Paper 2 and Paper 3 Preparation Paper

AQA Foundation

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You will need a calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Paper 2 and 3 Checklist

Question	Topic	Video number
Starred Topics		
1	Angle Facts	35, 30, 34, 39
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6	Angles in a Polygon	32
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27	Volume of a Cuboid/Cube	355, 356
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30	Square Numbers and Square Roots	226, 228
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55	Combined Mean	53a
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58	Tree Diagrams	252

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63	Collecting Like Terms	9
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Question	Topic	Video number
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94	Surface Area of a Sphere/Cone	313, 314
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Question	Topic	Video number
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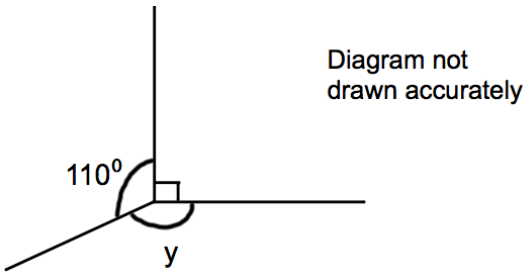
1.

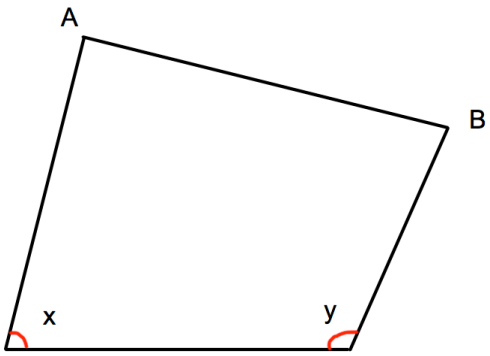


Work out the size of the angle marked y.

.....°

(1)

2.

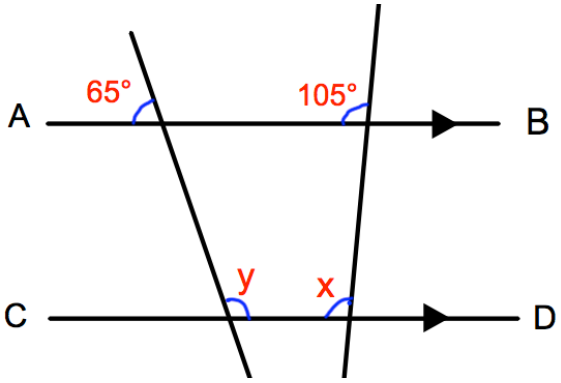


What type of angle is x?

.....

(1)

3.



AB is parallel to CD.

(a) Work out the size of the angle marked x.

.....°

Give a reason for your answer.

.....

.....

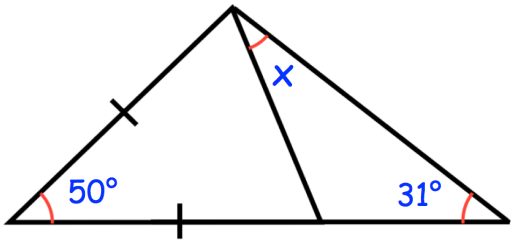
(2)

(b) Work out the size of the angle marked y.

.....°

(2)

4.

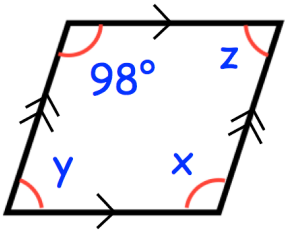


Find the size of the angle marked x.

.....°

(3)

5.



(a) Find x

.....°

(1)

(b) Find y

.....°

(1)

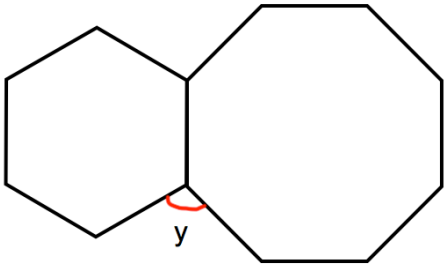
(c) Find z

.....°

(1)

---

6. Shown is a regular hexagon and a regular octagon.

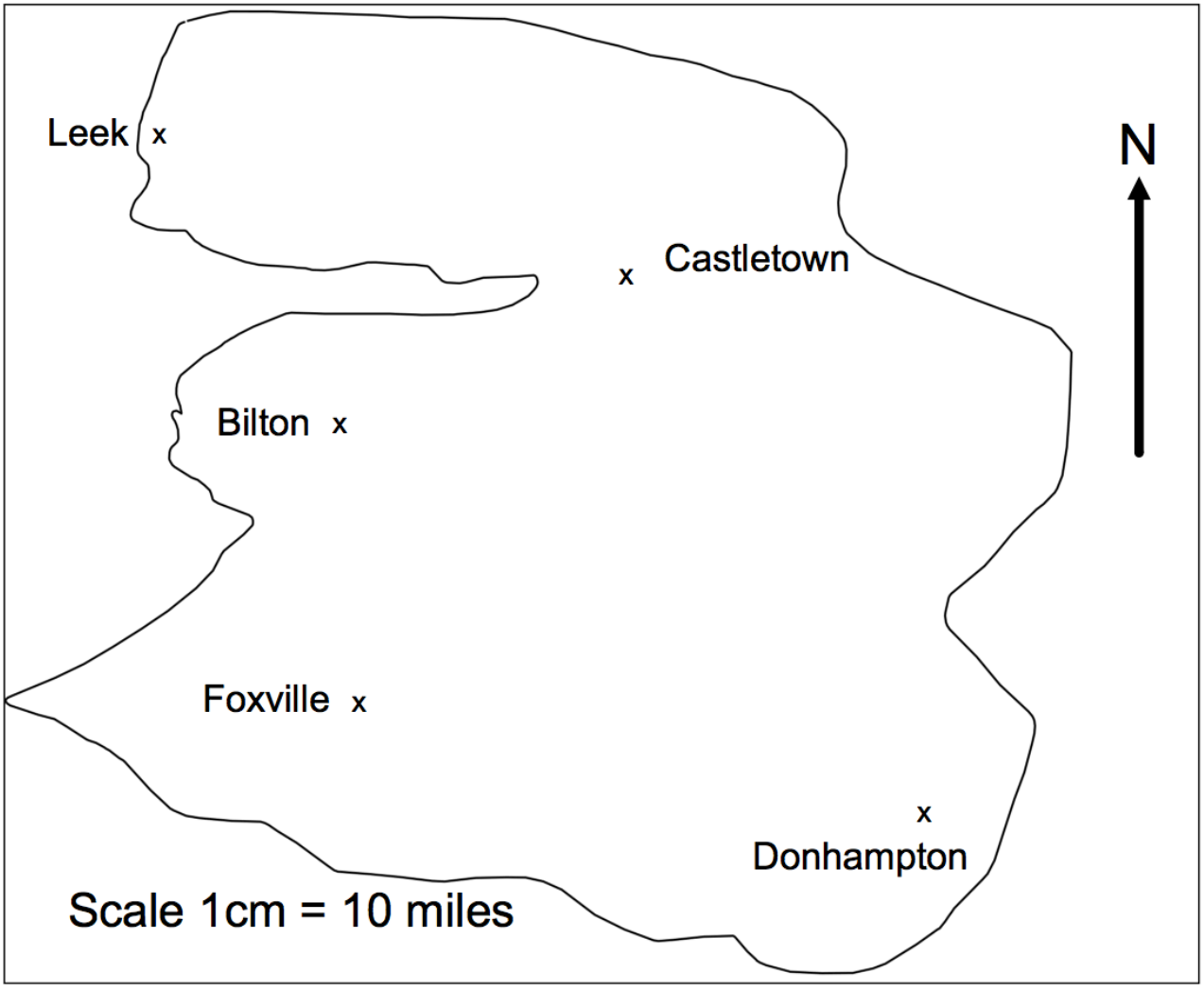


Calculate the size of angle y.

y = ...°

(3)

7. This is a map of an island.



A helicopter flies in a straight line from Leek to Donhampton.

(a) How far does the helicopter fly?

.....miles
(2)

(b) Write down the bearing of Donhampton from Leek.

.....°
(1)

8. The perimeter of a parallelogram is 17cm.
The length of each long side is 5cm.

Work out the length of each short side.

.....cm
(2)

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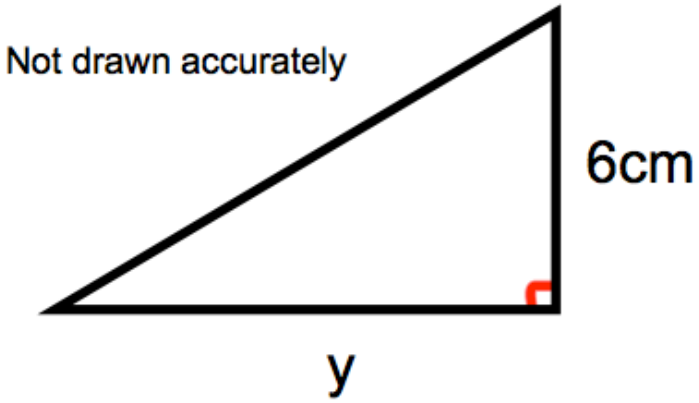
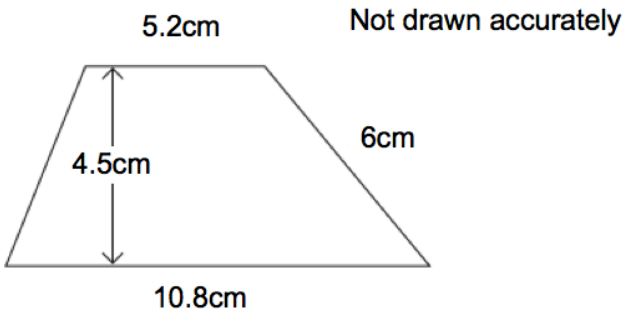
9. Shown below is a right-angled triangle.



The area of the triangle is 21cm²
Calculate y, the length of the base.

.....cm
(2)

10.



Calculate the area of the trapezium.

.....cm²

(2)

---

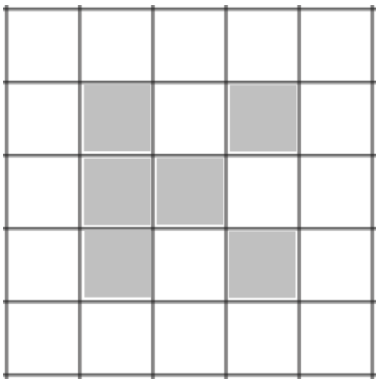
11. The mass of a 2p coin is 7g.

Find the mass of £6 worth of 2p coins.
Give your answer in kilograms.

.....kilograms

(4)

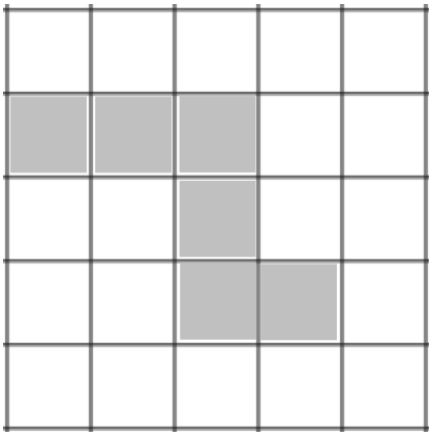
12.



Shade one more square to make a pattern with 1 line of symmetry.

(1)

13.



Shade one more square to make a pattern with rotational symmetry order 2.

