

Numbers – 2023 O Level Math D 40241. **Nov/2023/Paper_4024/11/No.1**(a) Work out $6 + 4 \div 2$.

..... [1]

(b) Work out 40×0.3 .

..... [1]

2. **Nov/2023/Paper_4024/11/No.2**

Write these numbers in order of size, starting with the smallest.

$\frac{1}{5}$

$\frac{3}{25}$

13%

0.1

..... [2]
smallest

3. Nov/2023/Paper_4024/11/No.3

(a) Work out the temperature that is 20 degrees higher than -12°C .

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

(b) Work out the difference between -4°C and 10°C .

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

4. Nov/2023/Paper_4024/11/No.4

Kasia buys 12 apples.
Each apple costs 65 cents.

Work out how much Kasia pays.
Give your answer in dollars.

\$ [2]

5. Nov/2023/Paper_4024/11/No.7

By writing each number correct to 1 significant figure, estimate the value of

$$\frac{53.7}{2.61 + 7.48} .$$

..... [2]

6. Nov/2023/Paper_4024/11/No.13

Work out $1\frac{3}{5} \div 1\frac{2}{3}$.

..... [2]

7. Nov/2023/Paper_4024/11/No.14

(a) Write 36 as a product of its prime factors.

..... [2]

(b) Bus *A* leaves the bus station every 36 minutes.
Bus *B* leaves the bus station every 48 minutes.
The two buses both leave the bus station at 09 30.

Find the next time when the two buses leave the bus station together.

..... [3]

8. Nov/2023/Paper_4024/11/No.17

y is directly proportional to the square root of x .

When $x = 16$, $y = 2$.

Find y when $x = 25$.

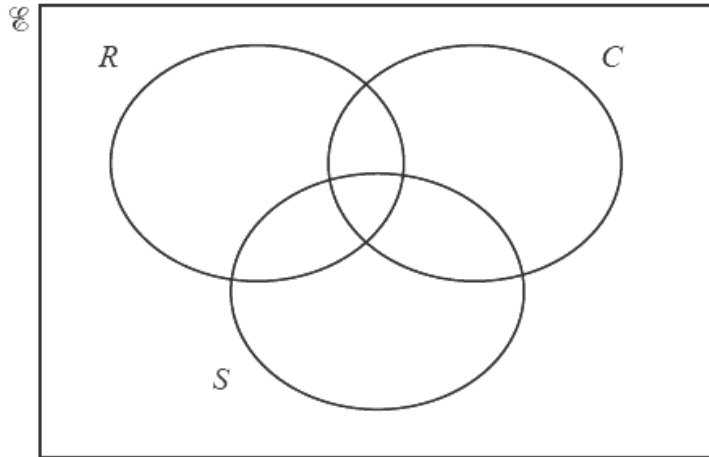
$y = \dots\dots\dots$ [2]

9. Nov/2023/Paper_4024/11/No.18

(a) In a sports club of 40 members:

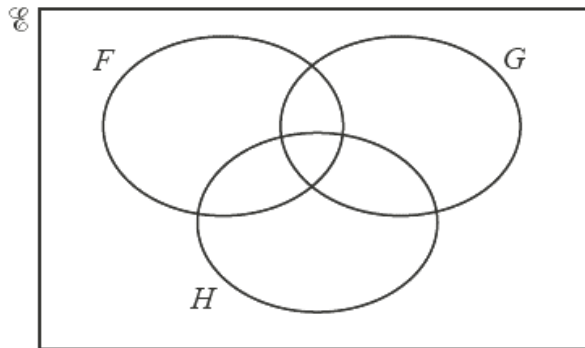
- 22 members run (R)
- 24 cycle (C)
- 14 sail (S)
- 3 cycle and sail but do not run
- 9 run and cycle but do not sail
- 5 run and sail but do not cycle
- 6 run only.

Complete the Venn diagram.



[3]

(b) Use set notation to describe the shaded subset in the Venn diagram.



..... [1]

10. Nov/2023/Paper_4024/12/No.1

Work out.

