4
$30 < t \leqslant 45$	9
$45 < t \leqslant 60$	12
$60 < t \leqslant 75$	15
$75 < t \leqslant 90$	12
$90 < t \leqslant 105$	4
$105 < t \leqslant 120$	2

(a) Write down the modal class.

..... $< t \leqslant$ ..... [1]

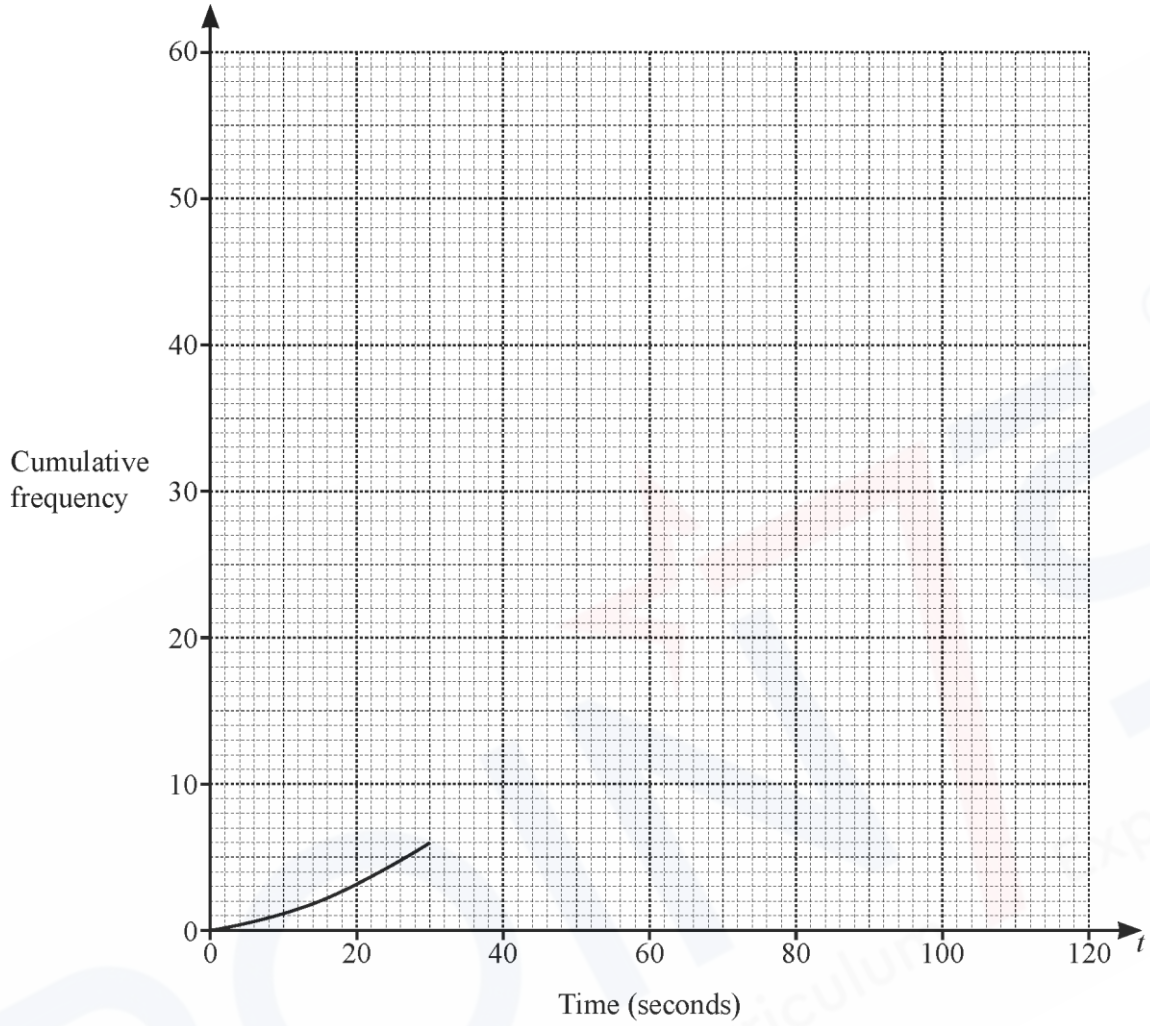
(b) Complete the cumulative frequency table.

Time (t seconds)	Cumulative frequency
$t \leqslant 15$	2
$t \leqslant 30$	6
$t \leqslant 45$	
$t \leqslant 60$	
$t \leqslant 75$	
$t \leqslant 90$	
$t \leqslant 105$	
$t \leqslant 120$	60

[1]

PAPER-4

(c) Complete the cumulative frequency curve.