(1)

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14. Connor's watch is 17 minutes slow
Joseph's watch is 5 minutes fast

The time on Joseph's watch is 19:01

What time is shown on Connor's watch?

.....

(1)

15. Here is part of a timetable for a bus.

Southville	09 18	10 38	12 05
Leek	09 28	10 48	-------
Milton	09 41	11 01	-------
Newtown	09 49	11 09	-------
Red Island	09 55	11 15	12 36
Sandville	10 13	11 33	-------
Bakerstown	10 31	11 51	13 00

A bus leaves Southville at 10 38

(a) At what time should the bus arrive at Newtown?

.....
(1)

(b) How long will the journey take?

.....minutes
(1)

James arrives at the Milton bus stop at 09 29.
He waits for the next bus to Red Island.

(c) (i) How many minutes should he wait?

.....minutes
(1)

(ii) At what time should James arrive at Red Island?

.....
(1)

Sally wants to travel from Southville to Bakerstown.
The 12 05 is an 'express' bus.

(d) How many minutes shorter is the journey if she takes the 'express bus?'

.....minutes
(2)

16. The distance chart below shows the distance, in miles, between some towns and cities.

Cambridge			
54	Ipswich		
64	45	Norwich	
43	82	78	Peterborough

(a) Write down the distance between Ipswich and Peterborough.

..... miles
(1)

(b) Write down the distance between Norwich and Cambridge.

..... miles
(1)

(c) Write down the names of the places that are 78 miles apart

..... and.. .....
(1)

---

17. The distance from Leek to Milton is 310 miles.
A train travels this distance in 4 hours 15 minutes.

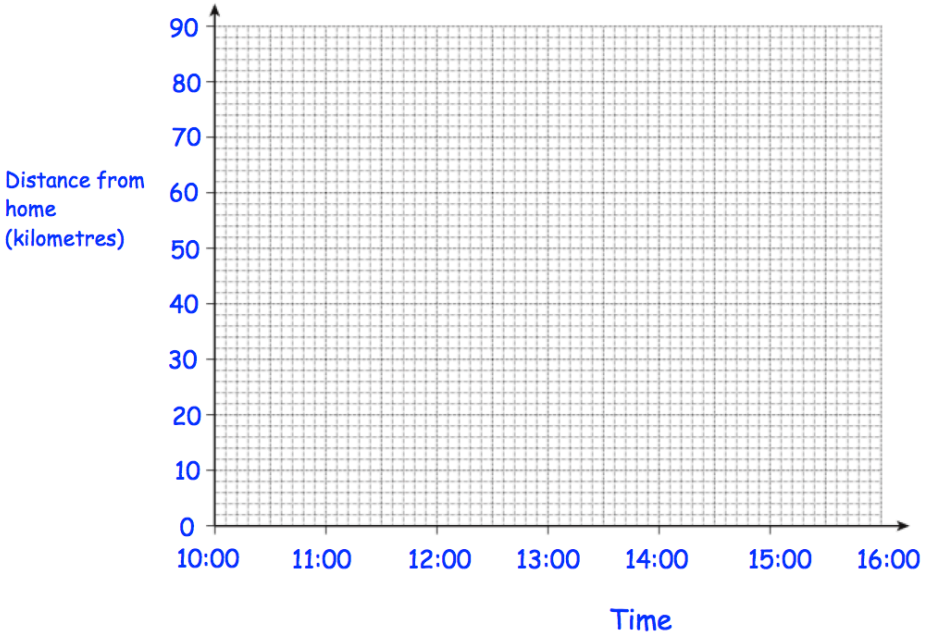
Calculate the average speed of the train.

.....mph
(3)

18. Bethany drove to a family meal and then back home.
The meal was at a restaurant that is 70 kilometres from her home.

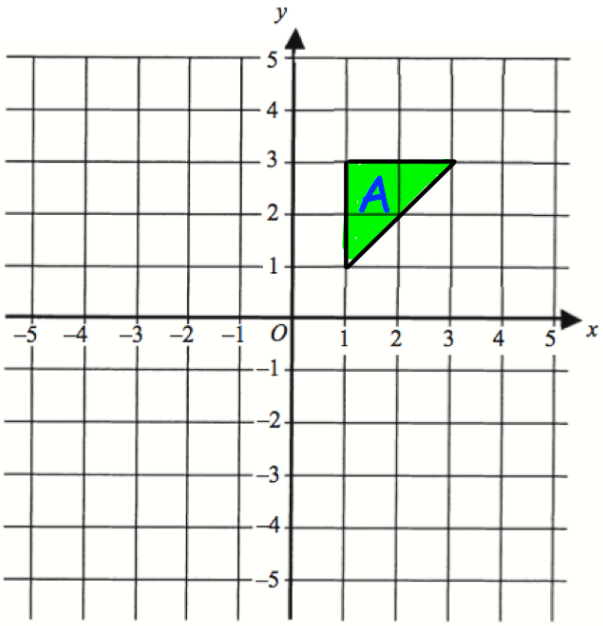
Bethany left home at 10:00 and arrived at the restaurant at 11:30.
She stayed at the family meal for 2 hours.
Bethany then drove home at a speed of 35 kilometres per hour.

Show this information on the distance-time graph.



(3)

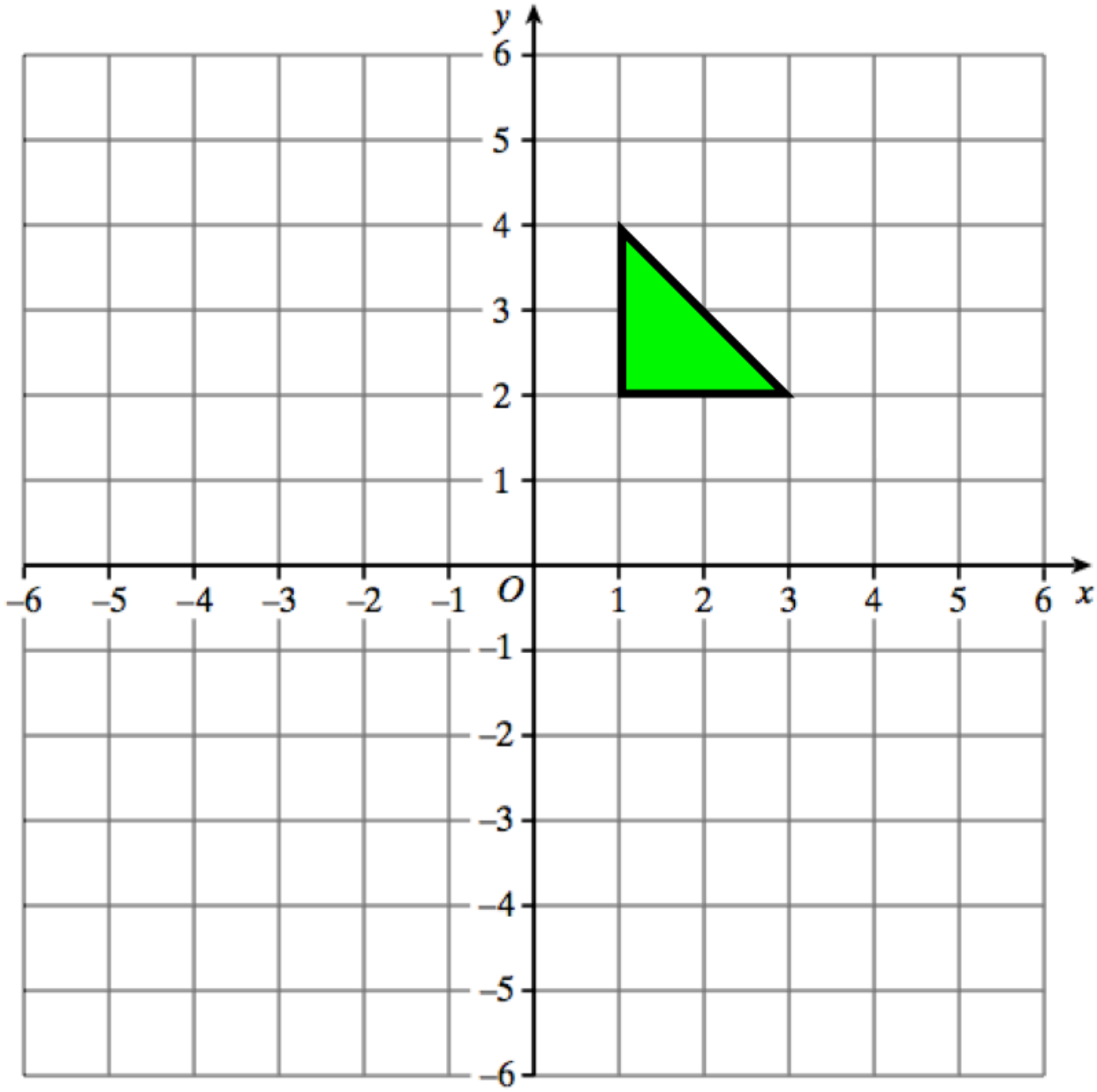
19.



Translate triangle A by the vector $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$

(2)

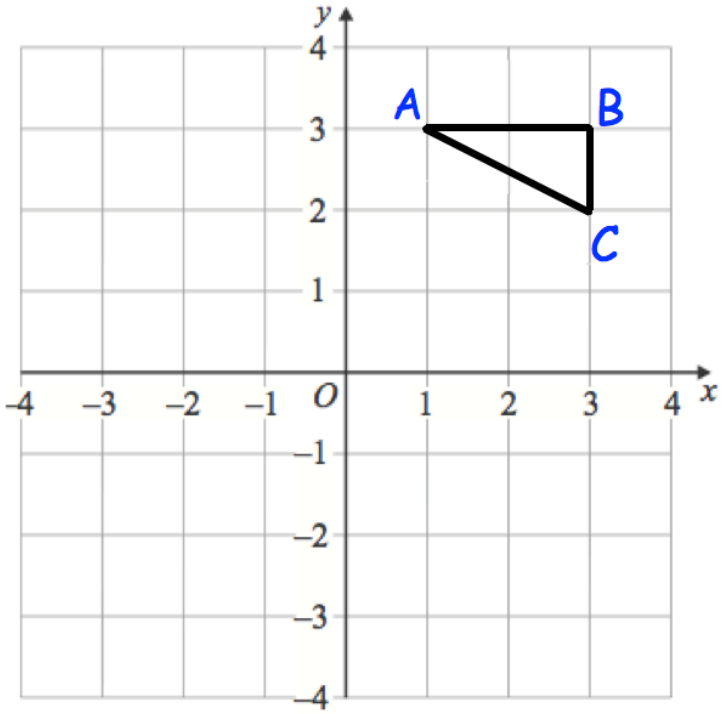
20.



Reflect the triangle in the line y = –1
Label the new triangle B.

(2)

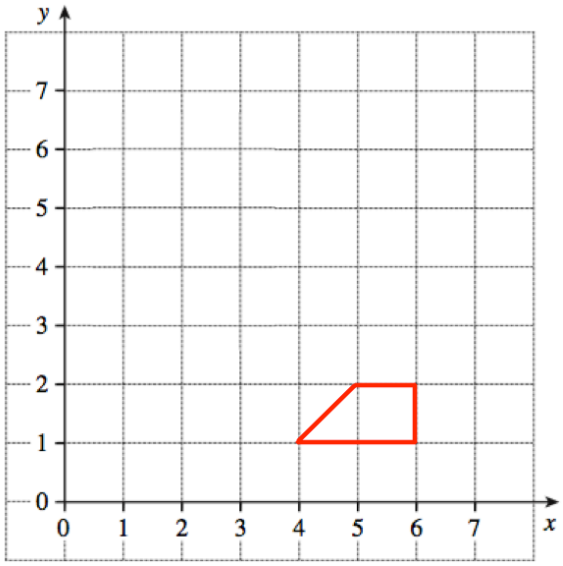
21.



