Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a list of numbers.

| 1 | 17 | 21 | 25 | 26 | 31 | 39 | 64 |

From this list, write down

(a) an even number

26 or 64

(1)

(b) a multiple of 3

21 or 39

(1)

(c) a prime number

17 or 31

(1)

(d) a cube number

1 or 64

(1)

(Total for Question 1 is 4 marks)

2 (a) Change 3 litres into millilitres.

3000 millilitres

(1)

(b) Change 6500 grams into kilograms.

6·5 kilograms

(1)

(Total for Question 2 is 2 marks)

3 Paula asks 16 members of her class the number of pets they each have.
Here are her results.

1 2 2 4 0 1 2 1

3 3 4 1 1 0 3 2

(a) Complete the frequency table for her results.

Number of pets	Tally	Frequency
0	ll	2
1	llll	5
2	llll	4
3	lll	3
4	ll	2

(2)

(b) Write down the mode for the number of pets.

.... 1

(1)

(c) Work out the range for the number of pets.

4 - 0

.... 4

(1)

(Total for Question 3 is 4 marks)

4 The table gives the minimum temperature for January 2018 in each of six cities.

City	Minimum temperature (°C)
Barcelona	3
Donetsk	−10
Mexico City	−1
Mombasa	22
New York	−15
Sydney	15

(a) Which of these six cities has the lowest minimum temperature?

New York

(1)

(b) Work out the difference between the minimum temperature of Donetsk and the minimum temperature of Sydney. *−10*

15

−10   0   15
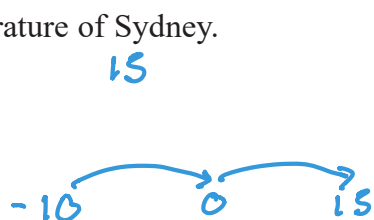
25 °C

(1)

The minimum temperature in Edmonton for January 2018 was 50°C less than the minimum temperature in Mombasa for January 2018 *22*

(c) Work out the minimum temperature in Edmonton for January 2018

22 − 50

−28 °C

(1)

(Total for Question 4 is 3 marks)

5 (a) Write these decimals in order of size.
Start with the smallest decimal.

0.9**00** ✓   0.035   0.003 ✓   0.539   0.5**00**

0·003   0·035   0·500   0·539   0·9

(1)

(b) Write 0.6 as a percentage.

60 %

(1)

(c) Write $\dfrac{60}{7}$ as a mixed number.

7 × **8** = 56

60 - 56 = 4

$8\frac{4}{7}$

(1)

(d) Work out the difference between $\dfrac{19}{20}$ and 0.68

Give your answer as a decimal.

0·95 - 0·68

0·27

(2)

(Total for Question 5 is 5 marks)

6 Here are the first five terms of a number sequence.

$$3 \qquad 7 \qquad 11 \qquad 15 \qquad 19$$

(a) Write down the next term of the sequence.

.... 23 ....

(1)

(b) Explain how you worked out your answer.

.... add 4 to the previous term ....

(1)

(c) Find the first number greater than 70 that is in the sequence.

$4n-1 = 70$ $\qquad\qquad$ $4 \times 18 - 1 = 71$

$\qquad 4n = 71$

$\qquad\quad n = \dfrac{71}{4} = 17.75$

.... 71 ....

(2)

Ada says,

"96 is a number in the sequence"

(d) Is Ada correct?
You must give a reason for your answer.

.... No, 96 is even, all the numbers in the sequence are odd. ....

....