[3]

(d) Use your curve to find

(i) the median,

..... s [1]

(ii) the lower quartile,

..... s [1]

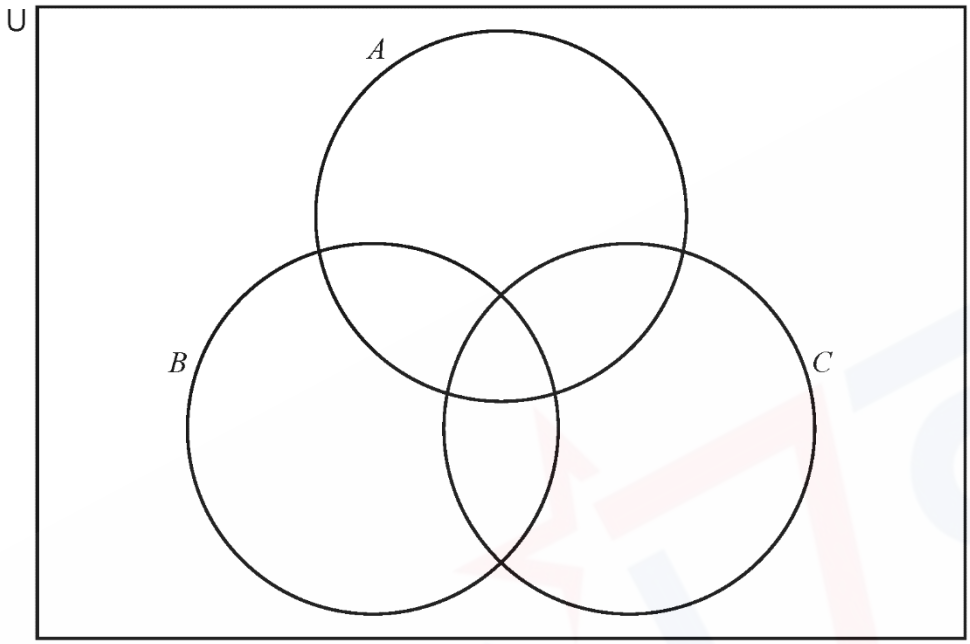
(iii) the number of calls that lasted more than 80 seconds.

..... [2]

PAPER-4

Q.2

The Venn diagram shows the sets A, B and C.



U = {integers from 10 to 20, including 10 and 20}

A = {prime numbers}

B = {multiples of 3}

C = {multiples of 4}

(a) List the elements of set A.

..... [1]

(b) Write all the elements of U in the correct parts of the Venn diagram. [2]

(c) List the elements of $(A \cup B)'$.

..... [1]

(d) Find $\mathrm{n}((A \cup B) \cap C')$.

..... [1]

PAPER-4

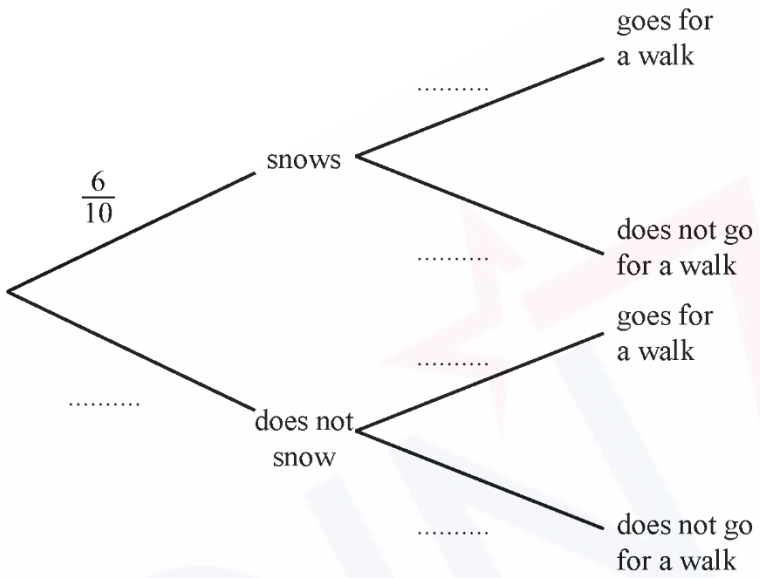
Q.3

The probability that it snows on any day in February is $\frac{6}{10}$.

If it snows, the probability that Maud goes for a walk is $\frac{2}{5}$.

If it does not snow, the probability that Maud goes for a walk is $\frac{5}{7}$.

