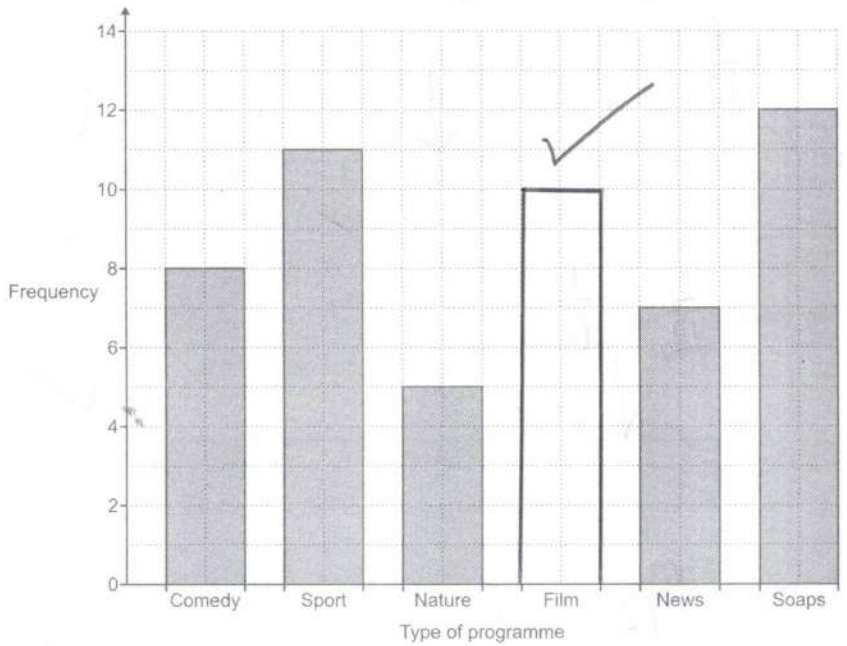
Answer **all** the questions.

1 Reece asked some friends what type of programme they watch most on television.
The bar chart shows some of his results.



(a) 10 people answered Film.

Complete the bar chart to show this information. **[1]**

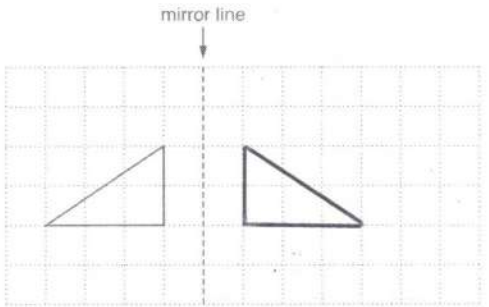
(b) Complete these sentences.

(i) Soaps was chosen by the most people. **[1]**

(ii) 7 people chose News. **[1]**

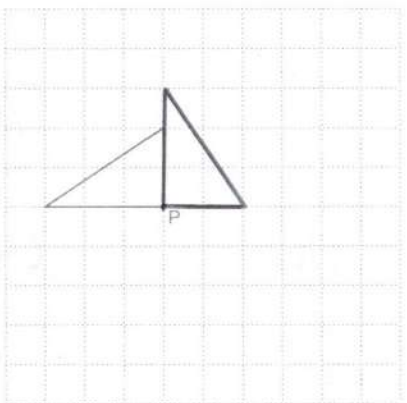
(iii) 3 **fewer** people chose Nature than Comedy. **[1]**

2 **(a)** Reflect the triangle in the mirror line.



[2]

(b) Rotate the triangle 90° clockwise about the point P.



[2]

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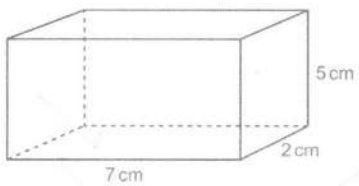
3 Work out the volume of this cuboid.



7 × 5 × 2 ✓

70 ✓

..... cm³ [2]

4 (a) Write 2% as a decimal.

÷100

0·02 ✓

(a) ..... [1]

(b) Write $\frac{11}{20}$ as a percentage.