(a) 0.05×0.3

..... [1]

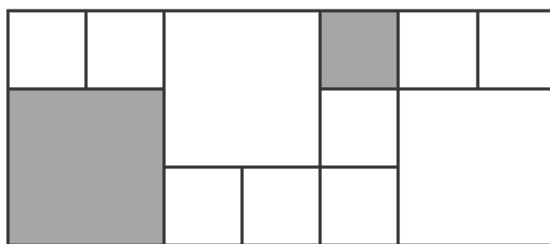
(b) $600 \div 0.2$

..... [1]

(c) $20 - 12 \div (8 - 6)$

..... [1]

11. Nov/2023/Paper_4024/12/No.2



This rectangle is split into squares of two different sizes.

Find the fraction of the rectangle that is shaded grey.

..... [1]

12. Nov/2023/Paper_4024/12/No.3

(a) Find the decimal which is exactly halfway between $\frac{3}{5}$ and 68% .

..... [1]

(b) Write 4.073 82 correct to 3 decimal places.

..... [1]

(c) Evaluate $\sqrt[3]{64}$.

..... [1]

13. Nov/2023/Paper_4024/12/No.5

Anna and Ria share some money in the ratio 5 : 9.
Ria receives \$8 more than Anna.

Work out the total amount of money that is shared.

\$ [2]

14. Nov/2023/Paper_4024/12/No.8

(a) Write the number 0.00493 in standard form.

..... [1]

(b) Evaluate $(4 \times 10^9) \times (2 \times 10^{-2})$.
Give your answer in standard form.

..... [1]

15. Nov/2023/Paper_4024/12/No.9

(a) Write 180 as the product of its prime factors.

..... [2]

(b) Expressed as the product of their prime factors,

$$36 = 2^2 \times 3^2 \quad \text{and} \quad N = 2^2 \times 3 \times k, \text{ where } k > 3.$$

180 is the lowest common multiple (LCM) of 36 and N .

Find the value of k .

$k =$ [1]

16. Nov/2023/Paper_4024/12/No.10

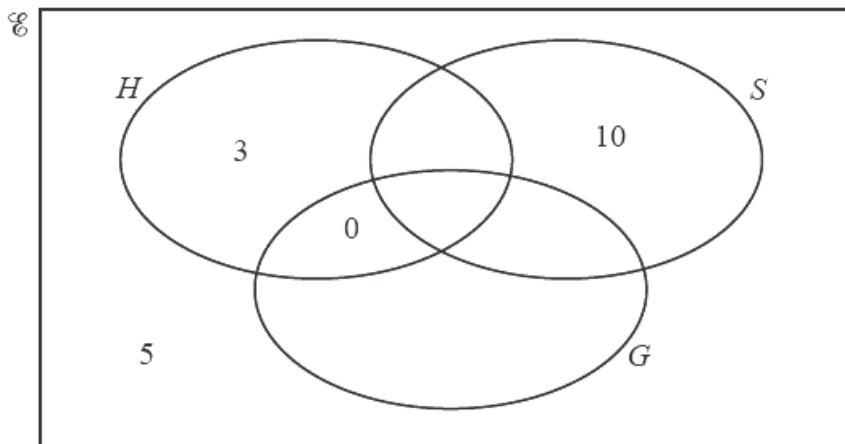
By writing each number correct to 1 significant figure, estimate the value of

$$\sqrt{\frac{1240 \times 3.8}{11.2}}$$

..... [2]

17. Nov/2023/Paper_4024/12/No.23

A shop sells hats (H), scarves (S) and gloves (G).
 A group of 40 people are asked which items they buy in the shop.
 Some of the results are shown in the Venn diagram.



- (a) 2 people buy all three items.
 Those people that buy both a hat and a scarf also buy gloves.
 4 people buy exactly two items.

Use this information to complete the Venn diagram.

[2]

- (b) Work out $n(S \cap (H \cup G)')$.

..... [1]

18. Nov/2023/Paper_4024/21/No.1

- (a) The population of a town is 36 400.
23% of the population are aged 18 and under.

Work out the number of people in the town aged over 18.

..... [2]

- (b) In a village, the ratio of the ages of the population is under 18 : 18 to 60 : over 60 = 4 : 11 : 5 .
There are 890 people aged over 60.

Work out the total number of people in the village aged 60 and under.

..... [2]

- (c) In 2015, the population of a city was 702 800.

- (i) In 2020, the population was 678 202.

Calculate the percentage decrease in the population from 2015 to 2020.

..... % [2]

- (ii) The population of the city increased by 12% between 1980 and 2015.