Rotate triangle ABC 90° clockwise about centre (0, 0)

(3)

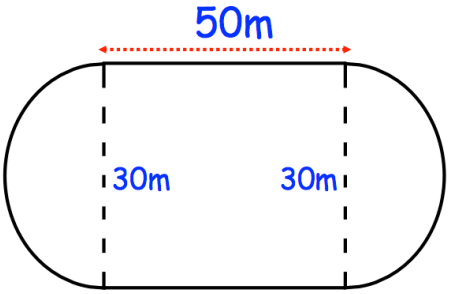
22.



Enlarge the trapezium by scale factor 3, centre (6, 0).

(2)

23. A primary school has a running track.
It has two straights of 50 metres.
Also there are two 'bends' that are semicircles with diameter 30 metres.

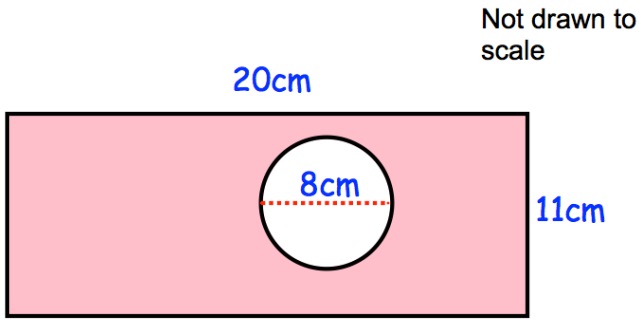


Work out the distance around the running track.

.....m
(5)

---

24. The diagram shows a rectangle with a circle cut out.

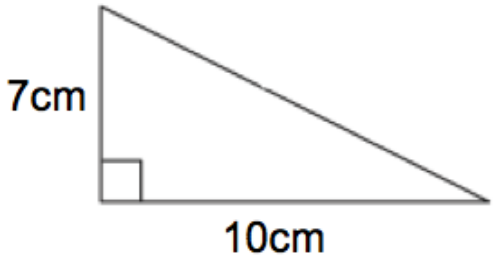


The rectangle has length 20cm and width 11cm.
The circle has diameter 8cm.

Work out the shaded area.
Give your answer correct to 2 decimal places.

.....cm²
(4)

25.



Shown is a right-angled triangle.

Work out the perimeter of the triangle

..... cm

(4)

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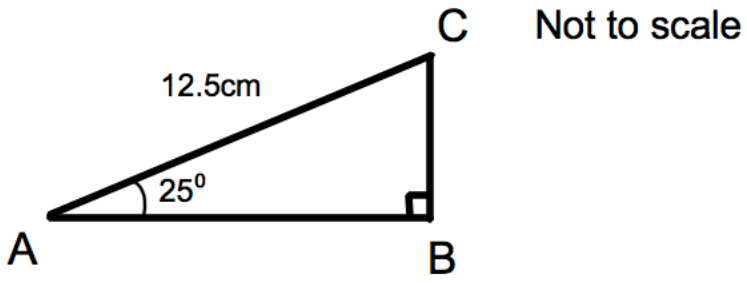
26. Triangle ABC has a right angle.
Angle BAC is 25^0
AC = 12.5cm

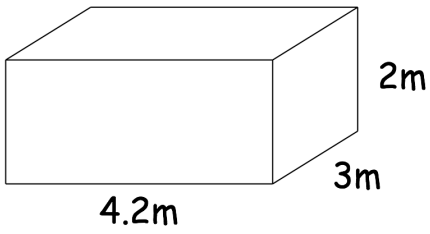


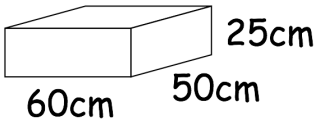
Calculate the length of AB

.....cm

(3)

27. A store room measures 4.2m × 3m × 2m
A box measures 60cm × 50cm × 25cm





Work out the greatest number of boxes that can be stored in the store room.

.....

(3)

---

28. Given

$$\mathbf{a} = \begin{pmatrix} 6 \\ -4 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$$

Work out $3\mathbf{a} - \mathbf{b}$

.....

(3)

---

29. Write down all the prime numbers between 10 and 20.

.....

(2)

30. Megan says “when you square root a number, the answer is always smaller.”

Show she is wrong.

(2)

---

31. From the list of numbers

3 6 8 14 16 28 41 64

(a) write down the cube numbers

..... and .....

(2)

(b) write down the cube root of 27.

.....

(1)

---

32. (a) Write 50 as a product of its prime factors.

.....

(2)

(b) Find the Lowest Common Multiple (LCM) of 32 and 50.

.....

(2)

33. Find the HCF of 80 and 32

.....

(3)

---

34. Calculate 3^6

.....

(1)

---

35. Work out

$$10^{-2}$$

Give your answer as a decimal.

.....

(2)

36. Complete the table.

Fraction	Decimal	Percentage
		85%
	0.12	
$\frac{23}{25}$		

(4)

37. Express 42 as a percentage of 64

.....%

(2)

38. Joanne sees this special offer in a shop.

Special Offer

Laptop	£465
Printer	£109

Buy both items and receive a 4% discount

Joanne buys both items.

How much does she pay?

£.....

(3)

39. Sarah bought a TV for £250
Three years later she sold it for £180

Work out the percentage loss

.....%
(3)

---

40. Nina invested £1500 for 4 years at 2.5% per annum simple interest.

Work out the total amount of money in the account at the end of 4 years.

£.....
(3)

---

41. Fiona leaves £1600 in the bank for four years.
It earns compound interest of 4% each year.

Calculate the total amount Fiona has in the bank at the end of the four years.

£.....
(3)

42. Lauren is given a 12% pay rise.
Her new salary is £24,080

What was Lauren's salary before the pay rise?

£.....

(3)

---

43. Chris and Molly win money in a competition.
They share the money in the ratio 2 : 3
Molly receives £240.

(a) How much money does Chris receive?

£.....

(2)

(b) How much money did they win in the competition?

£.....

(1)

44. Sophie went to Spain.
She changed £225 into euros (€).

The exchange rate was £1 = €1.62

(a) Change £225 into euros (€).

€.....
(2)

On her return to England, Sophie changed €66 into pounds (£)

The new exchange rate was £1 = €1.50

(b) Change €66 into pounds (£).

£.....
(2)

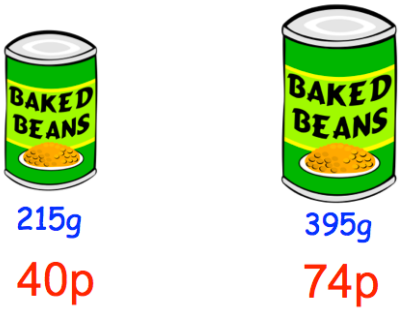
---

45. A number, n, is rounded to 1 decimal place.
The result is 1.3

Using inequalities, write down the error interval for n.

.....
(2)

46. A supermarket sells Baked Beans in two different size cans.



Which size can is the best value for money?
You must show all your working.

(4)

---

47. Work out

$$\sqrt[4]{100 - 2.4^3}$$

Give your answer to 3 significant figures.

.....

(2)

48. 100 students study one language at a college.

Some students study French.
Some students study Spanish.
The rest of the students study German.

54 of the students are in Year 12.
20 of the 29 students who study Spanish are in Year 13.
31 students study German.
15 Year 13 students study French.

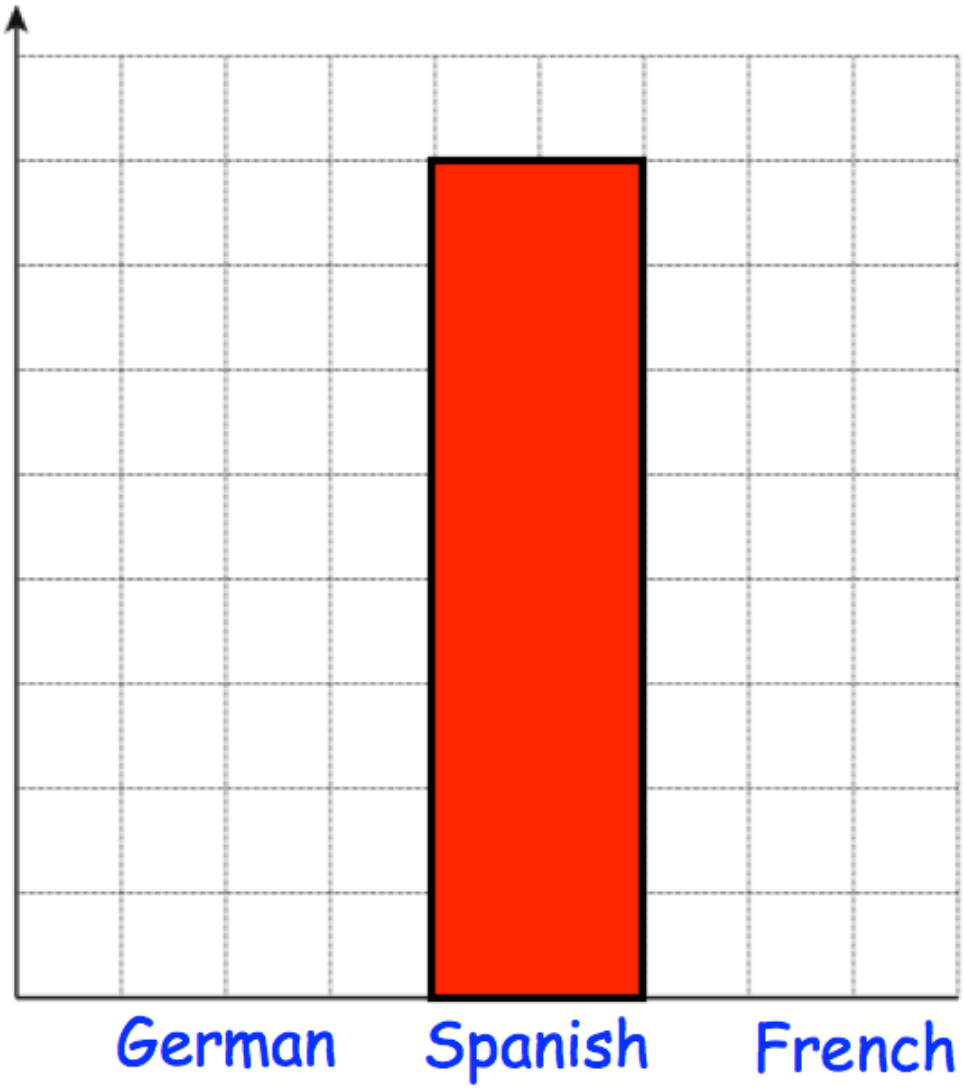
Work out the number of Year 12 students who study German.

.....

(4)

49. Miss Jackson asked the 32 students in her tutor group which language they study.

Each student studies one language only.



Half of the students in the tutor group study Spanish.
Six more students study German than French.