(1)

(Total for Question 6 is 5 marks)

7 The diagram shows three points, *A*, *B* and *C*, marked on a grid.
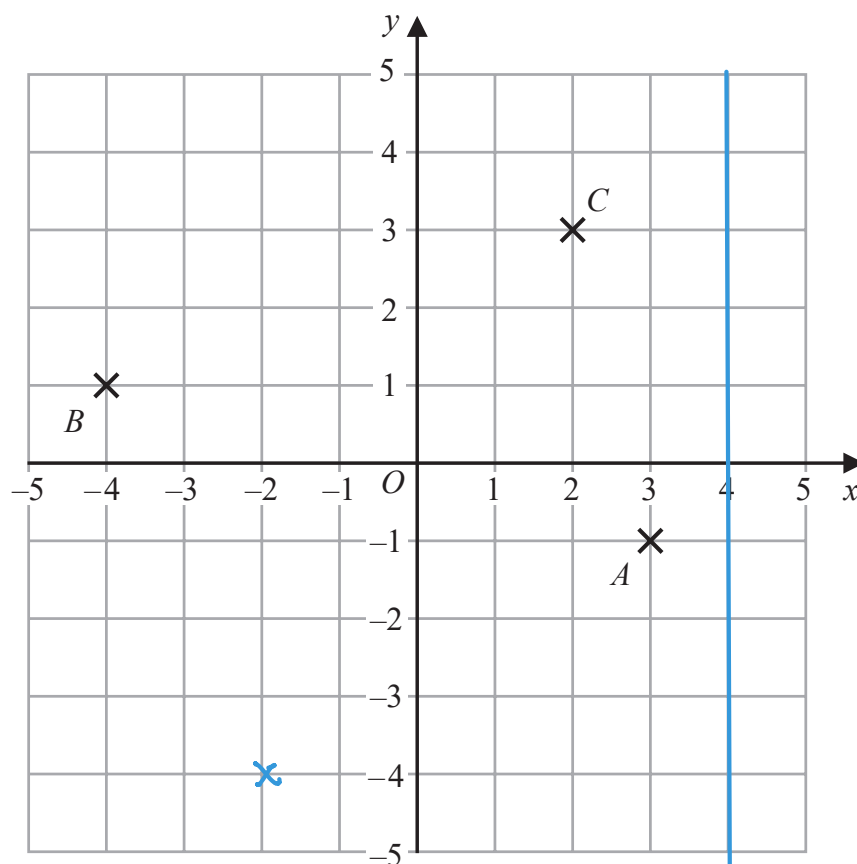
(a) Write down the coordinates of point *A*.

(.......**3**......., ...**-1**.......)

(1)

The coordinates of the point *D* are (–2, –4)

(b) On the grid, mark with a cross (×) the position of *D*.
Label the cross *D*.

(1)

(c) Find the coordinates of the midpoint of *BC*.

(.......**– 1**......., ...**2**.......)

(2)

(d) On the grid, draw the line with equation *x* = 4

(1)

(Total for Question 7 is 5 marks)

8 Lucas is going on a country walk.

Lucas works out how long each part of his walk will take.
This information is shown in the following table.

	Time taken	
Walk from home to Village A	20 minutes	11·10
Walk from Village A to Village B	35 minutes	11·30
Stop for lunch in Village B	1 hour 15 minutes	12·05
Walk from Village B to home	30 minutes	13:20
		13:50

Lucas leaves home at 11 10

At what time will Lucas get home?

13:50

(Total for Question 8 is 3 marks)