Calculate the population of the city in 1980.

..... [2]

(d) The table shows the population and area of some countries.

Country	Population	Area in km ²
Bangladesh	1.63×10^8	148 000
Bahrain	1.54×10^6	760
Maldives	3.92×10^5	298
Lebanon	5.30×10^6	10 400

- (i) Work out how many more people live in Bahrain than in Maldives.
Give your answer in standard form.

..... [1]

- (ii) The population density of a country is the number of people per square kilometre.

Which of these countries has the highest population density?
Show how you decide.

..... [3]

19. Nov/2023/Paper_4024/21/No.5(a, c)**(a)** This is part of a bus timetable.

Town square	06 30	06 50	07 10	07 35	07 45
Railway station	06 48	07 08	07 28	07 53	08 03
Business park	07 16	07 36	07 56	08 21	08 31
Airport	07 35	07 55	08 15	08 40	08 50

(i) Work out how long the bus takes to get from the town square to the business park.

..... minutes [1]

(ii) Tom arrives at the railway station at 07 12.
He gets on the next bus to the airport.

Find the time he arrives at the airport.

..... [1]

(c) Chen's journey to work is a distance of 37 km, correct to the nearest kilometre.
His journey on Monday takes 43 minutes, correct to the nearest minute.Calculate the lower bound of the average speed for this journey.
Give your answer in kilometres per hour.

..... km/h [3]

20. Nov/2023/Paper_4024/22/No.1

- (a) Idris repairs computers.
This is how he calculates the charge for a repair.

\$56 for the first hour
Then \$12.25 for each additional 15 minutes

- (i) Work out the amount Idris charges for a repair that takes him 2 hours.

\$ [2]

- (ii) Idris charges \$166.25 for another repair.
He starts work on the repair at 2.30 pm.

Find the time when he completes the repair.

..... [3]

- (b) Idris invests \$6200 in an account paying compound interest at a rate of 1.7% per year.

Calculate the total amount of interest earned at the end of 4 years.

\$ [3]

- (c) The exchange rate between dollars (\$) and euros (€) is $\$1 = \text{€}0.84$.

Idris buys some equipment from a website that charges in euros.

The equipment costs €760.

Idris must pay 2.5% tax on this cost.

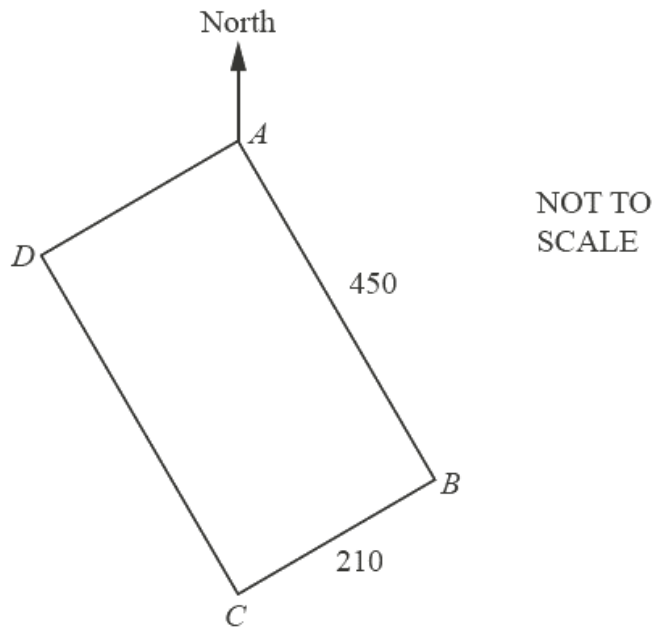
Work out the amount Idris pays for the equipment including tax.

Give your answer in dollars.

\$ [3]

21. Nov/2023/Paper_4024/22/No.9a (i)

(a)



$ABCD$ is a rectangular field.
 C is due south of A .
 $AB = 450$ m and $BC = 210$ m.

(i) Martha walks at an average speed of 5.2 km/h.

Calculate the time Martha takes to walk once around the perimeter of the field.
Give your answer correct to the nearest minute.

..... minutes [3]

22. June/2023/Paper_4024/11/No.1

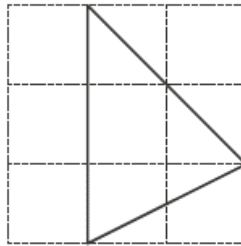
Work out.