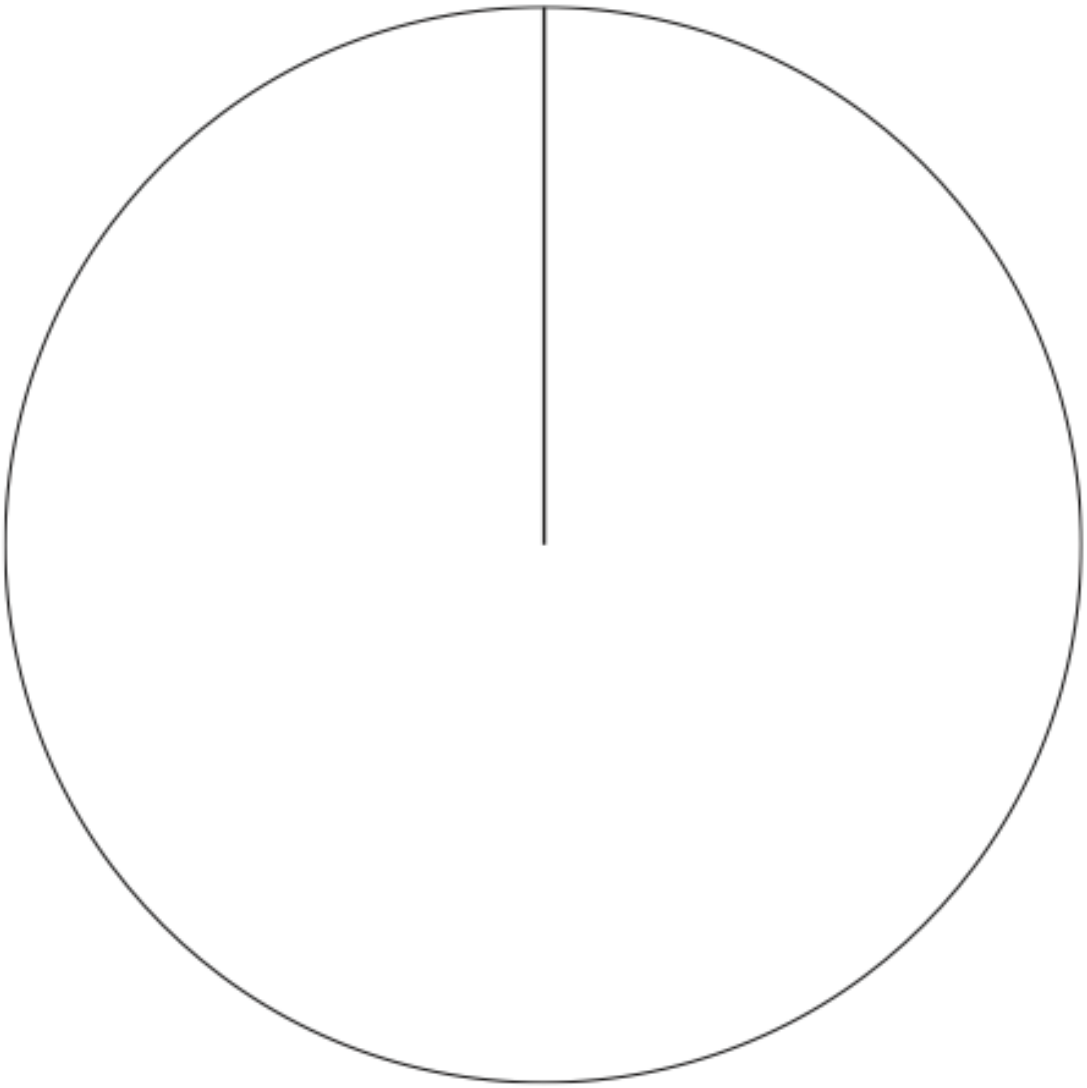
Complete the bar chart.

(4)

50. The table gives information about students staying after school to play sport.

Sport	Frequency
Netball	15
Hockey	10
Rugby	26
Football	9

Draw an accurate pie chart to show this information.



(4)

51. A rugby team can win, draw or lose a match.
The table shows the probabilities of each result.

Result	Win	Draw	Lose
Probability	0.4	0.35	

(a) Calculate the missing probability in the table.

.....

(2)

Each win is worth 2 points.
Each draw is worth 1 point.
Each loss is worth 0 points.
The rugby team plays 20 games in a season.

(b) Work out how many points the rugby team should receive in one season.

.....

(3)

52. William is going to attend a two day summer camp at his local leisure centre. He can take part in one activity on Monday and one activity on Tuesday.

Monday	Tuesday
Golf	Ice-skating
Football	Swimming
Rugby	Dodgeball
Hockey	Basketball

List all the possible combinations of activity he can take part in.

.....

.....

.....

.....

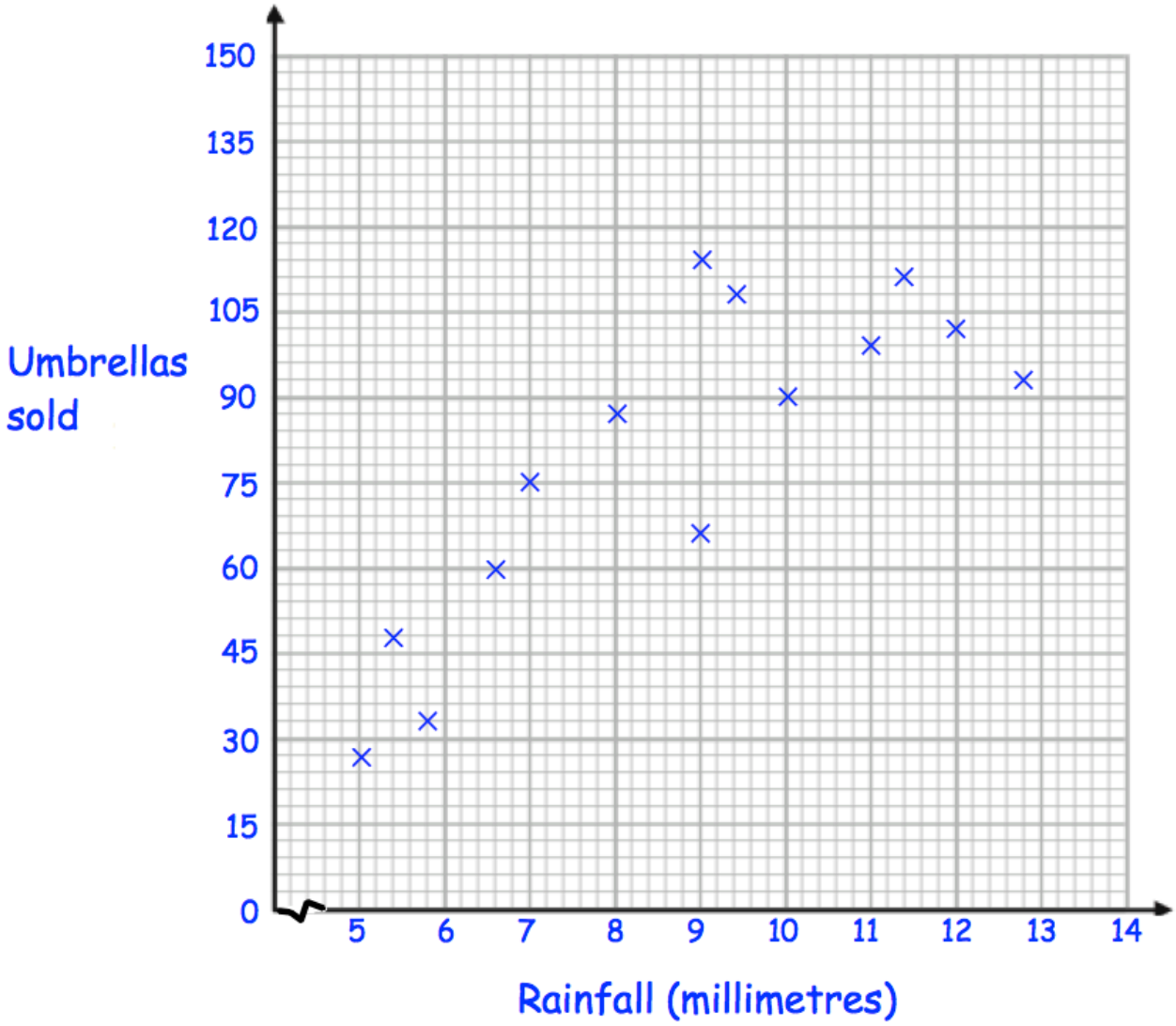
.....

.....

(2)

53. A shop sells umbrellas.

The scatter graph shows information about the number of umbrellas sold each week and the rainfall that week, in millimetres.



(a) Describe the relationship between the rainfall and umbrellas sold.

.....

.....

(1)

(b) What is the greatest amount of rainfall in one week?

.....

(1)

In another week, there was 6mm of rain.

(c) Estimate the number of umbrellas sold.

.....

(2)

(d) Explain why it may **not** be appropriate to use your line of best fit to estimate the number of umbrellas sold in a week with 25mm of rainfall.

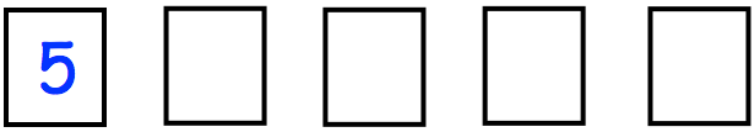
.....

.....

(1)

---

54. Shown below are five cards which are arranged in order from smallest to largest



The range of the cards is 4.
The median of the cards is 8.
The mean of the cards is 7.

Work out the 4 missing numbers.

....., ..., ... and .....

(4)

55. 5 Year 10 students and 45 Year 11 students sit a test.

The mean mark for the whole group is 70
The mean mark for the Year 11 students is 72

Work out the mean mark for the Year 10 students.

.....

(2)

---

56. Timothy asked 30 people how long it takes them to get to school.

The table shows some information about his results.

Time (t minutes)	Frequency
$0 < t \leq 10$	2
$10 < t \leq 20$	8
$20 < t \leq 30$	12
$30 < t \leq 40$	7
$40 < t \leq 50$	1

Work out an estimate for the mean time taken.

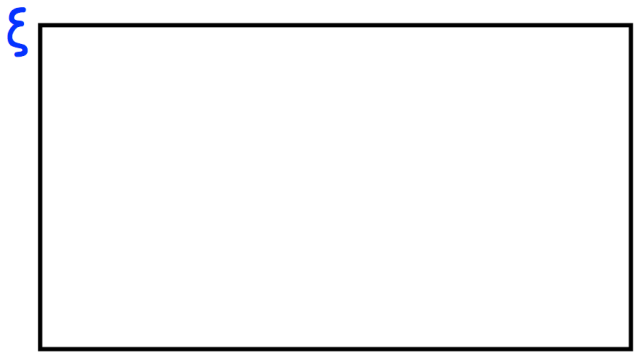
.....minutes

(4)

57. A gym runs two fitness classes, spinning and circuits.

On Saturday 100 people visited the gym.
18 people attended the spinning class.
10 people attended both classes.
56 people did not attend either class.

(a) Represent this information on a Venn diagram



(3)

A person who attended the gym is selected at random.

Find the probability that this person

(b) attended only circuits

.....

(2)

(c) attended exactly one class

.....