(a) Complete the tree diagram to show this information.



[3]

(b) One day in February is chosen at random.

Find the probability that it snows and Maud does not go for a walk.

..... [2]

PAPER-4

Q.4

The table shows the type of doughnut and the number of doughnuts sold in a shop on one day.

Type	Sugar	Raisin	Cream	Jam	Iced
Number	2000	2500	1500	1250	750

(a) Find the total number of doughnuts sold.

..... [1]

(b) Write down the most popular type of doughnut.

..... [1]

(c) Work out how many more jam doughnuts were sold than iced doughnuts.

..... [1]

(d) Work out the fraction of the doughnuts sold that were jam doughnuts.
Give your answer as a fraction in its simplest form.

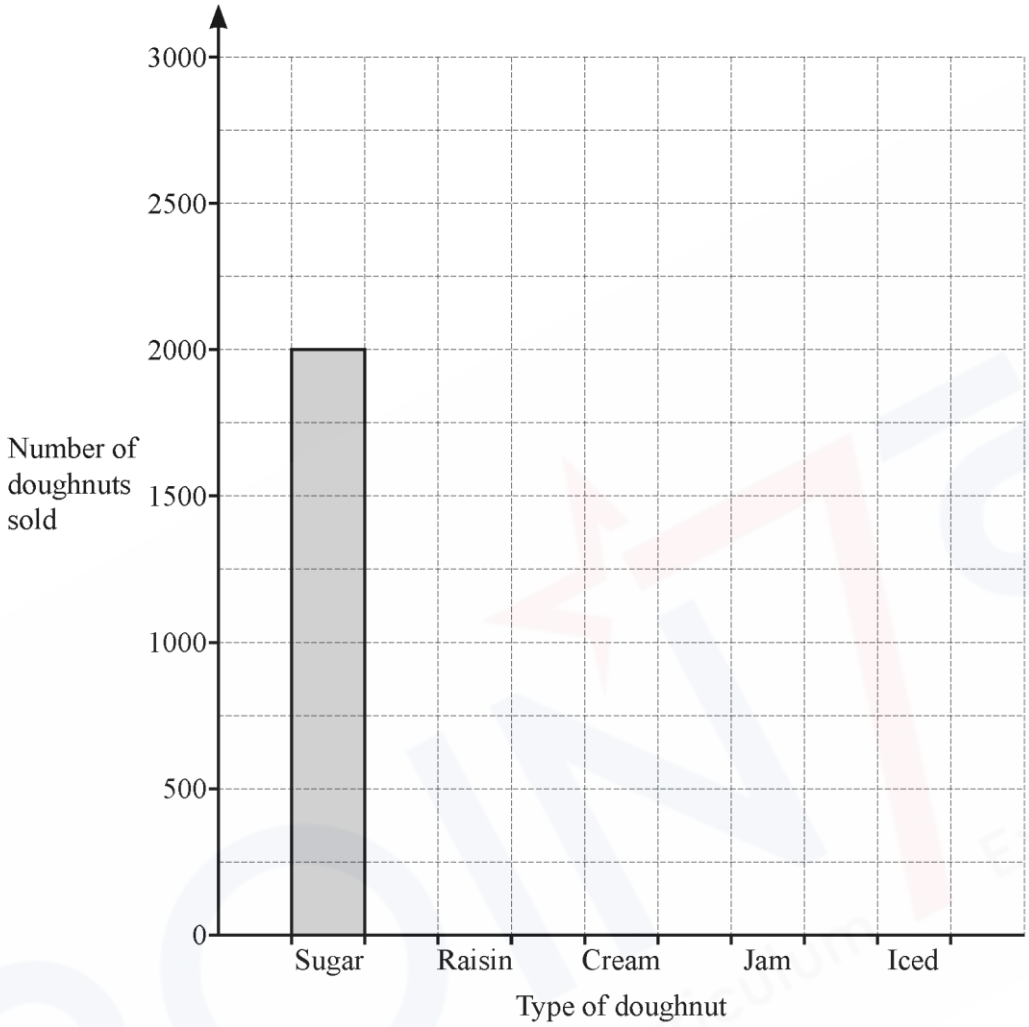
..... [2]

(e) Write the ratio 1500 : 1250 : 750 in its simplest form.

..... : ..... : ..... [2]

PAPER-4

(f) On the grid below, complete the bar chart to show the information in the table.



[2]

(g) Sugar doughnuts cost $1.25 each.
Raisin doughnuts cost $1.50 each.

Work out the total cost of 5 sugar doughnuts and 3 raisin doughnuts.