9 Below is a conversion graph to change between metres and feet.
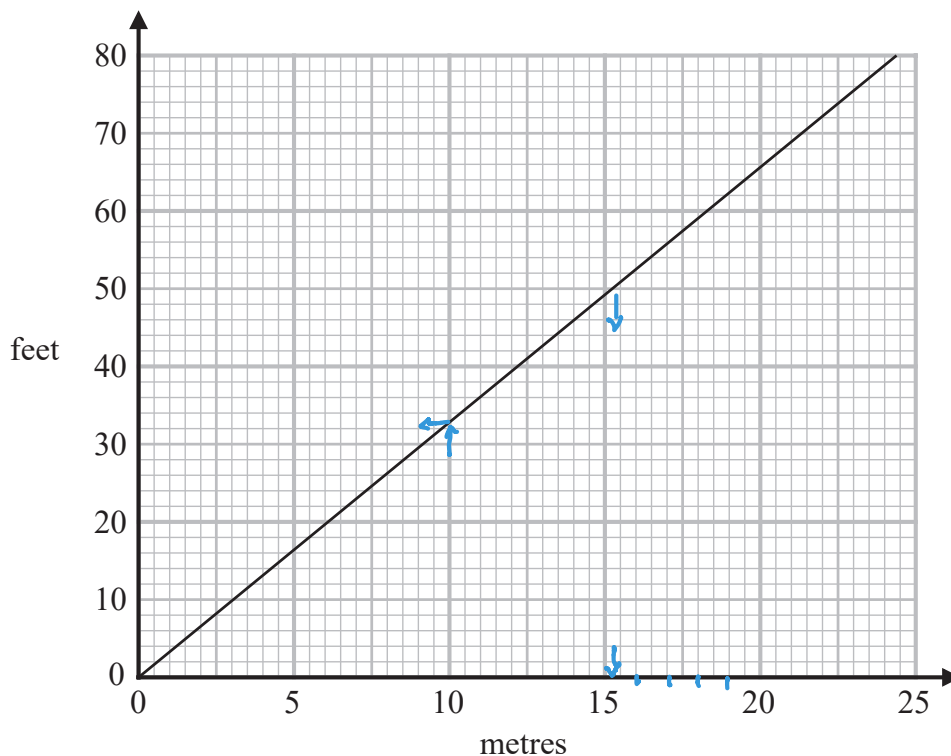
(a) Use the graph to change

   (i) 10 metres to feet,

   ....33............ feet
   (32 to 34)

   (ii) 50 feet to metres.

   ....15............ metres
   (15 to 16)   (2)

Joss lives 820 metres above sea level.
Nicky lives 2850 feet above sea level.

(b) Which is the greater, 820 metres or 2850 feet?
    You must show how you get your answer.

(2)

(Total for Question 9 is 4 marks)

10 Hugo records the number of pairs of trainers sold in each of four shoe shops last Saturday.
He is going to draw a pie chart for his results.

The incomplete table shows two of Hugo's results and the sizes of three of the angles in his pie chart.

Name of shop	Number of pairs of trainers	Angle in pie chart
ABC Shoes	12	30° ÷2·5
Kilian Stuart Sports	18	45°
One Stop Shoes	48 x 2·5	120 °
Superfast Trainers	66	165° ÷ 2·5

Complete the table.

$45° = 18$ pairs
$2.5° = 1$ pair

11 Work out 23% of 450 millilitres.

0.23×450

........103·5........millilitres

(Total for Question 11 is 2 marks)

12 (a) Write down all the factors of 9

1×9

3×3

........1, 3, 9........
(1)

(b) Find the lowest common multiple (LCM) of 15 and 70

15 × 70
× 140
✓ 210

........210........
(2)

(Total for Question 12 is 3 marks)

13 The diagram shows the plan of Sophia's gym floor.

20 m

12 m

26 m
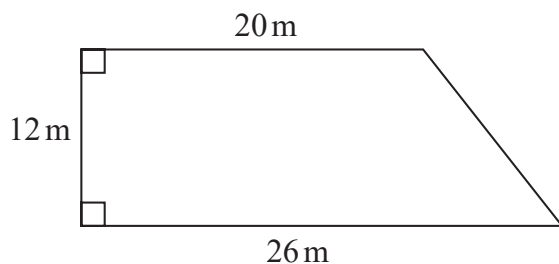
Diagram **NOT**
accurately drawn

Sophia is going to paint all the gym floor.

Each tin of paint she is going to use covers an area of 20 m²

There is a special offer on the paint that Sophia is going to buy.