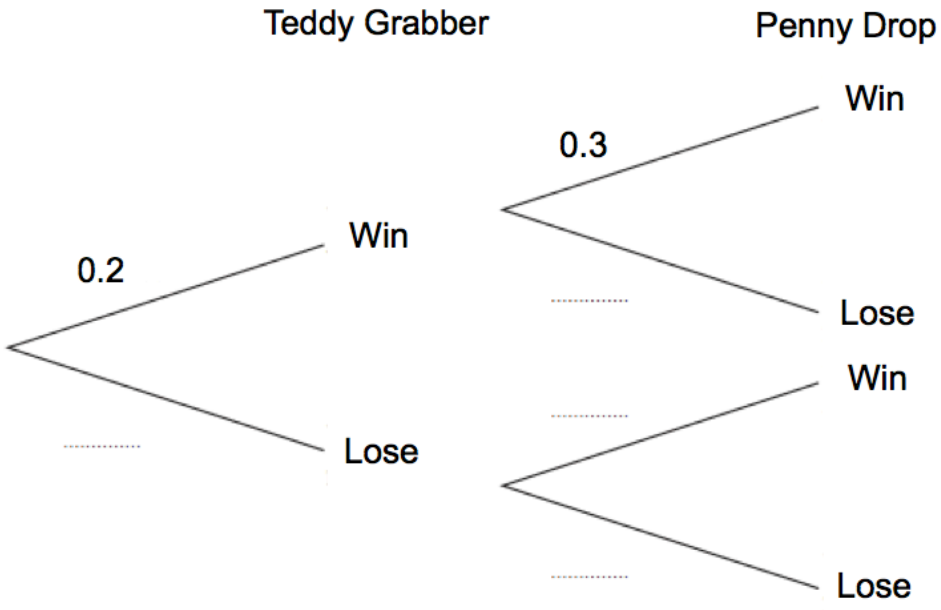
(2)

58. James goes to an arcade.

He has one go on the Teddy Grabber.
He has one go on the Penny Drop.

The probability that he wins on the Teddy Grabber is 0.2.
The probability that he wins on the Penny Drop is 0.3.

(a) Complete the tree diagram.



(2)

(b) Work out the probability that James wins on the Teddy Grabber and he also wins on the Penny Drop.

.....

(2)

59.

Name	Price (£)	Mass (kg)	Thickness (cm)	Battery (minutes)
Epic	£799	1.23	1.89	690
Bell	£1249	1.2	1.52	650
Lemon	£1599	1.37	1.49	720
HB	£799	1.28	1.7	740
Lazer	£1049	1.35	1.66	660

(a) Which laptop is the thickest?

.....

(1)

(b) How much longer does the HB battery last than the Bell battery?

.....

(1)

---

60. 480 students attend a school.
A teacher asks 50 students which colour they would like the new school blazer to be.
The table shows the results.

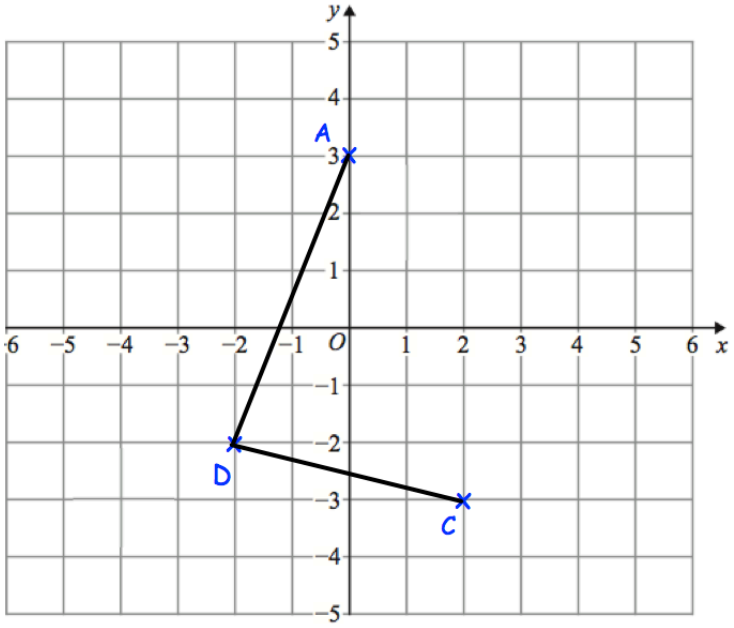
Colour	Number of students
Black	20
Navy	15
Green	9
Maroon	6

Estimate how many of the 480 students would like a black blazer.

.....

(2)

61. The points A (0, 3), C (2, -3) and D (-2, -2) are shown.



ABCD is a parallelogram.
Complete the parallelogram and write down the coordinates of B.

(..... , ...)
(2)

---

62. An airplane has economy and first class seating.
There are *s* seats in each row in economy.
There are *t* seats in each row in first class.
There are 8 rows in first class and 18 rows in economy.

Write down an expression, in terms of *s* and *t*, for the number of seats on the airplane.

.....
(2)

63. Simplify 9h + 5k + 4h – 8k

.....

(2)

---

64. (a) Simplify

$$m^9 \times m^2$$

.....

(1)

(b) Simplify

$$\frac{m^{10}}{m^2}$$

.....

(1)

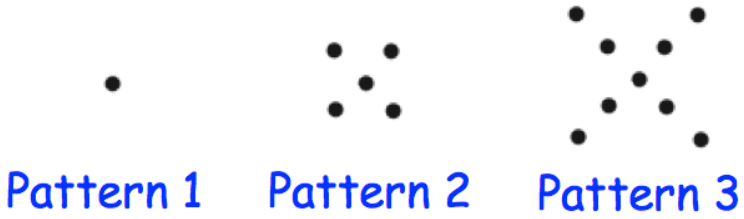
(c) Simplify

$$(m^3)^6$$

.....

(1)

65. Here is a pattern of dots



(a) Continue the pattern to show Pattern 4

(2)

(b) How many dots will there be in Pattern 6?

.....

(1)

---

66. Work out the *n*th term for this sequence

8 17 26 35 44 ... ...

.....

(2)

---

67. Expand and simplify (w – 3)(w – 8)

.....

(2)

68. Factorise

$15y + 20$

.....

(2)

---

69. (a) Factorise $x^2 + 2x - 24$

.....

(2)

(b) Factorise $x^2 - 25$

.....

(1)

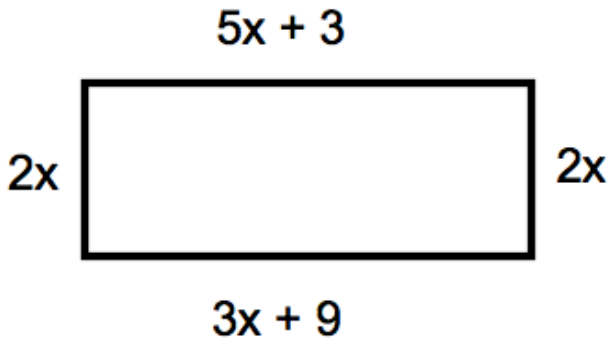
---

70. Solve $4y + 1 = 6y + 26$

y = ...

(2)

71.



The diagram shows a rectangle. The sides are measured in centimetres.

(a) Explain why $5x + 3 = 3x + 9$

.....

.....

(1)

(b) Solve $5x + 3 = 3x + 9$

x =.....cm

(2)

(c) Calculate the perimeter of the rectangle.

.....cm

(2)

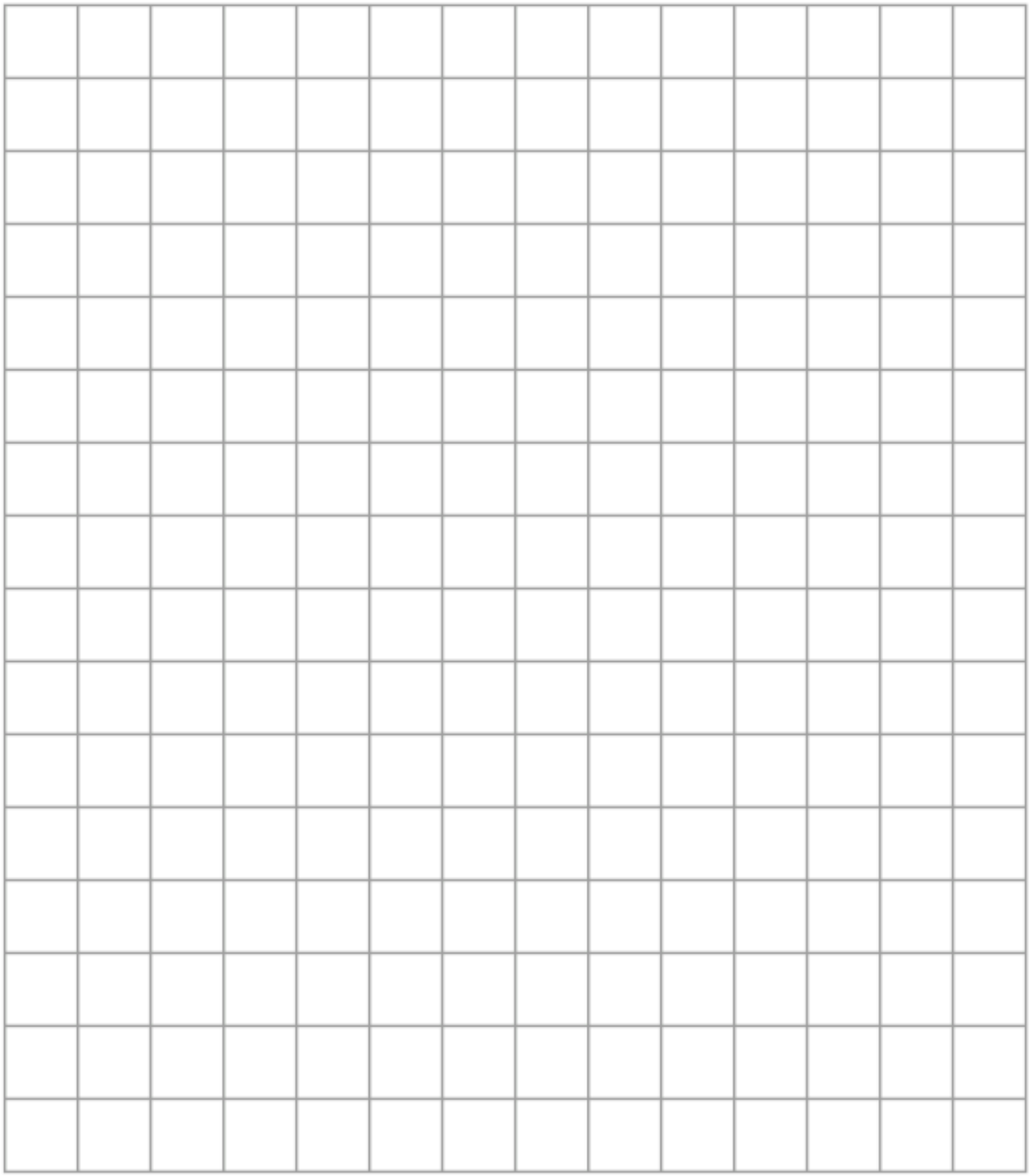
---

72. Solve the inequality $5x + 11 \geq 2$

.....