(a) $1234.4 \div 8$

..... [1]

(b) $\frac{3}{7}$ of 56

..... [1]

23. June/2023/Paper_4024/11/No.2(a) Write down the fraction of this 3×3 square that is shaded.

..... [1]

(b) Evaluate 0.5^2 .

..... [1]

24. June/2023/Paper_4024/11/No.5

- (a) Insert one set of brackets to make the calculation correct.

$$3 + 5 \times 2 - 7 = 9 \quad [1]$$

- (b) Insert +, - and
- \times
- to make the calculation correct.

$$3 \quad 5 \quad 2 \quad 7 = 20 \quad [1]$$

25. June/2023/Paper_4024/11/No.7

- (a) Here are five temperatures in
- $^{\circ}\text{C}$
- .

-18 -21 -2 17 -10

Write these temperatures in order from coldest to hottest.

.....,,,, [1]
coldest

- (b) Work out the temperature that is
- 5°C
- colder than
- -18°C
- .

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

26. June/2023/Paper_4024/11/No.8

A rope is cut into three pieces with lengths in the ratio $3 : 5 : 4$.
The length of the shortest piece of rope is 180 cm.

(a) Find the length, in cm, of the longest piece of rope.

..... cm [2]

(b) Find the total length of rope.
Give your answer in metres.

..... m [2]

27. June/2023/Paper_4024/11/No.10

(a) Work out $1\frac{1}{3} \times \frac{8}{9}$.

Give your answer as a mixed number in its simplest form.

..... [2]

(b) Kate has a bunch of grapes.

She ate $\frac{1}{4}$ of the grapes in the morning.

She ate $\frac{2}{3}$ of the grapes in the afternoon.

Work out the fraction of the grapes that she has **not** eaten.

..... [2]

28. June/2023/Paper_4024/11/No.17

The mass of the planet Saturn is 5.7×10^{26} kg.

The mass of the planet Venus is 4.9×10^{24} kg.

Calculate the difference in mass between Saturn and Venus.

Give your answer in standard form.

..... kg [2]

29. June/2023/Paper_4024/11/No.23

The attendance at a cricket match is 36 000 correct to the nearest thousand.

(a) Write down the minimum number of people at the cricket match.

..... [1]

(b) The number of males attending the match is 21 000 correct to the nearest five hundred.

Find the maximum number of females that could be attending the cricket match.

..... [3]

30. June/2023/Paper_4024/12/No.1

Work out.

(a) $3.25 - 1.73$

..... [1]

(b) 1.2^2

..... [1]

31. June/2023/Paper_4024/12/No.3

Write these numbers in order of size, starting with the smallest.

0.65 $\frac{5}{8}$ 62% $\frac{11}{20}$ 0.595

.....,,,, [2]
smallest

32. June/2023/Paper_4024/12/No.4(a)

- (a) At midday the temperature is 8°C .
 At midnight the temperature is 12°C lower.

Find the temperature at midnight.

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

33. June/2023/Paper_4024/12/No.5

Maya invests \$480 at a rate of 2% per year simple interest.

Calculate the total amount of interest she receives at the end of 5 years.

\$ [2]

34. June/2023/Paper_4024/12/No.8

Work out $1\frac{3}{4} + \frac{5}{6}$.

Give your answer as a mixed number in its simplest form.

..... [2]

35. June/2023/Paper_4024/12/No.11

By writing each number correct to 1 significant figure, estimate the value of

$$\frac{18.2^3}{0.395}$$

..... [2]

36. June/2023/Paper_4024/12/No.14

(a) Write 325 as a product of its prime factors.

..... [2]

(b) $P = x^n y^2$ and $Q = x^{n-1} y^4$, where x and y are prime.

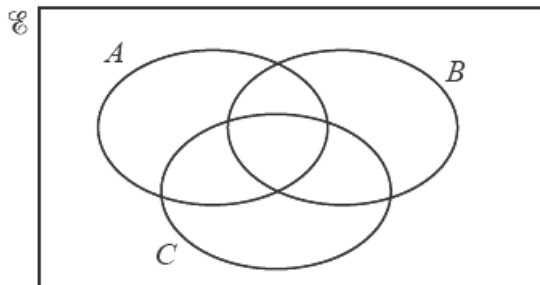
Find the highest common factor (HCF) of P and Q .