Special Offer

1 tin for $13
4 tins for $40

Work out the least amount of money that Sophia has to pay in order to buy all the paint she needs.
Show your working clearly.

$$\text{Area} = \frac{1}{2}(20 + 26) \times 12 = 276 \, m^2$$

$$\text{Tins} \quad 276 \div 20 = 13.8 \text{ so } 14 \text{ tins}$$

$$4 \text{ tins} = \$40$$
$$4 \text{ tins} = \$40$$
$$4 \text{ tins} = \$40$$
$$2 \text{ tins} = \underline{\$26} \quad @ \$13$$
$$146$$

$ ....146.......

(Total for Question 13 is 5 marks)

14 (a) Factorise $25f - 10$

$5 \times 5 \quad\quad 5 \times 2$

$5(5f - 2)$

(1)

(b) Make y the subject of the formula $c = 5y - h$

$c + h = 5y$

$y = \dfrac{c + h}{5}$

$y = \dfrac{c + h}{5}$

(2)

(c) Solve the inequality $4x + 7 > 2$

$-7 \quad -7$

$4x > -5$

$x > -\dfrac{5}{4}$

$x > -1.25$

(2)

(Total for Question 14 is 5 marks)

15 Show that $\dfrac{2}{5} \div \dfrac{11}{20} = \dfrac{8}{11}$

$\dfrac{2}{\cancel{5}_1} \times \dfrac{\cancel{20}^4}{11}$

$= \dfrac{8}{11}$ as required.

(Total for Question 15 is 2 marks)

16 The table shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.

Length of time (*L* minutes)	Frequency
20 < ~~*L*~~ **26** ⩽ 30	6
30 < ~~*L*~~ **35** ⩽ 40	26
40 < ~~*L*~~ **45** ⩽ 50	31
50 < ~~*L*~~ **55** ⩽ 60	40
60 < ~~*L*~~ **65** ⩽ 70	17

(a) Write down the modal class.

$$50 < L \leqslant 60$$

(1)

(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.

$25 \times 6 = 150$

$35 \times 26 = 910$

$45 \times 31 = 1395$

$55 \times 40 = 2200$

$\underline{65 \times 17 = 1105}$

5760

$5760 \div 120$
$= 48$

48 .... minutes

(4)

(Total for Question 16 is 5 marks)

P 6 2 6 5 4 A 0 1 5 2 4

17 Here is a list of ingredients needed to make apple crumble for 6 people.

[handwritten: 8/1, ×2 arrow, 2/1]

Apple Crumble
Ingredients for 6 people *[handwritten: ÷3]*
12 apples
150 g butter
195 g flour
90 g oats
120 g sugar

Nadiya wants to make apple crumble for 14 people.

(a) Work out the amount of butter she needs.

[handwritten working:]
$$50g = 2 \text{ people} \quad \div 3$$
$$150g = 6 \text{ people}$$
$$200g = 8 \text{ people} \quad \times 4$$
×4

$$14 = 150g + 200g$$

.... **350** .... g

(2)

Alison makes apple crumble for a group of people.

She uses 630 g of oats.

(b) Work out the number of people in the group.

[handwritten working:]
$$90g = 6 \text{ people}$$
×7
$$630g = 42 \text{ people}$$
×7

.... **42** ....

(2)

At a cake sale, Michael sells some lemon cakes and some chocolate cakes.

the number of lemon cakes he sells : the number of chocolate cakes he sells = 2 : 7

Michael sells a total of 162 cakes.

(c) Work out the number of lemon cakes Michael sells.

$$L \quad : \quad C$$
$$2 \quad : \quad 7$$

$$162 \div 9 = 18$$

$$2 \times 18 \qquad\qquad 7 \times 18$$
$$= 36 \qquad\qquad = 126$$

.... 36 ....