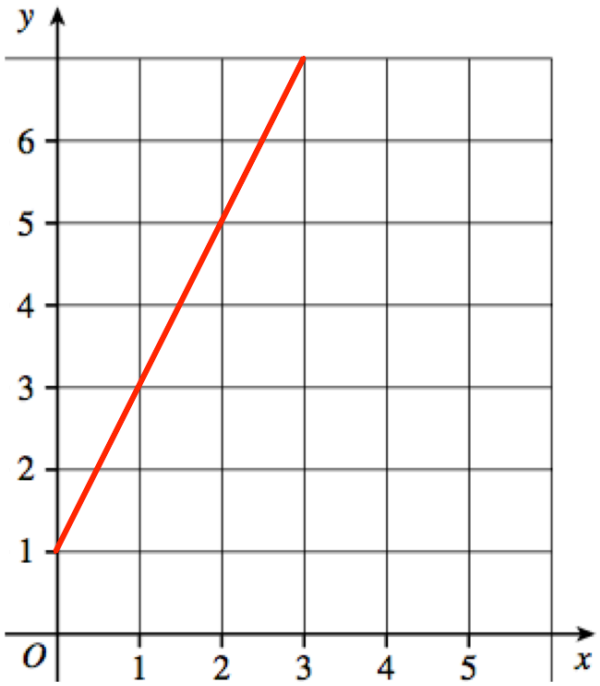
(2)

73. On the grid, draw $x + 2y = 6$ for values of x from -2 to 2.



(4)

74. A straight line L is shown on the grid.



Work out the equation of line L

.....

(3)

---

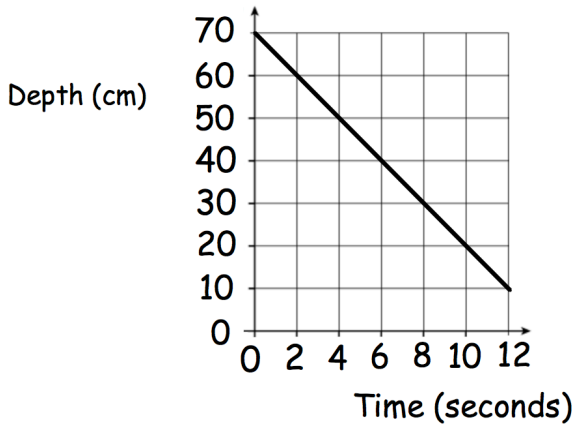
75. A is the point with coordinates (1, 4).
B is the point with coordinates (7, 22).

Find the gradient of AB.

.....

(2)

76. The graph below shows the depth of water in a container.



(a) Write down the gradient of the line

.....

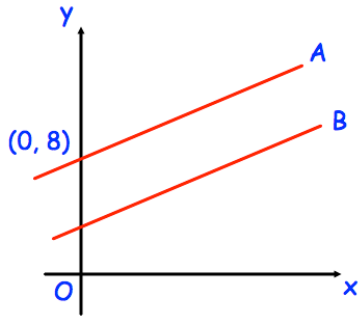
(1)

(b) What does the gradient of the line represent?

.....

(1)

77.



The lines A and B are parallel.
The line A passes through the point (0, 8)
The line B has equation $y = 3x + 4$

Write down the equation of line A

.....

(2)

78. Make *w* the subject of the formula

$$y = 3w - a$$

w = ...

(2)

---

79. Solve the simultaneous equations

$$2x + 4y = 26$$
$$3x - y = 4$$

Do not use trial and improvement

x = ... y = ...

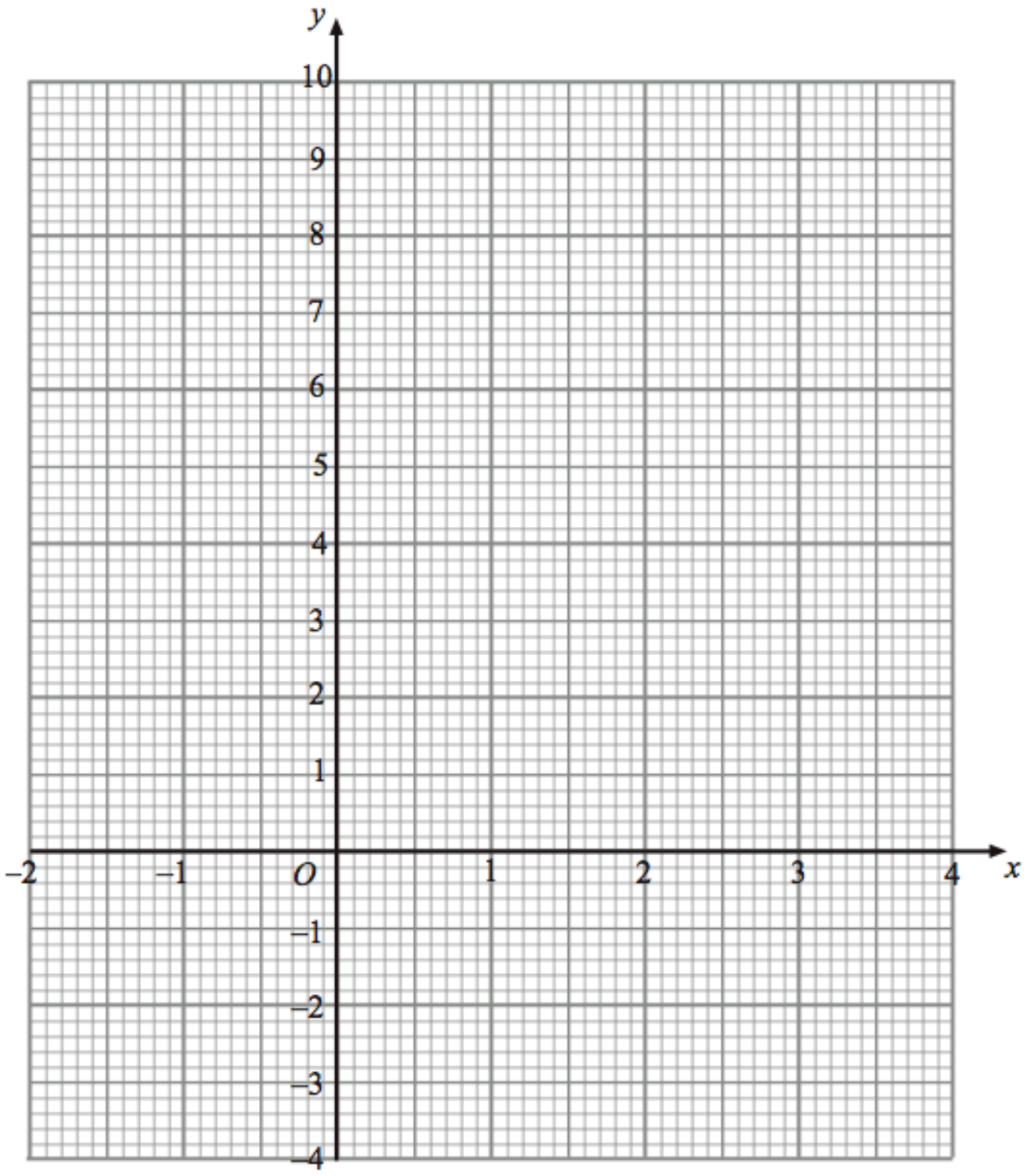
(3)

80. (a) Complete the table of values for $y = x^2 - 3x$

x	–2	–1	0	1	2	3	4
y	10		0	-2		0	

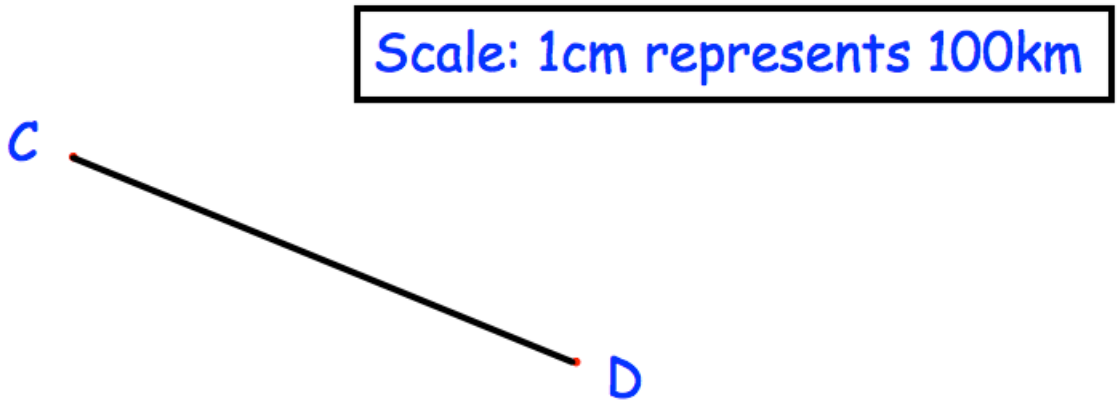
(2)

(b) On the grid, draw the graph of $y = x^2 - 3x$ for the values of x from -2 to 4.



(2)

81. The diagram shows a scale drawing.



(a) Use the diagram to calculate the actual distance from C to D.

.....km
(2)

E is 300km due south of C.

(c) Show E on the diagram.

(1)

---

82. A glass contains water.

Below are four estimates of the amount of water in the glass.
Circle the most appropriate estimate.

25ml 25L 250ml 2.5L

(1)

83. Use ruler and compasses to construct the perpendicular bisector of AB.
You **must** show clearly all your construction arcs.

(2)

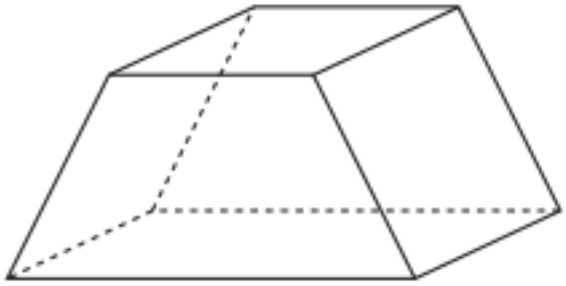
84. The diagram shows two lighthouses.

A boat is within than 8 miles of lighthouse A.
The same boat is within 6 miles of lighthouse B.

Shade the possible area in which the boat could be.

(2)

85. Below is a solid.



(a) Write down the number of faces

.....

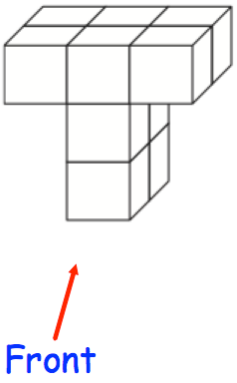
(1)

(b) Write down the number of vertices

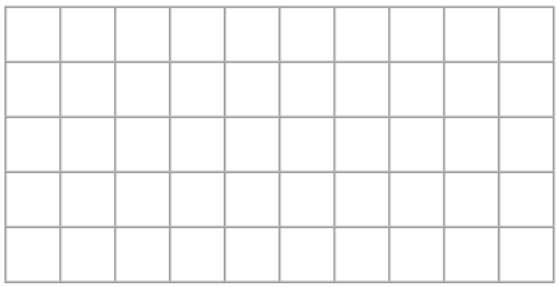
.....

(1)

86. Shown below is a solid shape made from centimetre cubes.

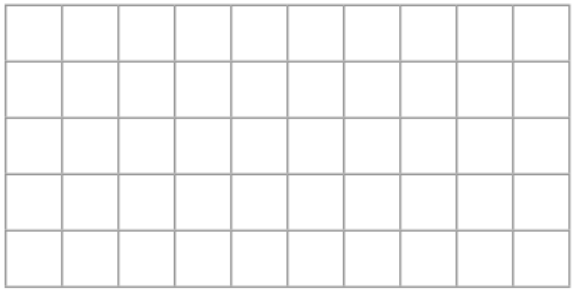


(a) On the centimetre square grid, draw the front elevation.