$ ..... [2]

PAPER-4

Q.5

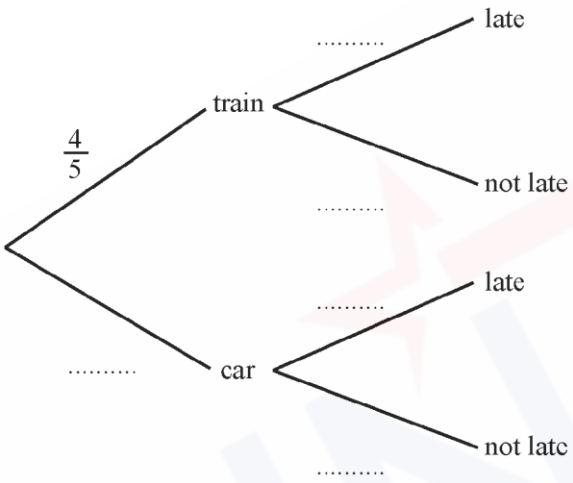
Kensuke travels to school either by train or by car.

The probability that he travels by train is $\frac{4}{5}$.

If Kensuke travels by train then the probability that he is late for school is $\frac{1}{20}$.

If Kensuke travels by car then the probability that he is late for school is $\frac{1}{15}$.

(a) Complete the tree diagram.



[3]

(b) Find the probability that Kensuke travels by train and is late for school.

Answer(b) ..... [2]

(c) Find the probability that Kensuke is not late for school.

Answer(c) ..... [3]

PAPER-4

Q.6

(a) 15 students go on a school trip.

The age of each student in years, correct to 1 decimal place, is listed below.

13.4	14.7	13.1	15.5	15.3
15.2	14.1	14.2	16.4	14.7
15.2	15.9	13.1	15.1	16.0

(i) Complete the ordered stem and leaf diagram to show this information.
16.0 has been entered for you.

13	
14	
15	
16	0

Key: ..... | ..... represents .....

[3]

(ii) Work out the range.

..... years [1]

(iii) Find the median.

..... years [1]

(b) Another student is 14 years 7 months old.

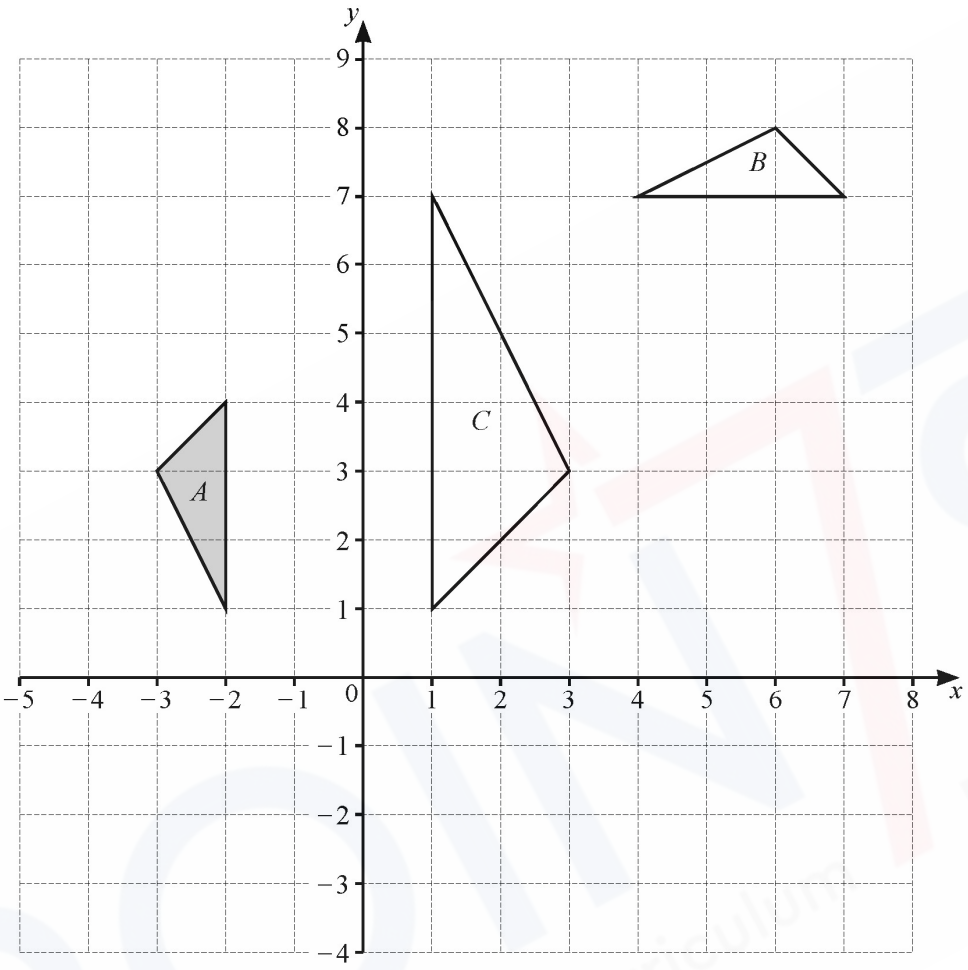
Write this student's age in years as a decimal, correct to 1 decimal place.

..... years [2]

Vector Transformations

1

(a)



(i) Reflect triangle A in the line $y = x$. [2]

(ii) Describe fully the **single** transformation that maps triangle A onto triangle B.

.....

..... [3]

(iii) Describe fully the **single** transformation that maps triangle A onto triangle C.

.....

..... [3]

(b) Write down the inverse of each of these transformations.

(i) Translation with the vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$

.....

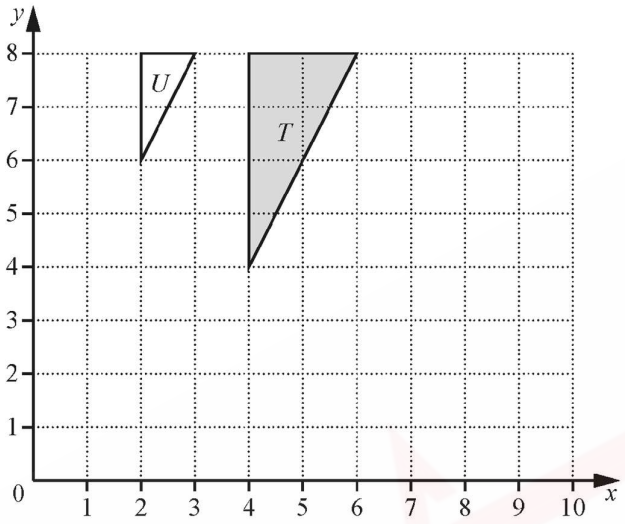
..... [2]

(ii) Stretch with the line $y = 1$ invariant and stretch factor 3

.....

..... [3]

2



(a) **(i)** Describe fully the **single** transformation that maps triangle T onto triangle U.

Answer(a)(i) .....

..... [3]

(ii) Describe fully the inverse of the transformation in **part(a)(i)**.

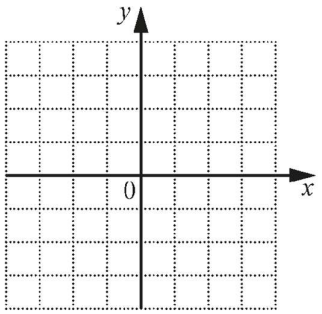
Answer(a)(ii) .....

..... [2]

(b) **(i)** Draw the image of triangle T under a reflection in the line $y = x$. [2]

(ii) Draw the image of triangle T under a rotation of 90° anti-clockwise about the point (6, 8). [2]

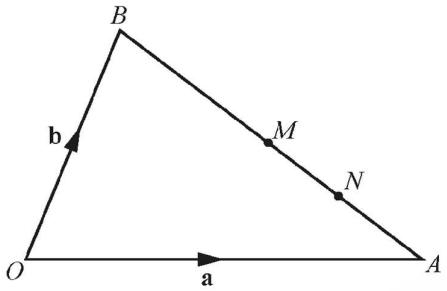
(c) Describe fully the **single** transformation equivalent to a rotation 90° clockwise about (0, 0) followed by a reflection in the line $y = -x$.
You may use the grid to help you.



Answer(c) .....

..... [3]

3



NOT TO SCALE

In the diagram, $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.
M is the midpoint of AB and N is the midpoint of AM.

(a) Find each of these vectors in terms of **a** and **b**.
Give each vector in its simplest form.

(i) $\overrightarrow{AB}$

$\overrightarrow{AB}$ = ... [1]

(ii) $\overrightarrow{AN}$

$\overrightarrow{AN}$ = ... [1]

(iii) $\overrightarrow{ON}$

$\overrightarrow{ON}$ = ... [2]

(b) O is the point (0, 0).

$\overrightarrow{OA} = \begin{pmatrix} 8 \\ 0 \end{pmatrix}$ and $\overrightarrow{OB} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$.

Find the co-ordinates of N.

(..... , ...) [3]