×5 OE

$\frac{55}{100}$

55 ✓

(b) ..... % [1]

5 Use one of the symbols <, = or > to make each statement true.

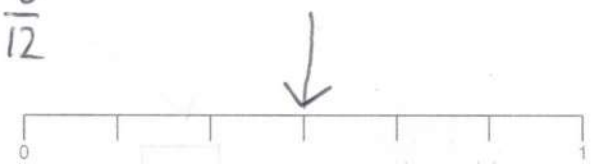
(a) 0.7 ..... $\frac{2}{3}$ [1]

(b) 27.06 ..... 27.59 [1]

6 A bag contains 12 counters.
6 are red, 4 are blue and 2 are yellow.
A counter is taken from the bag at random.

Mark with an arrow (↓) the probability the counter is

(a) red. $\frac{6}{12}$



✓

[1]

(b) yellow. $\frac{2}{12} = \frac{1}{6}$

✓

[1]

(c) green. $\frac{0}{12}$

✓

[1]

7 (a) Divide 72 in the ratio 4 : 5.

72 ÷ 9 = 8 ✓

4 × 8 5 × 8

32 : 40 ✓

(a) ..... : ..... [2]

(b) In one year, Clara and Dave borrowed books from a library in the ratio 3 : 7.
Dave borrowed 35 books.

Work out the number of books borrowed by Clara.

C D
3 7
×5 ✓
35

3 × 5 = 15 ✓

(b) ..... [2]

8 Yoghurts are packed in trays.
Each tray holds 12 yoghurts.

What is the smallest number of trays needed to pack 460 yoghurts?

$\frac{460}{12} = 38.3...$ ✓

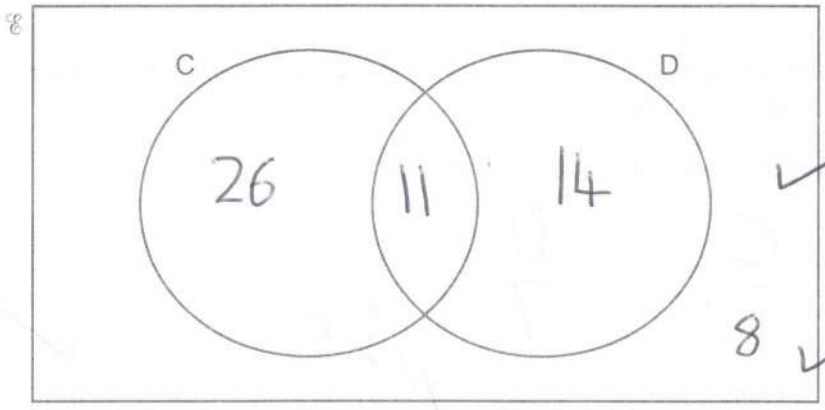
39 ✓

..... [2]

9 59 families are asked whether they have a cat (C) or a dog (D).

- 26 only have a cat.
- 14 only have a dog.
- 11 have both a cat and a dog.

(a) Show this information on the Venn diagram.



[1]

(b) (i) How many of the families do not have a cat or a dog?

(b)(i) 8 ✓ ..... **[1]**

(ii) Write your answer in the correct place on the Venn diagram. **[1]**

(c) One of the families is chosen at random.

Write down the probability that they have a dog.

(c) $\frac{25}{59}$ ✓✓ ..... **[2]**

10 Nadia thinks of a number.
She finds the square root and then divides by 5.
Her answer is 20.

What number is she thinking of?

$$\frac{\sqrt{x}}{5} = 20$$

$$\sqrt{x} = 100$$ ✓

$x = 100^2 = 10\,000$ ✓

..... **[2]**

11 The scale on a map is 1 : 50 000.

How many kilometres on the ground are represented by 8 cm on the map?

1 : 50000

8cm : 400,000 cm ÷100 ✓

= 4000 m ✓

÷1000

4 ✓

..... km **[3]**

12 (a) A train is travelling with a velocity of 15 m/s.
It then accelerates at 0.5 m/s^2 for 6 seconds.

Use the formula $v = u + at$ to calculate the velocity of the train after the 6 seconds.

$15 + 0.5 \times 6$ ✓

(a) 18 ✓ ..... m/s **[2]**

(b) Rearrange the formula $v = u + at$ to make a the subject.