Give your answer in terms of x , y and n .

..... [2]

37. June/2023/Paper_4024/12/No.16

(a) In the Venn diagram, shade the region represented by $(A \cap B') \cup (B \cap C')$.



[1]

(b) One morning 50 people visit a library.

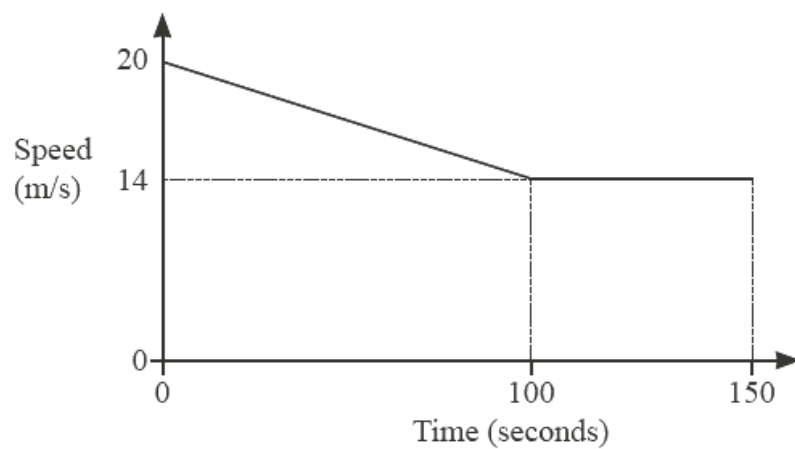
- 35 of them borrow a book.
- 12 of them use a computer.
- 8 of them do not borrow a book and do not use a computer.

Using a Venn diagram, or otherwise, find the number of people who use a computer but do not borrow a book.

..... [2]

38. June/2023/Paper_4024/12/No.19

The diagram shows the speed–time graph for part of a car’s journey.



Calculate the distance travelled by the car in the 150 seconds.

..... m [2]

39. June/2023/Paper_4024/12/No.22

y is directly proportional to w^2 .

x is inversely proportional to w .

When $w = 10$, $y = 5$ and $x = 0.4$.

Find y in terms of x .

Give your answer in its simplest form.

$$y = \dots\dots\dots [4]$$

40. June/2023/Paper_4024/21/No.2

- (a) Filomena starts work at 10.45 am on Monday.
She finishes work 2 hours 50 minutes later.

Find the time she finishes work on Monday.

..... [1]

- (b) Xavier works for 5 days each week.
He works for $4\frac{1}{2}$ hours on each of the 5 days.

- (i) Each week he earns \$261.

Calculate the hourly rate he is paid.

\$ [1]

- (ii) One day, the length of time Xavier works decreases by 20%.

Calculate the length of time he works that day.
Give your answer in hours and minutes.

..... hours minutes [2]

- (c) In 2021, Miguel's income was \$32 000.
In 2022, his income increased to \$33 408.

Calculate the percentage increase in his income from 2021 to 2022.

..... % [2]

- (d) Miguel invests \$ x in an account paying simple interest at a rate of 1.2% per year.
At the end of 3 years, he has \$890.96 in the account.

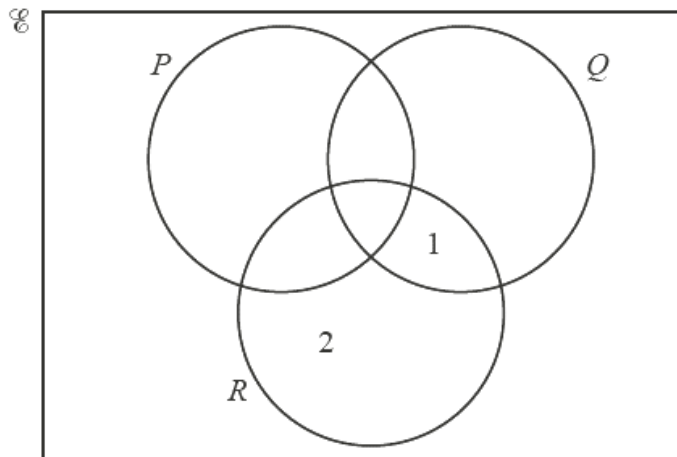
Calculate the value of x .

$x =$ [2]

41. June/2023/Paper_4024/21/No.5

- (a) $\mathcal{U} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
 $P = \{x : x \text{ is a multiple of } 3\}$
 $Q = \{x : x \text{ is an odd number}\}$
 $R = \{x : x \text{ is a factor of } 24\}$

(i) Complete the Venn diagram.



[3]

(ii) Find $n(R')$.

..... [1]

(iii) List the elements of $(P \cup R) \cap Q$.

..... [1]

(iv) Describe, in words, the type of number represented by $P \cap R \cap Q'$.

.....
 [1]

(v) A number, m , is chosen at random from the elements of R .

Find the probability that m is a multiple of 3.

..... [2]

(b) $M = 2^{2x} \times 3^4 \times 5 \times 7$
 $N = 2^3 \times 3^{x-y} \times 5^2$

The lowest common multiple (LCM) of M and N is $2^8 \times 3^6 \times 5^2 \times 7$.

(i) Find the value of x and the value of y .

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [2]$$

(ii) Find the largest square number that is a factor of M .

$$\dots\dots\dots [1]$$

(iii) Find the highest common factor (HCF) of M and N .
 Give your answer as a product of its prime factors.

$$\dots\dots\dots [1]$$

42. June/2023/Paper_4024/21/No.6(c)

(c) y is directly proportional to the cube of $(x - 2)$.

When $y = 12$, $x = 4$.

Find y when $x = 5$.

$y = \dots\dots\dots$ [2]

43. June/2023/Paper_4024/22/No.1

- (a) A shop buys some fruit.
The table shows the bill for this fruit.

Item	Quantity (kg)	Price per kg (\$)	Cost price (\$)
Bananas	50	0.51	25.50
Oranges	72	1.35	p
Avocados	r	1.95	q
Pears	45	s	51.30
Total cost price			240.30

- (i) Find the value of each of p , q , r and s .

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots$$

$$r = \dots\dots\dots$$

$$s = \dots\dots\dots [4]$$

(ii) The shop sells all this fruit for a total of \$325.

Calculate the percentage profit.

..... % [2]

(b) In 2022, the shop's total sales were \$34 974.

(i) A pie chart is drawn to show the item types that make up these total sales.

(a) The sales for fruit were \$9520.70 .

Calculate the angle representing fruit on the pie chart.

..... [2]

(b) The angle representing frozen food is 46° .

Calculate the sales for frozen food.

\$ [2]

(ii) The shop's total sales of \$34 974 in 2022 were a 4.4% increase on the total sales in 2021.

Calculate the total sales in 2021.

\$ [2]

44. June/2023/Paper_4024/22/No.5

(a) The table shows the population and area of three countries in 2019.

Country	Population	Area (km ²)
Sri Lanka	2.18×10^7	6.56×10^4
South Korea	5.17×10^7	1.00×10^5
Pakistan	2.17×10^8	8.82×10^5

(i) Write down the value of the smallest population.

..... [1]

(ii) Find the difference in area between Sri Lanka and Pakistan.
Give your answer in standard form.

..... km² [1]

(iii) The population density of a country is the number of people per square kilometre.

Find the value of the largest population density from these countries.

..... people/km² [2]

(b) In standard form, $A = 8.6 \times 10^n$ and $B = 1.5 \times 10^{n-1}$.

Giving your answer in standard form, find in terms of n

(i) $A - B$

..... [1]

(ii) $A \times B$.

..... [2]

45. June/2023/Paper_4024/22/No.6

Sophia takes part in the Trio Challenge.
She walks, then cycles and then swims.

<p><u>Trio Challenge</u></p> <p>Walk 6.3 km</p> <p>Cycle 3000 m</p> <p>Swim 1800 m</p>
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(a) Write these distances walk : cycle : swim as a ratio in its simplest form.

..... : : [2]

(b) Sophia walks at an average speed of 1.4 m/s.
She completes the walk at 11 05.

Find the time she starts walking.

..... [3]

(c) Sophia cycles a distance of 3000 m correct to the nearest 10 metres.
She cycles this distance in a time of 450 seconds correct to the nearest 10 seconds.

Calculate the upper bound for her average cycling speed in metres per second.

..... m/s [3]