(2)

(b) On the centimetre square grid, draw the plan view.



(2)

87. An object is placed on a table.
It exerts a force of 22 newtons on the table.

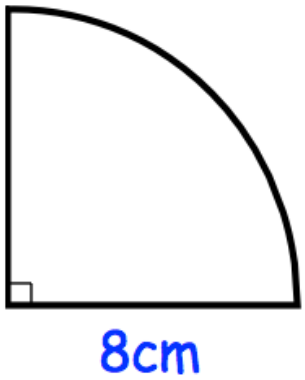
The pressure on the table is 500 newtons/m²

Calculate the area of the crate that is in contact with the table.
Include suitable units.

.....

(3)

88.

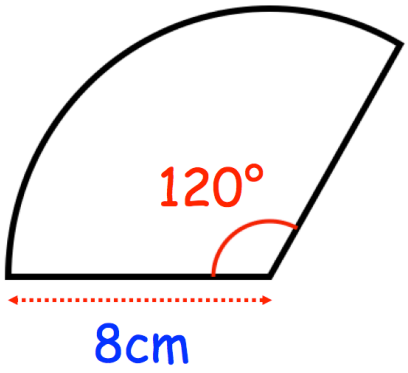


Calculate the perimeter of the sector.

.....cm

(2)

89.



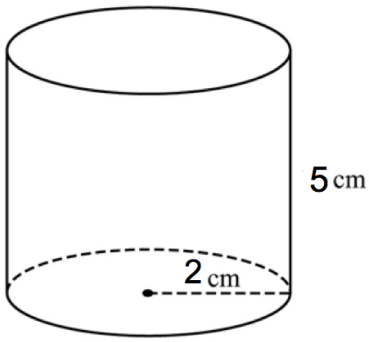
Calculate the area of the sector.

.....cm²

(2)

---

90. Below is a cylinder with radius 2cm and height 5cm.

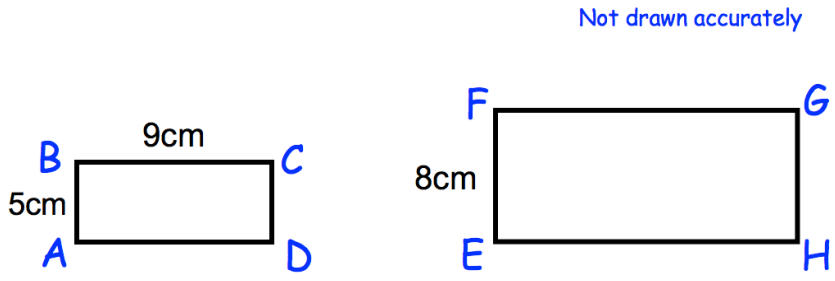


Calculate the volume of the cylinder.

.....cm³

(3)

91.



Rectangles *ABCD* and *EFGH* are similar.

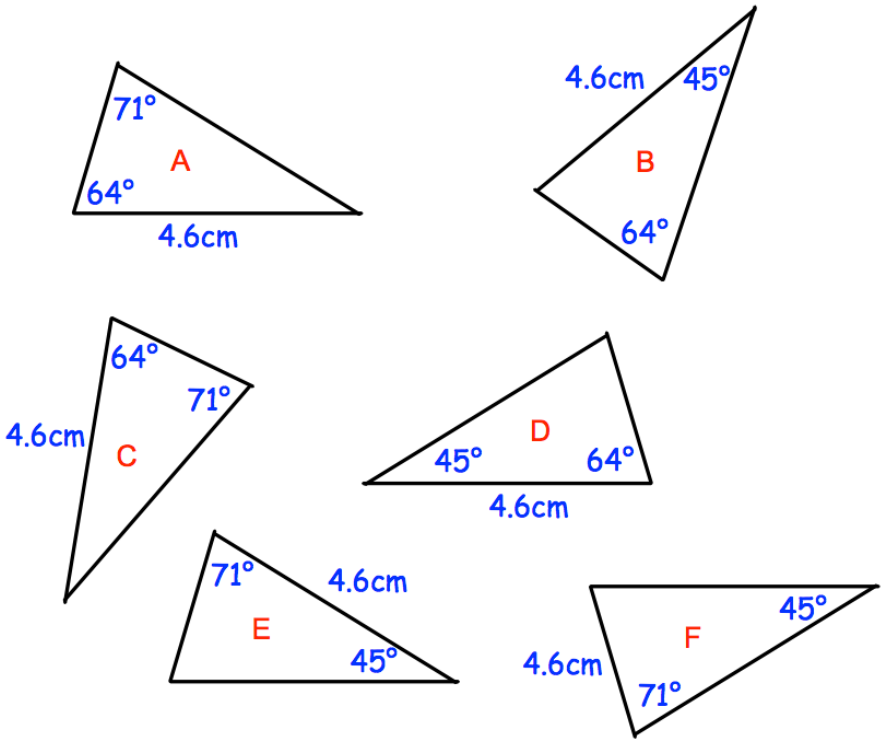
AB = 5cm
BC = 9cm
EF = 8cm

Work out the length of FG.

.....cm
(2)

---

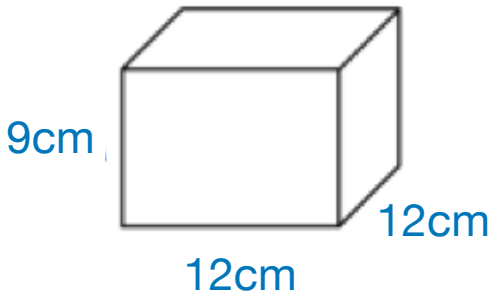
92. Shown below are six triangles that are not drawn accurately.



Which two triangles are congruent to triangle A?

..... and .....
(2)

93.



Work out the surface area of this cuboid.
State the units of your answer.

.....

(3)

---

94. A sphere has a radius of 5cm.

Calculate the surface area of the sphere.

.....

(3)

95. Holly works out the answer to 135.66 + 193.88 on a calculator.

Her answer is 329.54

(a) Round her answer to the nearest 10.

.....

(1)

(b) Round her answer to the nearest 100.

.....

(1)

(c) Round her answer to the nearest integer.

.....

(1)

(d) Round her answer to one decimal place.

.....

(1)

---

96. Write these numbers in order of size.
Start with the smallest number.

0.92 0.901 0.99 0.099 0.909

.....

(1)

97. Shown below is a 2 pence coin.

: 0.185cm

Each 2 pence coin is 0.185cm thick.
Stephen builds a tower of 250 2p coins.

How tall is the tower?

.....

(3)

---

98. Mr Holland has 2500kg of rice.

(a) Write 2500 kg in grams.
Give your answer in standard form.

.....g

(2)

(b) One grain of rice weighs 0.03g
Write the weight of one grain of rice in standard form.

.....g

(1)

(c) How many grains of rice are there in 2500kg of rice?
Give your answer in standard form.

.....

(2)

99. The attendance at Frome United versus Trowbridge Rovers was 8,701.

Of this crowd, five-sevenths supported Frome United.
Calculate how many people did not support Frome United.

.....

(3)

---

100. Write down the reciprocal of 0.35

.....

(1)

---

101. (a) Work out the difference between –3°C and 4°C

.....°C

(1)

At 5am the temperature is –6°C
By 2pm the temperature went up by 9°C
From 2pm to 11pm the temperature went down by 15°C

(b) Work out the temperature at 11pm

.....°C

(2)

102. Here are four digits.

9 4 7 5

(a) Use two of these digits to make the largest possible two-digit number.

.....

(1)

(b) Use all four of these digits to make the four-digit number closest to 5000.

.....

(1)

---

103. Florence buys a car for £17100

She pays a deposit of £6750 and pays the rest in equal monthly payments.
Each monthly payment is £230

How many monthly payments does Florence make?

.....

(3)

---

104. It takes 6 hours for 20 workers to seed 40 acres.

How long would it take 10 workers to seed 90 acres?

.....

(3)

105. Sophie asks 20 of her friends to choose their favourite sport.

Their replies are

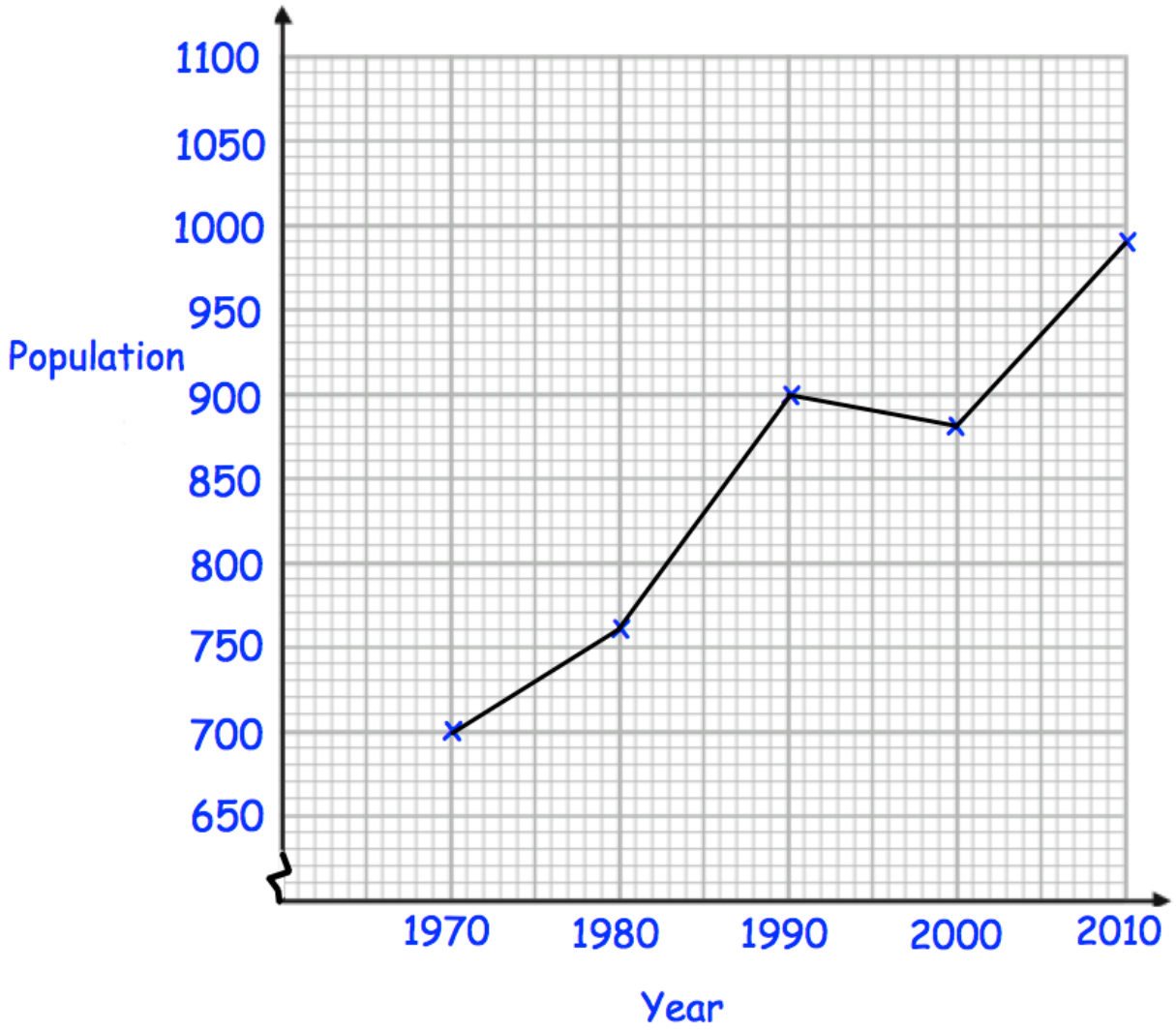
Rugby	Football	Rugby	Hockey	Cricket
Football	Football	Rugby	Hockey	Football
Rugby	Cricket	Hockey	Football	Football
Football	Rugby	Football	Football	Rugby

Complete the tally and the frequency columns in the table below.

Sport	Tally	Frequency
Rugby		
Football		
Hockey		
Cricket		

(2)

106. Below is a line graph that shows the population of a village.



(a) What was the population in 1980?

.....

(1)

(b) In which year was the population 700?

.....

(1)

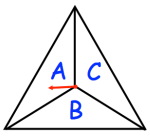
The population increased by 120 by 2020.

(c) Work out the population in 2020.

.....

(2)

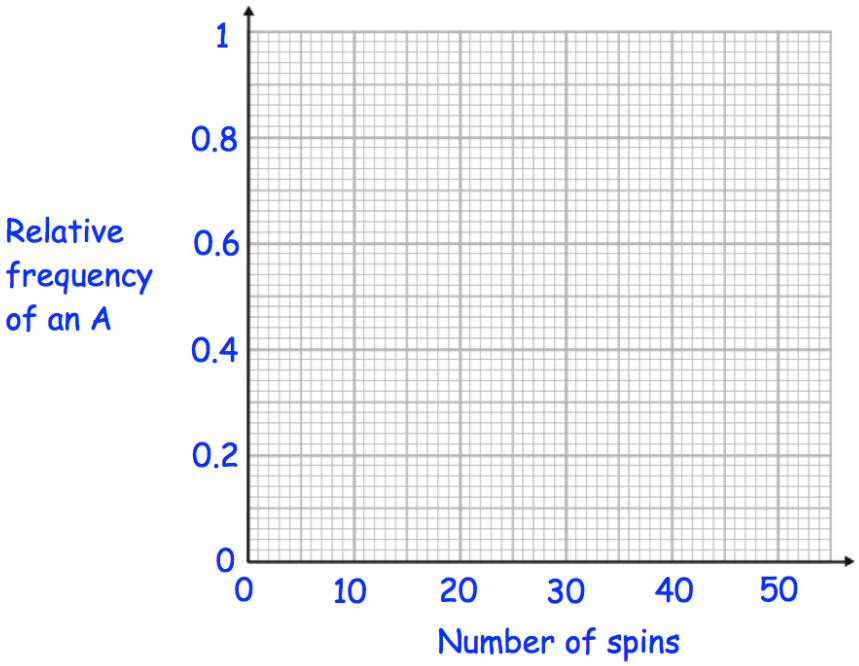
107. A three-sided spinner is labelled A, B and C.



The spinner is spun and the frequency the letter A is recorded every 10 spins.
The table below shows this information.

Spins	10	20	30	40
Frequency of an A	5	12	21	26

(a) Complete plot the relative frequencies on the graph below.



(3)

(b) Neil says the relative frequency after 50 spins is 0.8
Explain why Neil must be wrong

.....

.....

(2)

108. The table shows the number of pages in 100 books.

Number of pages, x	Frequency
$0 < x \leq 100$	7
$100 < x \leq 200$	25
$200 < x \leq 300$	40
$300 < x \leq 400$	12
$400 < x \leq 500$	16

Write down the modal class interval.

.....

(1)

---

109. A manager recorded how long each customer spent in his supermarket.
The table shows his results.

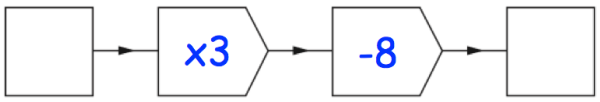
Time, t (minutes)	Frequency
$0 < t \leq 10$	24
$10 < t \leq 20$	31
$20 < t \leq 30$	50
$30 < t \leq 40$	35
$40 < t \leq 50$	60

Which class interval contains the median?

.....

(1)

110.



(a) Work out the output, when the input is 10.

.....

(1)

(b) Work out the input, when the output is 13.

.....

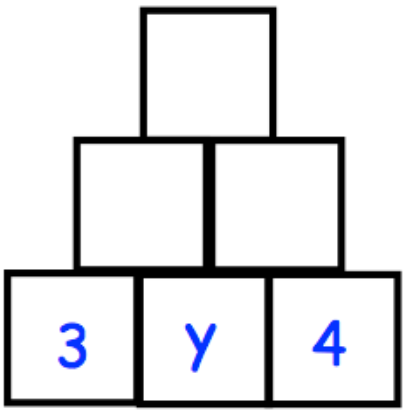
(1)

(c) If the input is the same as the output, work out the input.

.....

(1)

111.



To find the contents of each empty box, multiply the two terms directly beneath it.

Complete the multiplication pyramid.

(3)

112. Circle the geometric progression.

11, 9, 7, 5 ... 1, 4, 9, 16 ... 11, 21, 31, 41 ... 1, 4, 16, 64 ...

(1)

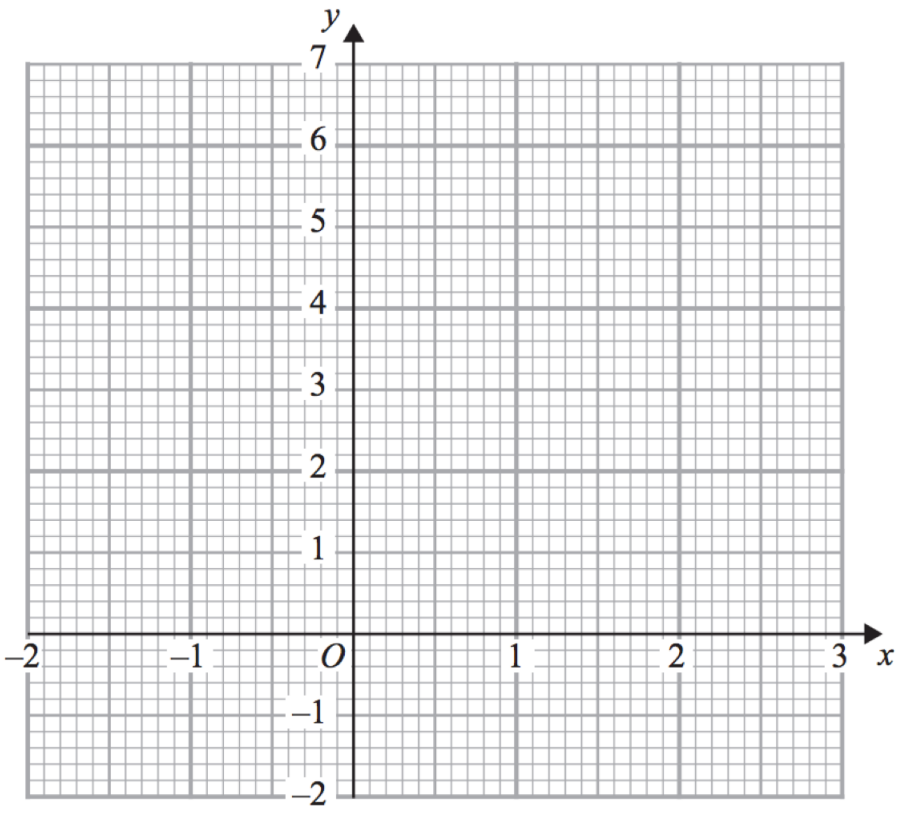
---

113. (a) Complete the table of values for $y = x^3 - 2x + 3$

x	-2	-1	0	1	2
y					

(2)

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



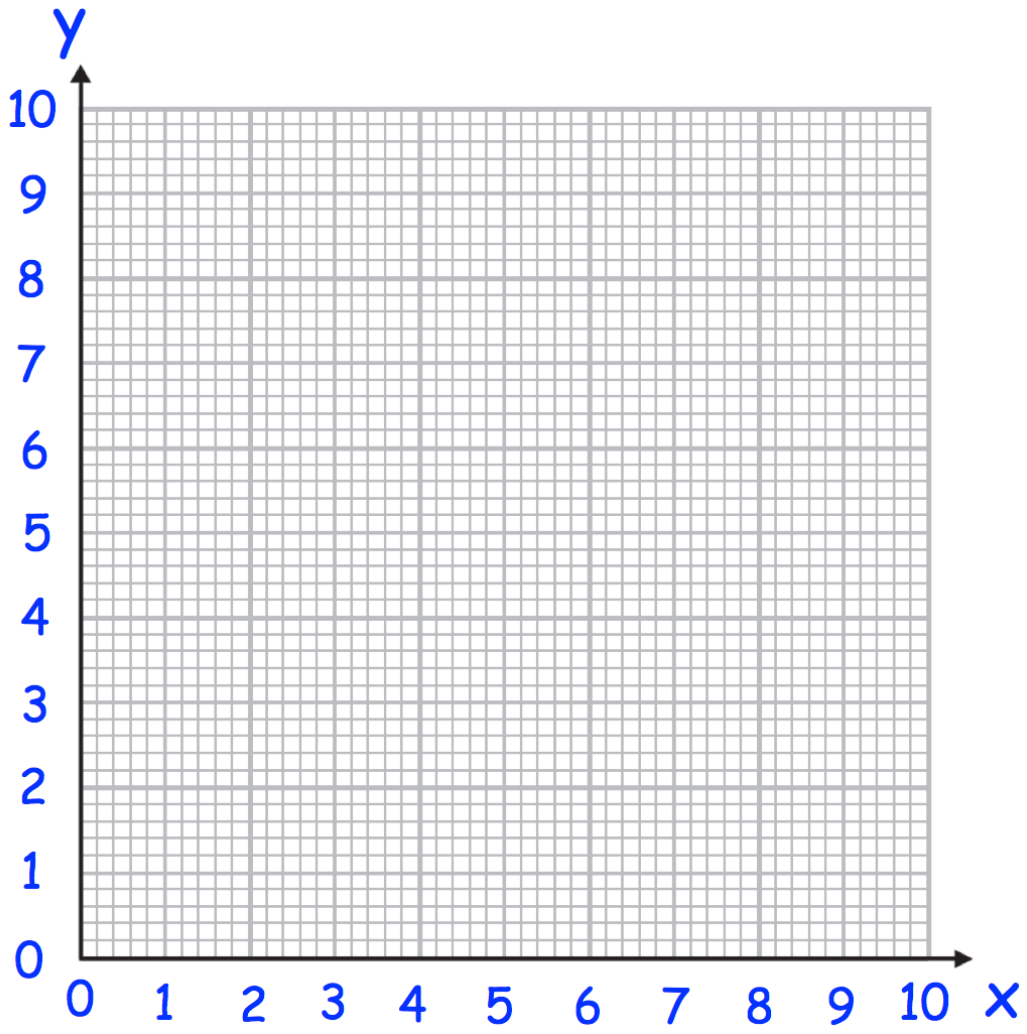
(2)

114. (a) Complete the table of value for $y = \frac{4}{x}$

x	0.5	1	2	4	8	10
y						

(2)

(b) On the grid, draw the graph of $y = \frac{4}{x}$ for $0.5 \leq x \leq 10$



(2)