(2)

(Total for Question 17 is 6 marks)
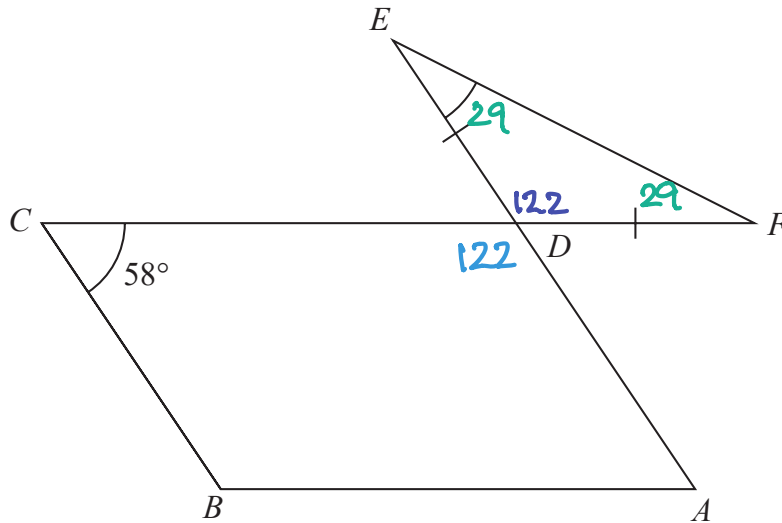
E

Diagram **NOT**
accurately drawn

29

122 29

C

122 D F

122

58°

B A

The diagram shows a parallelogram *ABCD* and an isosceles triangle *DEF* in which *DE = DF*

CDF and *ADE* are straight lines.
Angle *BCD* = 58°

Work out the size of angle *DEF*.
Give a reason for each stage of your working.

CDA = 180 - 58
    = 122

Countenor angles add up to
180°

EDF = 122

Vertically opposite angles are
equal

DEF = EFD
180 -122 = 58
    58÷2 = 29

Two angles in an isosceles
triangle are equal

............29............ °

(Total for Question 18 is 5 marks)

19 Andreas, Isla and Paulo share some money in the ratios 3 : 2 : 5

The **total** amount of money that Isla and Paulo receive is £76 more than the amount of money that Andreas receives.

Andreas buys a video game for £48.50 with some of his share of the money.

Work out how much money Andreas has left from his share of the money when he has bought the video game.

A   I   P
3   2   5

⌐‾‾‾‾‾‾‾¬
    7

$76 \div 4 = 19$

3×19 2×19 5×19 check
$= 57$ 38 95 38   133
                                                          95   −57
                                                          133   76 ✓

$57 - 48.50$
$= 8.5$

£ 8.50

(Total for Question 19 is 4 marks)

20 Himari's annual salary is 3 130 000 Japanese Yen (JPY).
She gets a salary increase of 4%

(a) Work out Himari's salary after this increase.

$$3130000 \times 1.04$$

..........3255200.......... JPY

(3)

Kaito bought a car.
The value of the car when Kaito bought it was 750 000 JPY.
At the end of each year, the value of his car had depreciated by 15%

(b) Work out the value of Kaito's car at the end of 3 years.
Give your answer correct to the nearest JPY.

$$750000 \times 0.85^3$$

$$= 460593.75$$

..........460594.......... JPY

(3)

(Total for Question 20 is 6 marks)

21 (a) Simplify $g^6 \times g^4$

$$g^{6+4}$$

$$g^{10}$$

(1)

(b) Simplify $(3cd^4)^2$

$$3^2 c^2 d^{4 \times 2}$$

$$9c^2 d^8$$

(2)

(c) Solve the simultaneous equations

    ① $4x + 3y = 17$
    ② $x + 2y = 5$ $\times 4$

Show clear algebraic working.

$$\begin{array}{ll} ③ & 4x + 8y = 20 \\ ① & 4x + 3y = 17 \end{array}$$

$$③ - ①$$

$$5y = 3$$

$$y = \frac{3}{5}$$

sub in ①

$$4x + 3 \times \frac{3}{5} = 17$$

$$4x = 17 - \frac{9}{5}$$

$$= \frac{76}{5}$$

$$x = \frac{19}{5}$$

$$x = \frac{19}{5} = 3.8$$

$$y = \frac{3}{5} = 0.6$$

(3)