$v - u = at$ ✓

$a = \frac{v-u}{t}$ ✓

(b) ..... **[2]**

13 Choose a word from this list that best describes each statement.

Identity Expression Formula Term Equation

(a) $8 = n + 2$ — (a) Equation ✓ [1]

(b) $3x + 2y$ — (b) Expression ✓ [1]

(c) $(a+b)(a-b) = a^2 - b^2$ — (c) Identity ✓ [1]

14 Harry is paid £8.60 per hour for the first 30 hours he works each week.
After 30 hours he is paid $1\frac{1}{2}$ times the hourly rate.

Last week, Harry worked for 33 hours.
He was also paid a bonus of $\frac{1}{10}$ of his earnings for that week.

Calculate how much Harry was paid **in total** last week.

✓ 8·60 × 30 = 258 + ✓

✓ 3 × 1·5 × 8·6 = 38·70

£ 296·70 ✓

296·70 × 1·1 ✓

326·37 ✓

£ ..... [6]

15 **(a)** Solve.

$\frac{x}{2} + 5 = 15$

$\frac{x}{2} = 10$ ✓

$x = 10 \times 2 = 20$ ✓

(a) $x =$ ..... **[2]**

(b) Factorise.

$5a^2 - 10a$

(b) $5a(a-2)$ ..... **[2]**

(c) Solve by factorising.

$x^2 + 15x + 56 = 0$

56 1
28 2
14 4
8 7

$(x+7)(x+8)$ ✓✓

(c) $x =$ -7 ..... or $x =$ -8 ..... **[3]** ✓

16 The height, h, of a lorry is 4.3 metres, correct to 1 decimal place.

Complete the error interval for the height, h.

$4.25 \leqslant h <$ 4.35 ..... **[2]**

✓ ✓

17 The table below shows the number of barrels of oil produced per day by some countries.

Country	Barrels of oil produced per day
USA	1.17×10^7
China	3.98×10^6
UK	9.39×10^5
Cameroon	9.32×10^4
Japan	3.92×10^3

(a) Write the number of barrels of oil produced per day by Cameroon as an ordinary number.

9.32×10000

(a) 93200 ✓ [1]

(b) How many more barrels of oil per day did China produce than the UK?
Give your answer in standard form, correct to 3 significant figures.

$3.98 \times 10^6 - 9.39 \times 10^5$ ✓

$= 3041000$ ✓

(b) 3.04×10^6 ✓✓ [4]

(c) Jamal says the USA produced approximately three times more barrels of oil than Japan.

Is he correct?
Show how you decide.

$\frac{1.17 \times 10^7}{3.92 \times 10^3} = 2984.69...$ ✓

Jamal is wrong because it is 3000 x more not 3. ✓ [2]

18 A triangle has sides of length 14.1 cm, 14.8 cm and 19.5 cm.

Is this a right-angled triangle?
Show how you decide.

$\sqrt{14.1^2 + 14.8^2} = 20.44...$ ✓✓

$\neq 19.5$

No ..... because the side lengths do not ✓
obey Pythagoras ..... [4]

19 One morning Kai records the colour of the cars passing his house.
He then works out the relative frequency of each colour.
Some of his results are shown in this table.

Colour	Silver	Red	Green	Black	Other
Relative frequency		0.16	0.10	0.24	0.32

The following morning, Kai is going to record the colour of the first 200 cars to pass his house.

Work out an estimate for the total number of cars, coloured silver or red, that he should expect to see.

0.82 ✓

$1 - 0.82 = 0.18$ ✓

$200 \times (0.18 + 0.16)$ ✓

68 ✓

..... [4]

20 James is taking three examination papers in Spanish.
Here are his first two results.

Paper 1: $\frac{43}{80}$ Paper 2: $\frac{38}{65}$

Paper 3 is out of 95.
The marks in each of the three papers are added together.

Find the lowest mark that James needs in Paper 3 to achieve 60% of the total marks.

$= \frac{60}{100} \times (80 + 65 + 95)$ ✓

$= 0.6 \times 240 = 144$ total needed ✓

$144 - 43 - 38$ ✓

63 ✓

..... [4]

21 Three people take $2\frac{1}{2}$ hours to deliver leaflets to 270 houses.

Assuming all people deliver leaflets at the same rate, how long will it take five people to deliver leaflets to 405 houses?
Give your answer in hours and minutes.

$3 \times 2.5 = 7.5$ hrs ✓ for 270 houses for 1 person

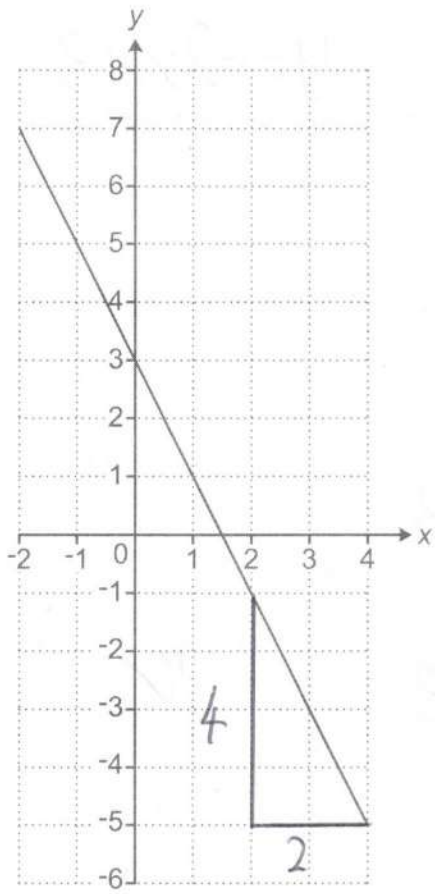
$(405 \div 270 = 1.5)$

$7.5 \times 1.5 \div 5$ people ✓

$= 2.25$ ✓

$=$ 2 hours 15 mins ✓ **[4]**

22 This graph shows part of a straight line.



(a) Write down the *y*-intercept.

(a) 3 ✓ ..... **[1]**

(b) Show that the gradient of the line is -2. **[1]**

$$m = \frac{-4}{2} = -2$$ ✓

(c) Write down the equation of the line.

(c) $y = -2x + 3$ ✓ [1]

(d) The line continues to the right.

Will this line pass through the point (50, ⁻103)?
Show how you decide.

$y = -2x + 3$

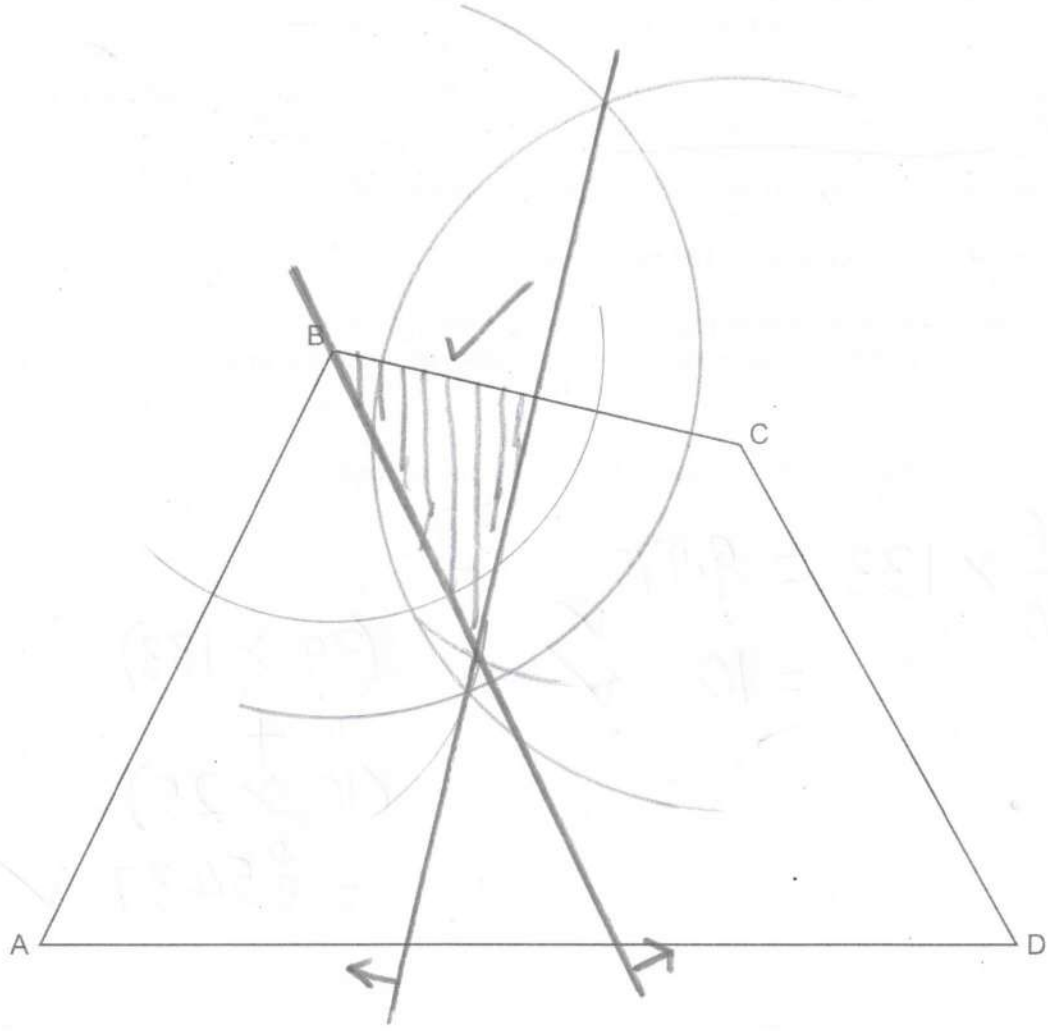
$x = 50$, $y = -103$

$-103 = -100 + 3$ m✓

$-103 \neq -97$

No because (50, -103) doesn't satisfy ✓ the equation [2]

23 ABCD is a quadrilateral.



(a) Construct the bisector of angle ABC.
Show all your construction lines. **[2]**

(b) Construct the perpendicular bisector of BC.
Show all your construction lines. **[2]**

(c) Shade the region which is

- nearer to BC than to AB

and

- nearer to B than to C.

[1]

24 Lily buys and sells microwaves.

She buys each one for £32 and sells it for £60.
She also pays £7 for the delivery of each microwave she sells.

If she sells a microwave that is faulty then Lily must pay for its repair and redelivery. This costs her another £25 for each faulty microwave.

Last month, 6 out of the 80 microwaves Lily sold were faulty.

This month she has orders for 133 microwaves.

Calculate her expected percentage profit on this month's order.
Showing your working in the boxes below may help you present your work.

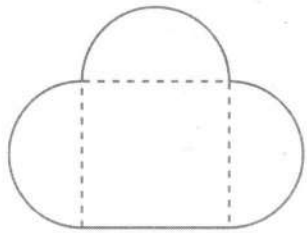
Expected number of faulty microwaves: $\frac{6}{80} \times 133 = 9.975$ ✓ $= 10$ ✓	Expected costs: 32 7 (39×133) $+$ (10×25) $= £5437$ ✓
Income from sales: $60 \times 133 = £7980$ ✓	Expected percentage profit: $\frac{2543}{5437} \times 100$ ✓ $= 46.77...$

47 ✓

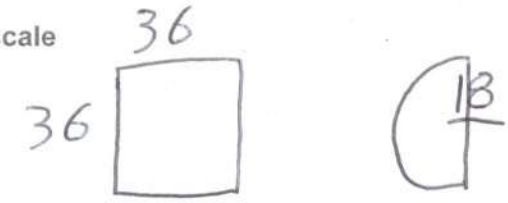
..... % **[6]**

Turn over for Question 25

25 The diagram shows Jane's lawn.
It is in the shape of a square of side 36 m and three semi-circles.



Not to scale



She is going to spread fertiliser on the lawn at a rate of 30 g per square metre.
The fertiliser is only sold in 10 kg bags costing £15.80 each.

Calculate the cost of buying the bags of fertiliser for her lawn.
You must show all your working.

Area = $36^2 + 1.5 \times \pi \times 18^2$ ✓✓

= 2822.8... m^2

$\times 30$ = 84684 g ✓

= 84.684 kg

= 9 bags ✓

✓
9×15.80

✓
142.20

£ ..... **[6]**

END OF QUESTION PAPER