(Total for Question 21 is 6 marks)

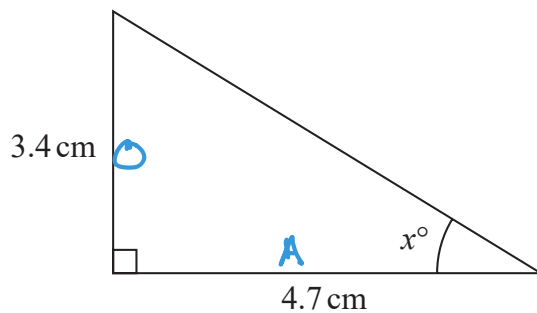**22** The diagram shows a right-angled triangle.

Diagram **NOT** accurately drawn

3.4 cm

$x°$

4.7 cm

Calculate the value of x.
Give your answer correct to one decimal place.

$$\tan x = \frac{3.4}{4.7}$$

$$x = \tan^{-1}\left(\frac{3.4}{4.7}\right)$$

$$= 35.882...$$
$$\quad\uparrow$$
$$(1dp)$$

$x = $ 35.9

(Total for Question 22 is 3 marks)

23 The diagram shows an isosceles triangle.

Diagram **NOT** accurately drawn

8.5 cm   8.5 cm

h

4

8 cm
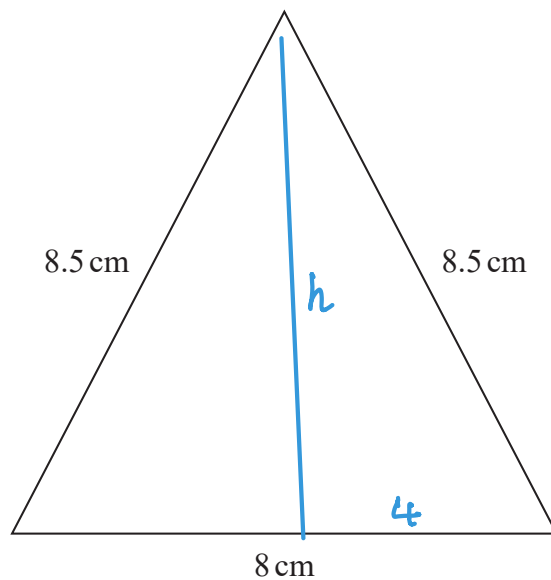
Work out the area of the triangle.

$h = \sqrt{8.5^2 - 4^2}$

$= 7.5$

$\text{Area} = \frac{1}{2} \times 8 \times 7.5$

$= 30$

.... 30 .... cm²

(Total for Question 23 is 4 marks)

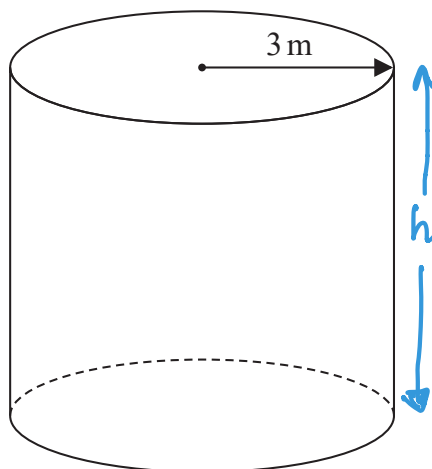**24** The diagram shows a solid cylinder with radius 3 m.

3 m

Diagram **NOT**
accurately drawn

h

The volume of the cylinder is 72π m³

Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

$\pi r^2 \times h = 72\pi$

$3^2 \times h = 72$

$h = \dfrac{72}{9} = 8$

surface area

$2 \times \pi r^2 + \pi \times d \times h$

$= 2 \times \pi \times 3^2 + \pi \times 6 \times 8$

$= 66\pi$

$= 207.345\ldots$

(3.sf.)

..........207.......... m²

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS