

Paper 2 and Paper 3 Preparation Paper

AQA - Higher
Very High Chance



Corbettmaths

You will need a calculator

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

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this test

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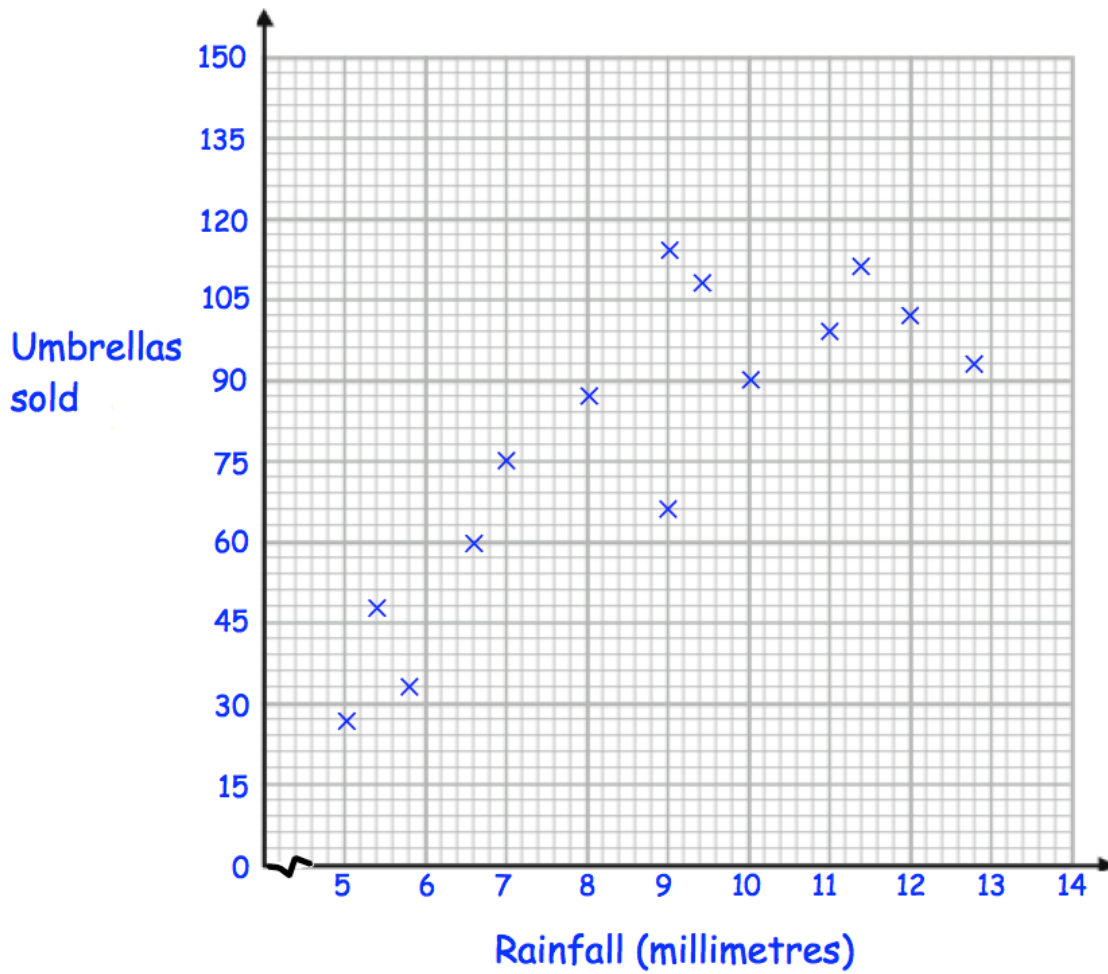


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1. A shop sells umbrellas.

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.

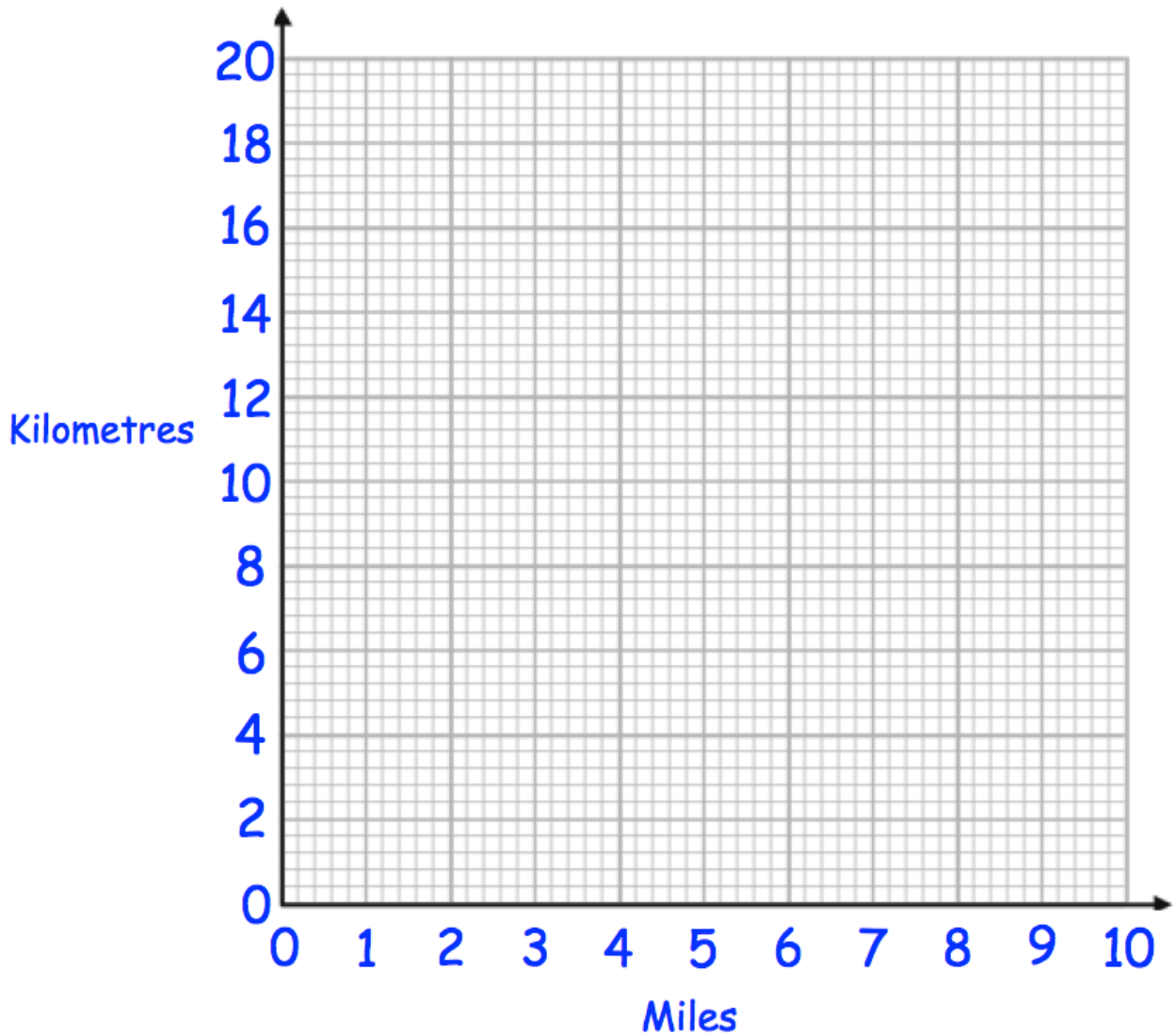
.....
(2)

(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)

2.

(a) Use the fact 5 miles = 8 kilometres to draw a conversion graph on the grid.



(2)

Use your graph to convert

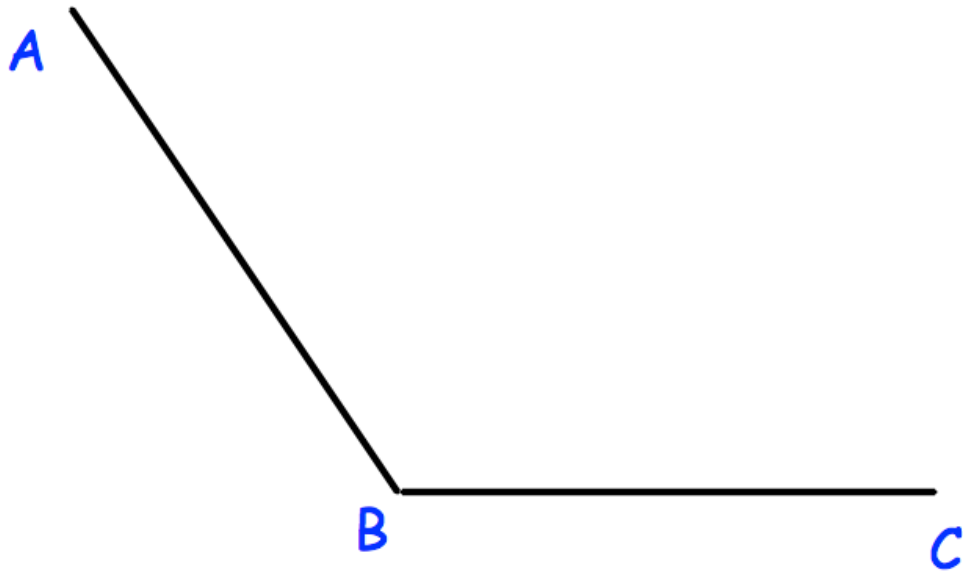
(b) 8 miles to kilometres

.....km
(1)

(c) 6 kilometres to miles

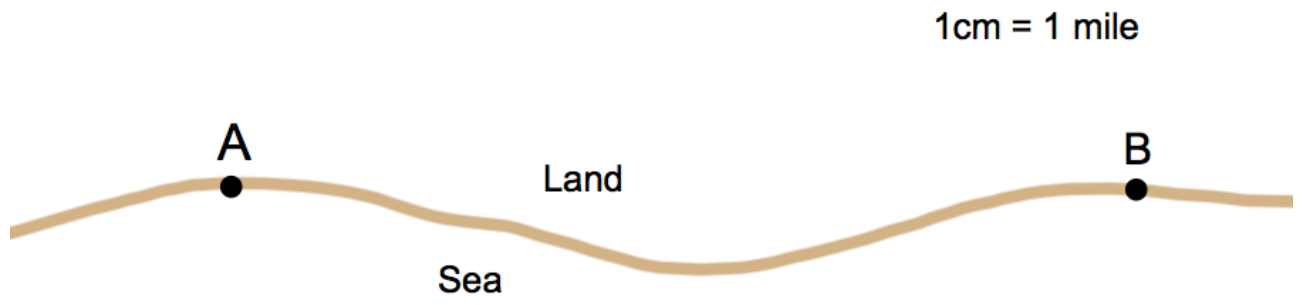
.....miles
(1)

3. Using ruler and compasses, construct the bisector of angle ABC.



(2)

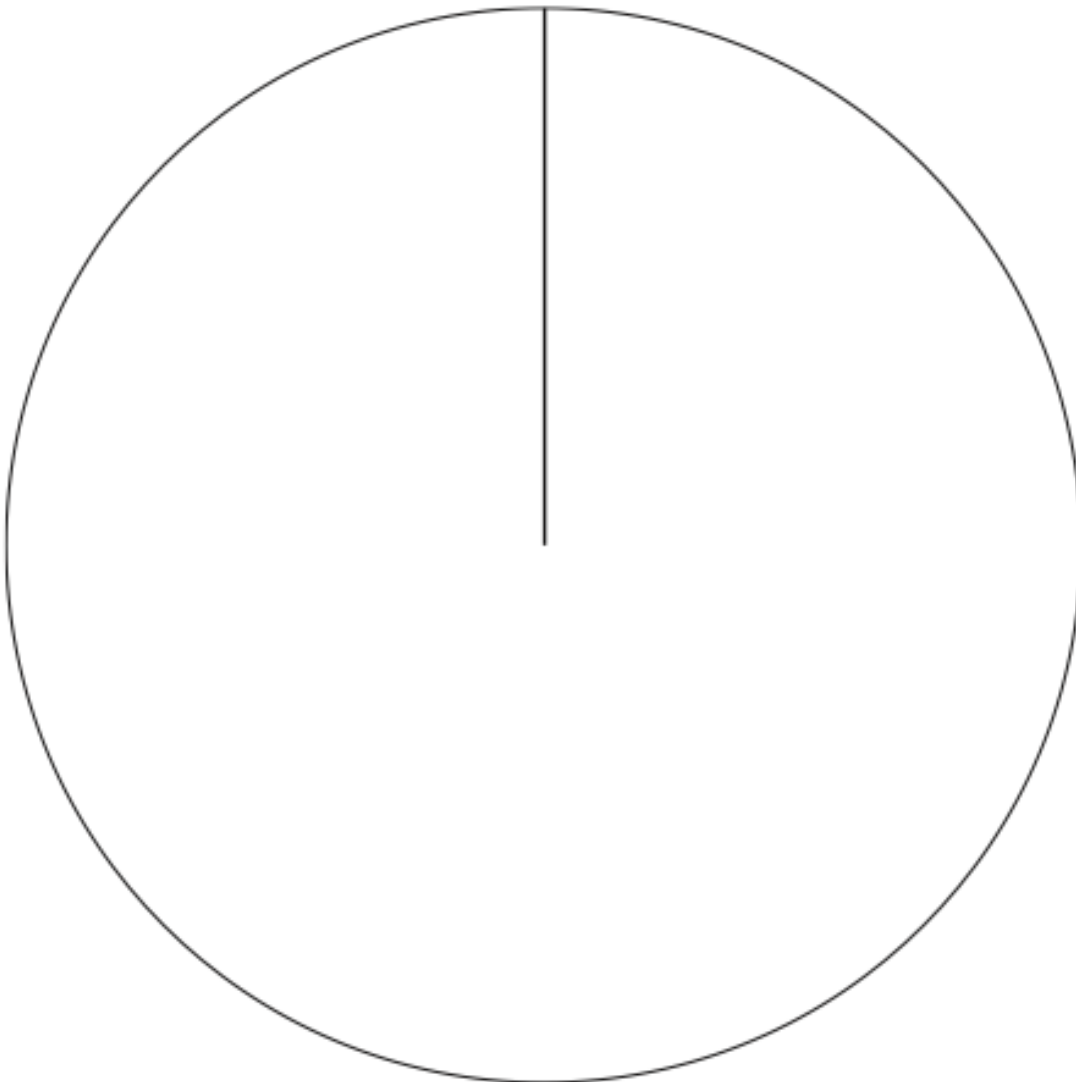
4. The diagram shows two lighthouses.
A boat is within than 8 miles of lighthouse A.
The same boat is within 6 miles of lighthouse B.
Shade the possible area in which the boat could be.



5. The table gives information about the number of students in years 7 to 10.

Year	Frequency
7	200
8	140
9	220
10	160

Draw an accurate pie chart to show this information.



(4)

6. Find the Lowest Common Multiple (LCM) of 60 and 72.

.....
(2)

7. Jim picks a five digit even number.
The second digit is less than 8.
The fourth digit is a square number The first digit is a cube number.
How many different numbers could he pick?

.....
(3)

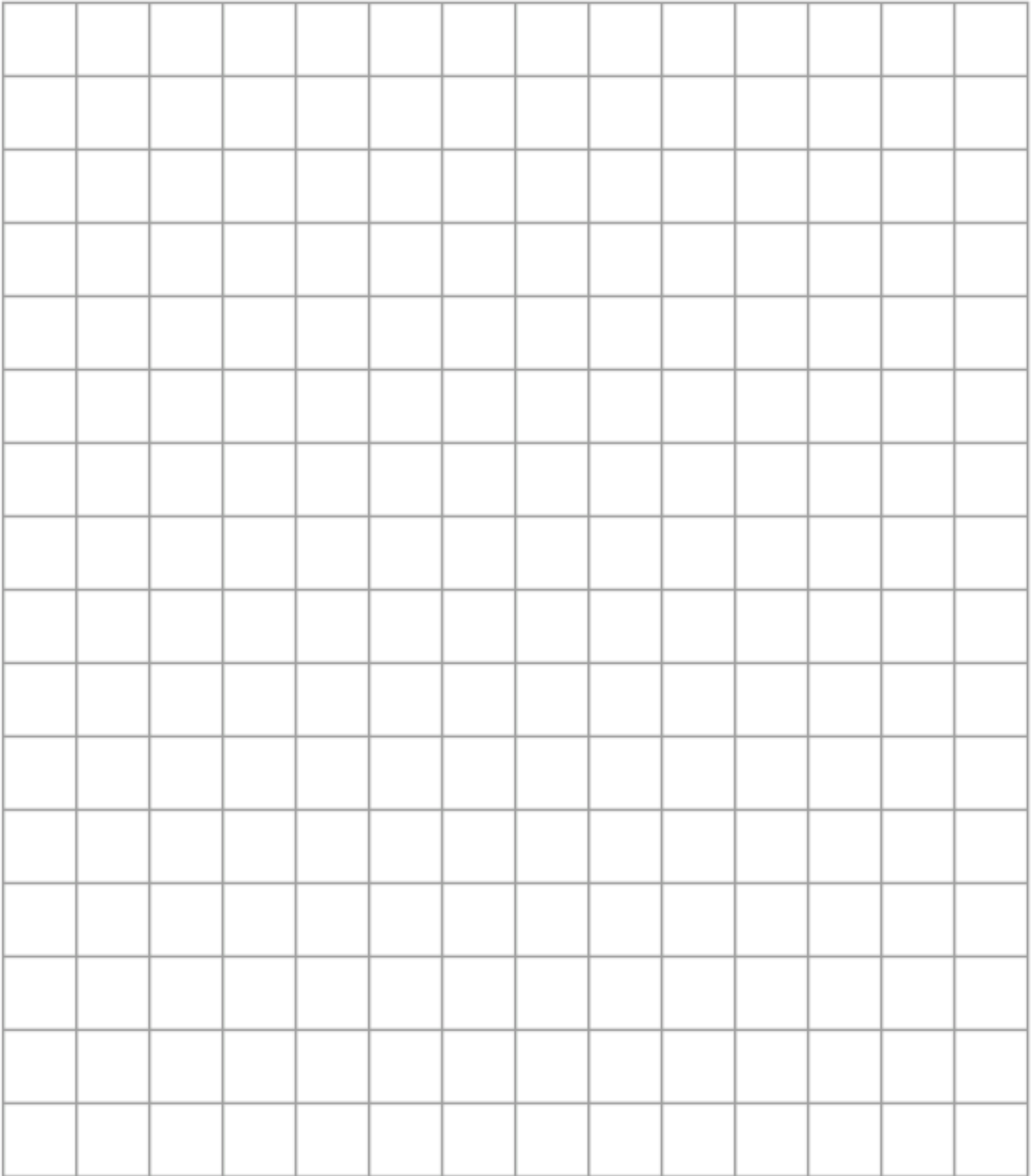
8. Make v the subject of the formula.

$$s = \frac{1}{2}(u + v)t$$

$$v = \dots\dots\dots$$

(3)

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



(4)

10. James has received two job offers.

A job in Milan which pays €55,000 a year.

A job in Boston which pays \$64,000 a year.

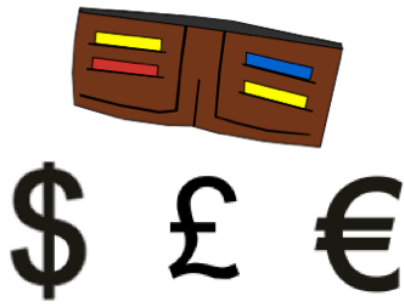
The exchange rates were $\text{£}1 = \$1.42$ and $\text{£}1 = \text{€}1.25$.

Which job offer has the highest salary?

Show working to explain your answer.

(3)

11. Terry goes to the Post Office to exchange money.



Exchange Rates

£1 : \$1.55

£1 : €1.24

*Commission Charged

Terry changes \$651 and €161.20 into pounds sterling.
The Post Office deducts their commission and gives Terry £528.

What is the percentage commission?

.....%
(4)

12. Martyn has some money to invest and sees this advert.

Bank of Maths

Double your money in 15 years.

The average annual growth for your investment is 4.5%

Will Martyn double his money in 15 years by investing his money with “Bank of Maths?”

You **must** show your workings.

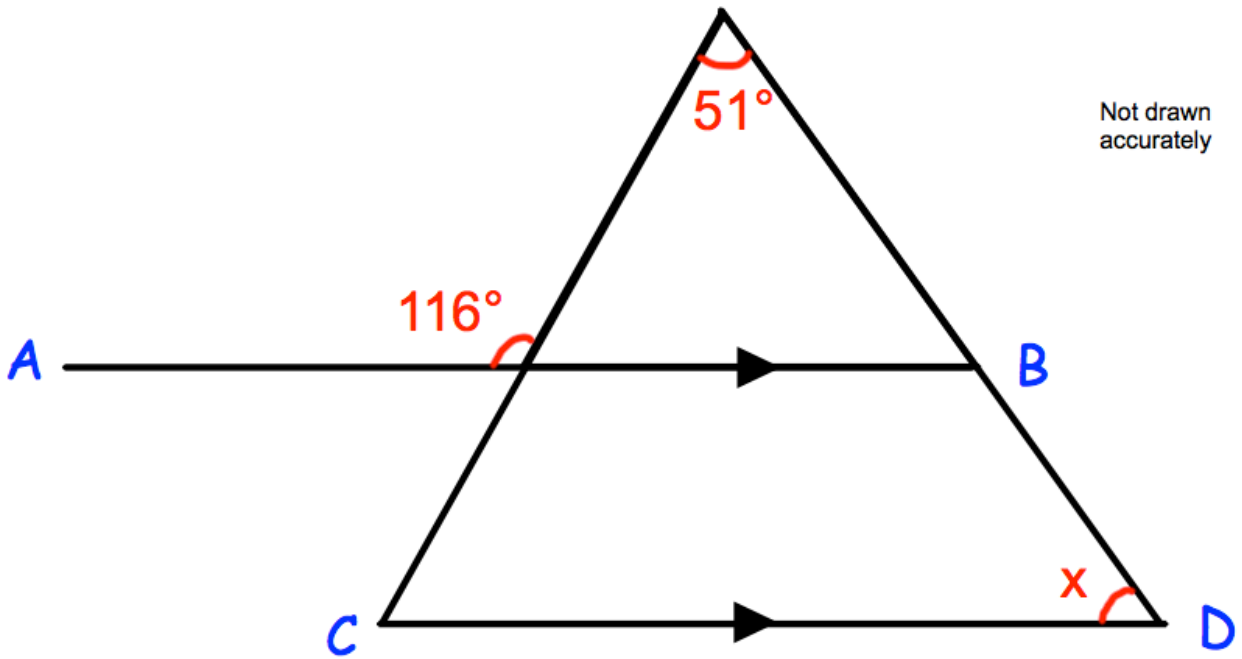
(4)

-
13. Nigel measures the time, t seconds, to complete a race as 15.4 seconds correct to the nearest tenth of a second.

Write down the error interval for t .

.....
(2)

14. In the diagram, AB is parallel to CD.

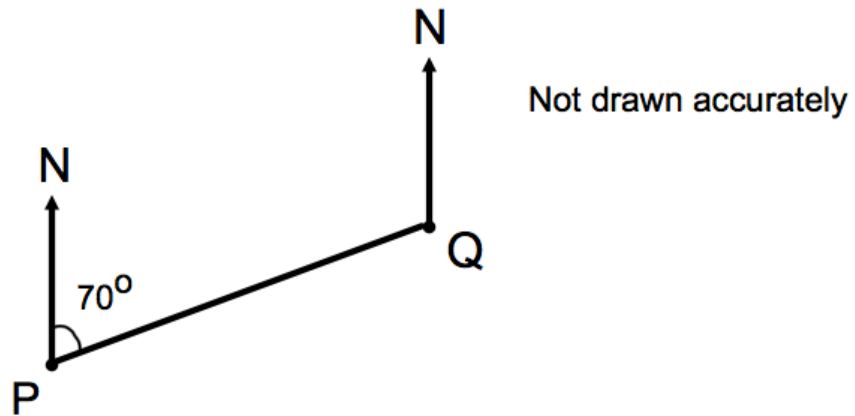


Work out the size of angle x .

You **must** show your workings.

.....°
(4)

15. The diagram shows the position of two airplanes, P and Q.



The bearing of Q from P is 070° .

Calculate the bearing of P from Q.

.....^o
(2)

16. The sum of the interior angles in a polygon is 7380° .

Calculate the number of sides the polygon has.

.....
(2)

17. In a sale the price of a sofa is reduced by 70%.
The sale price is £255

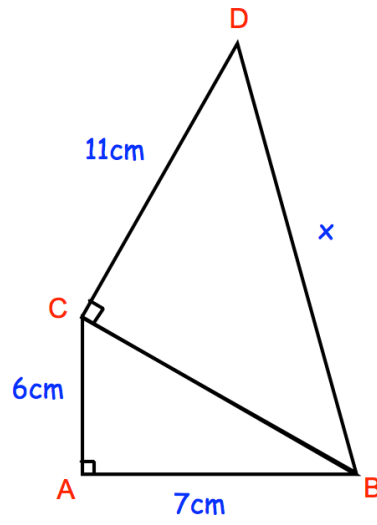
Work out the price before the sale.

£.....
(3)

-
18. Expand and simplify $(x - 6)(x + 1)(x - 2)$

.....
(4)

19. Below are two triangles, ABC and BCD.



Find x

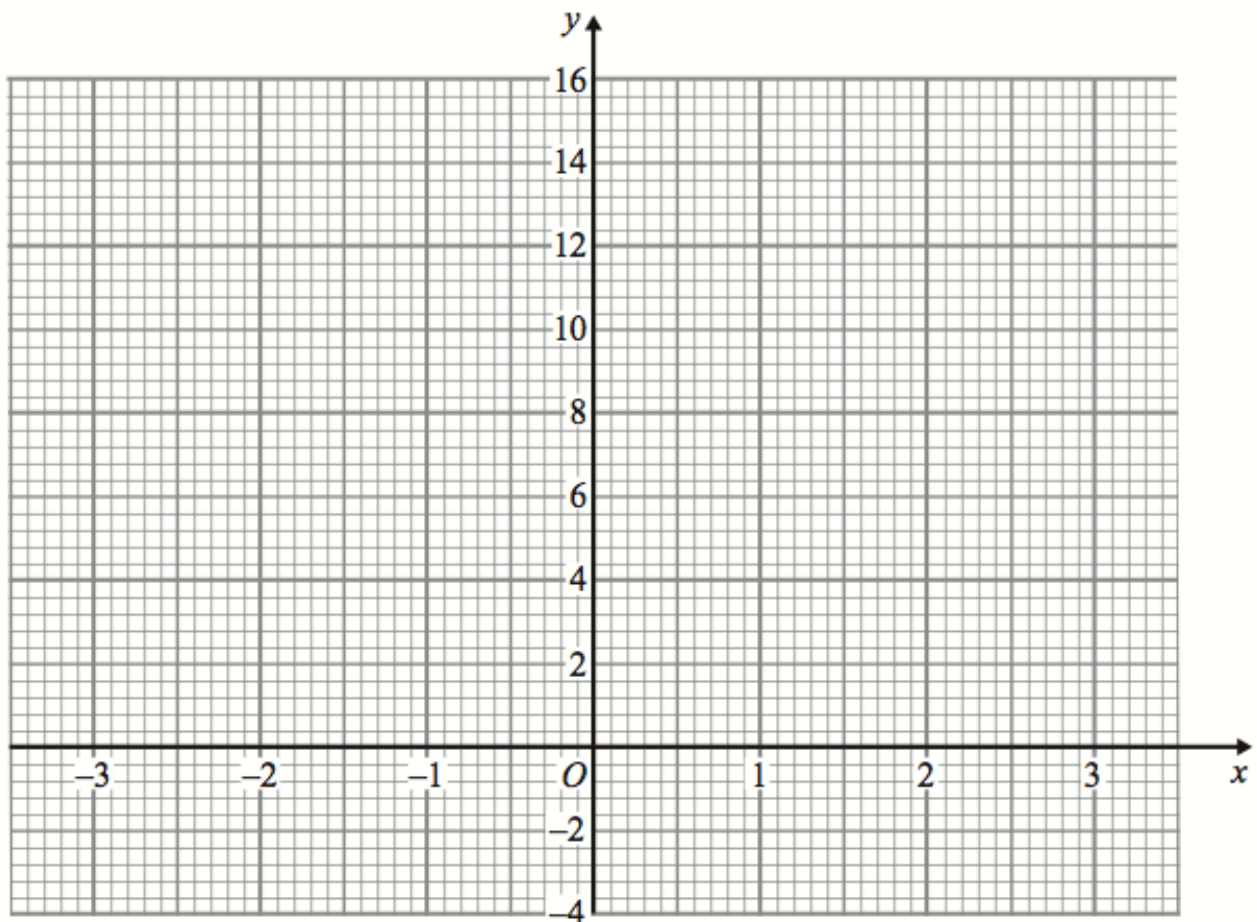
.....cm
(4)

20. (a) Complete the table of values for $y = x^2 + 2x + 1$

x	-3	-2	-1	0	1	2	3
y							

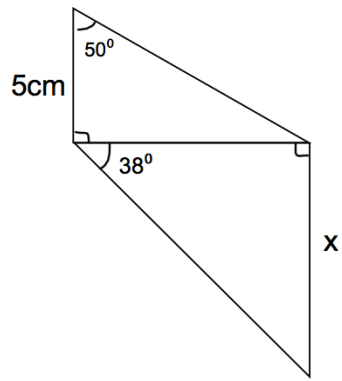
(2)

(b) On the grid, draw the graph of $y = x^2 + 2x + 1$ for the values of x from -3 to 3.



(2)

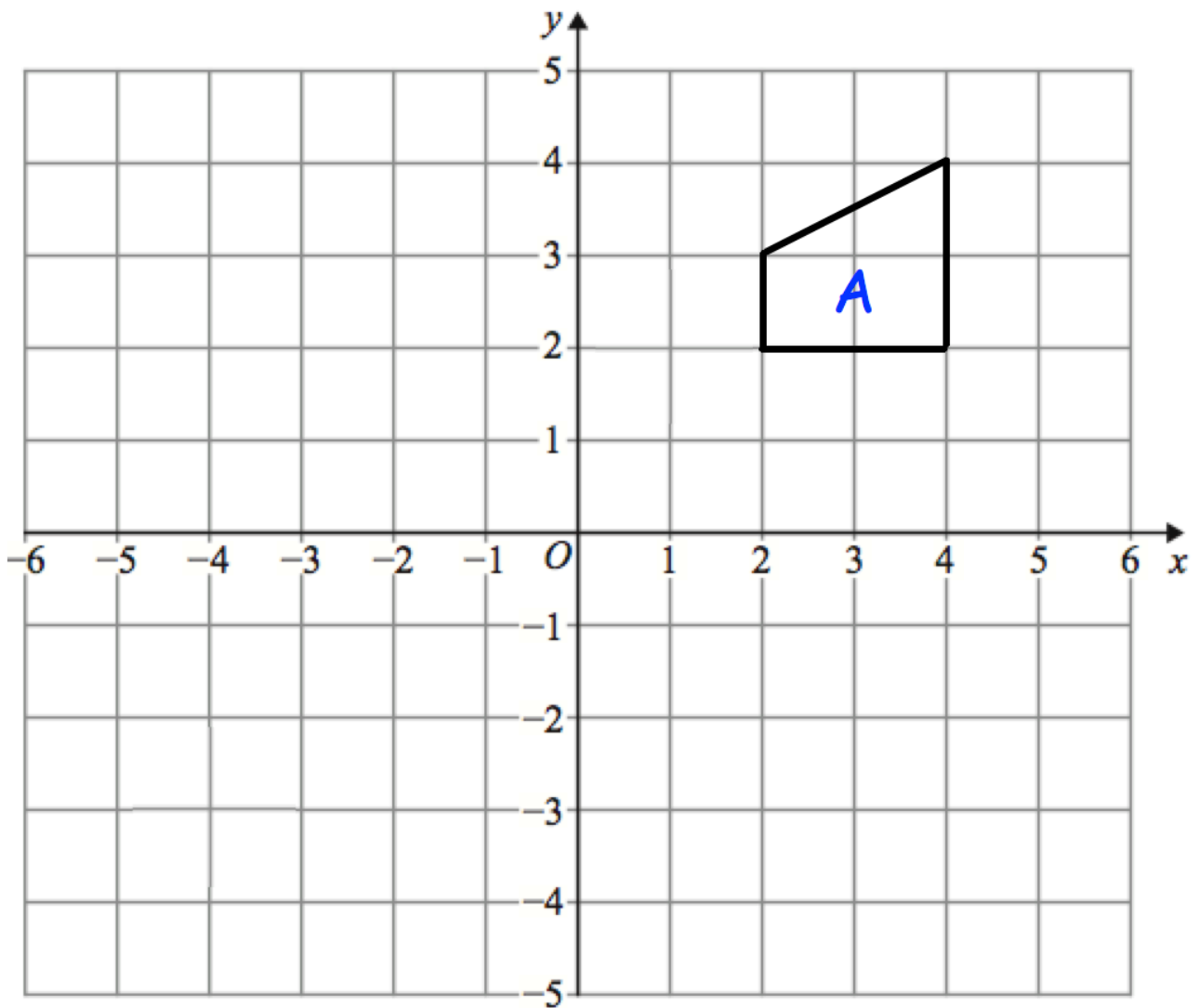
21. The diagram shows two right-angled triangles.



Calculate the value of x .

.....cm
(5)

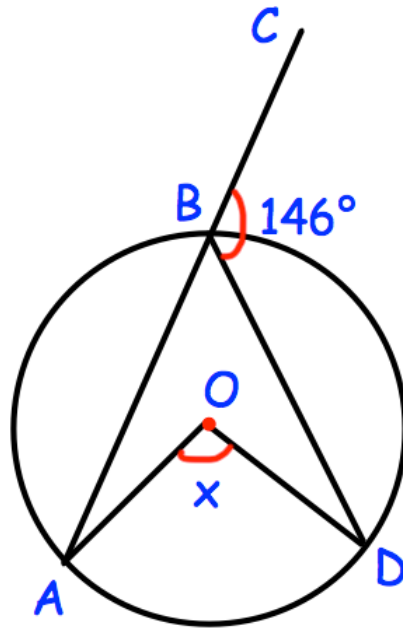
22.



Rotate shape A 180° about centre $(-1, 2)$

(3)

23.



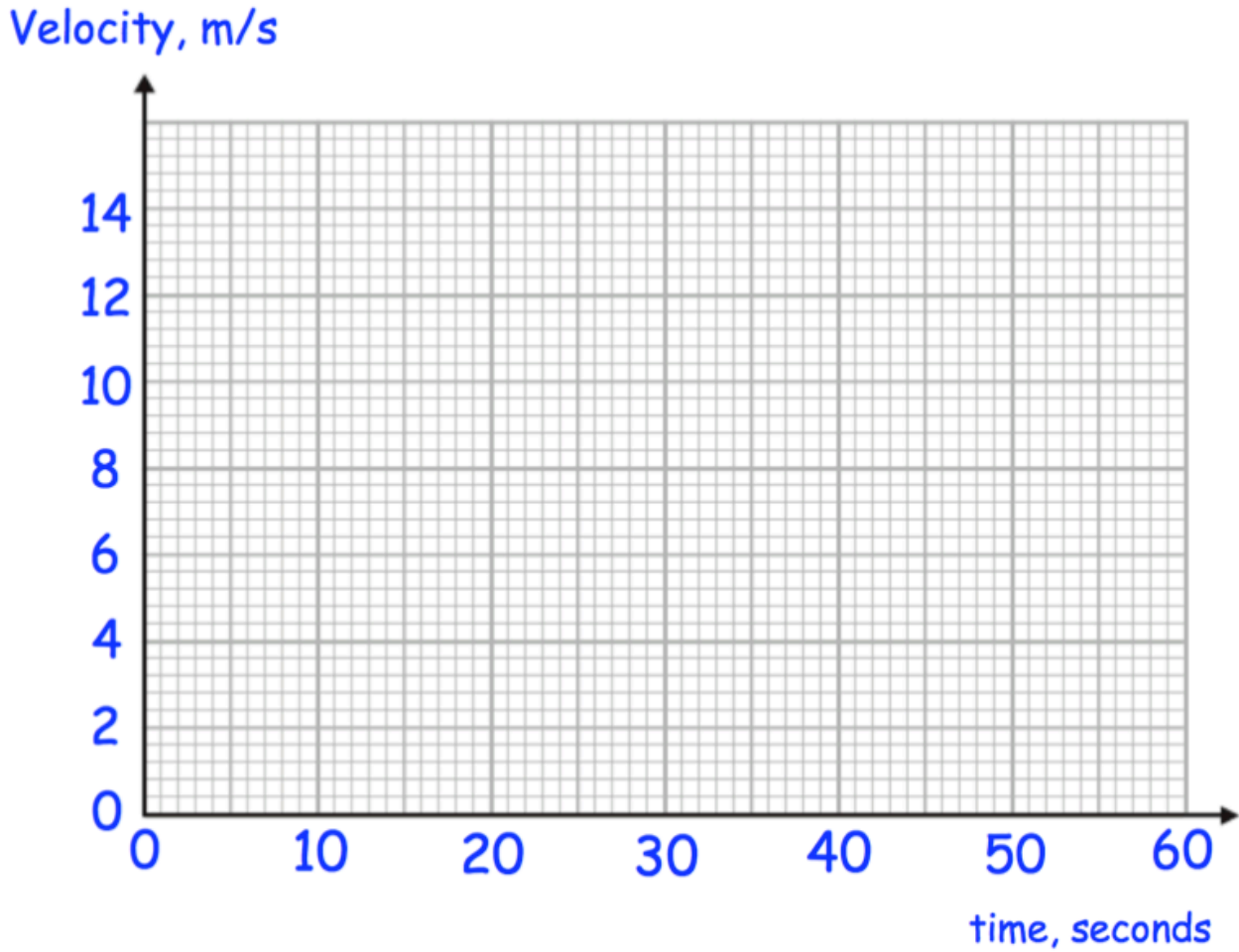
Shown is a circle with centre O.
ABC is a straight line.
Angle CBD is 146°

Find the size of angle AOD.

.....^o
(3)

24. A remote control car drives in a straight line.
 It starts from rest and travels with constant acceleration for 20 seconds reaching a velocity of 12m/s.
 It then travels at a constant speed for 20 seconds.
 It then slows down with constant deceleration of 4m/s^2 .

(a) Draw a velocity time graph



(b) Using your velocity-time graph, work out the total distance travelled.

.....m
 (2)

25.

Lee complete a journey in three stages.

In stage 1 of his journey, he drives at an average speed of 30km/h for 45 minutes.

(a) How far does Lee travel in stage 1 of his journey?

.....km
(2)

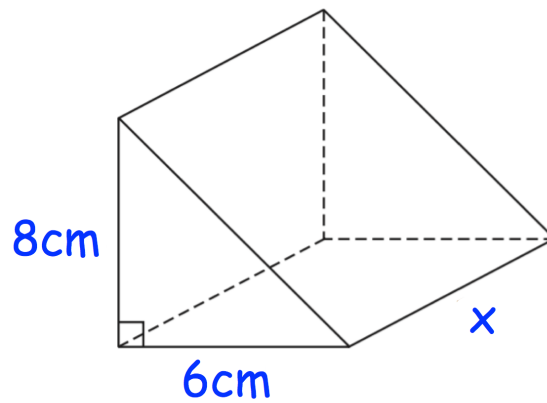
In stage 2 of his journey, Lee drives at an average speed of 50km/h for 2 hours 48 minutes.

Altogether, over all three stages, Lee drives 200 km in 4 hours.

What is his average speed, in km/h, in stage 3 of his journey?

.....km/h
(4)

26. The diagram shows a solid triangular prism.



The prism is made from wood and has a mass of 643.8g
The density of wood is 1.85g/cm^3

Calculate the length of the prism.

.....cm
(4)

27. Timothy weighs the mass of some oranges, in grams.

The table shows some information about his results.

Mass	Frequency
$20 < m \leq 25$	12
$25 < m \leq 30$	24
$30 < m \leq 35$	17
$35 < m \leq 40$	15
$40 < m \leq 45$	4

Work out an estimate for the mean mass of an orange.

.....grams
(4)

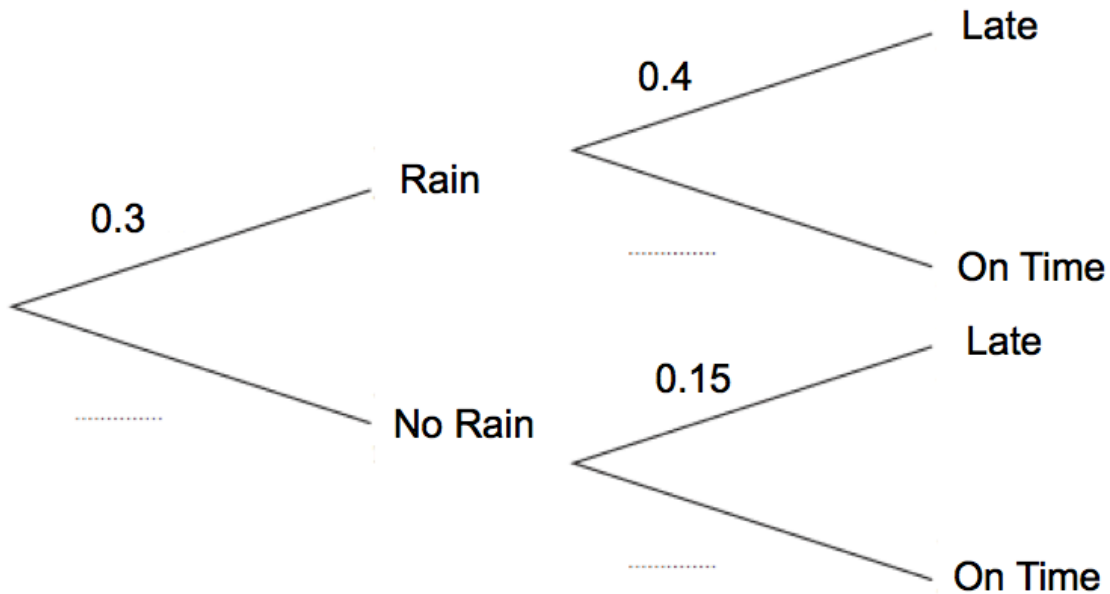
28. In a small village, one bus arrives a day.

The probability of rain in the village is 0.3.

If it rains, the probability of a bus being late is 0.4.

If it does not rain, the probability of a bus being late is 0.15.

(a) Complete the tree diagram

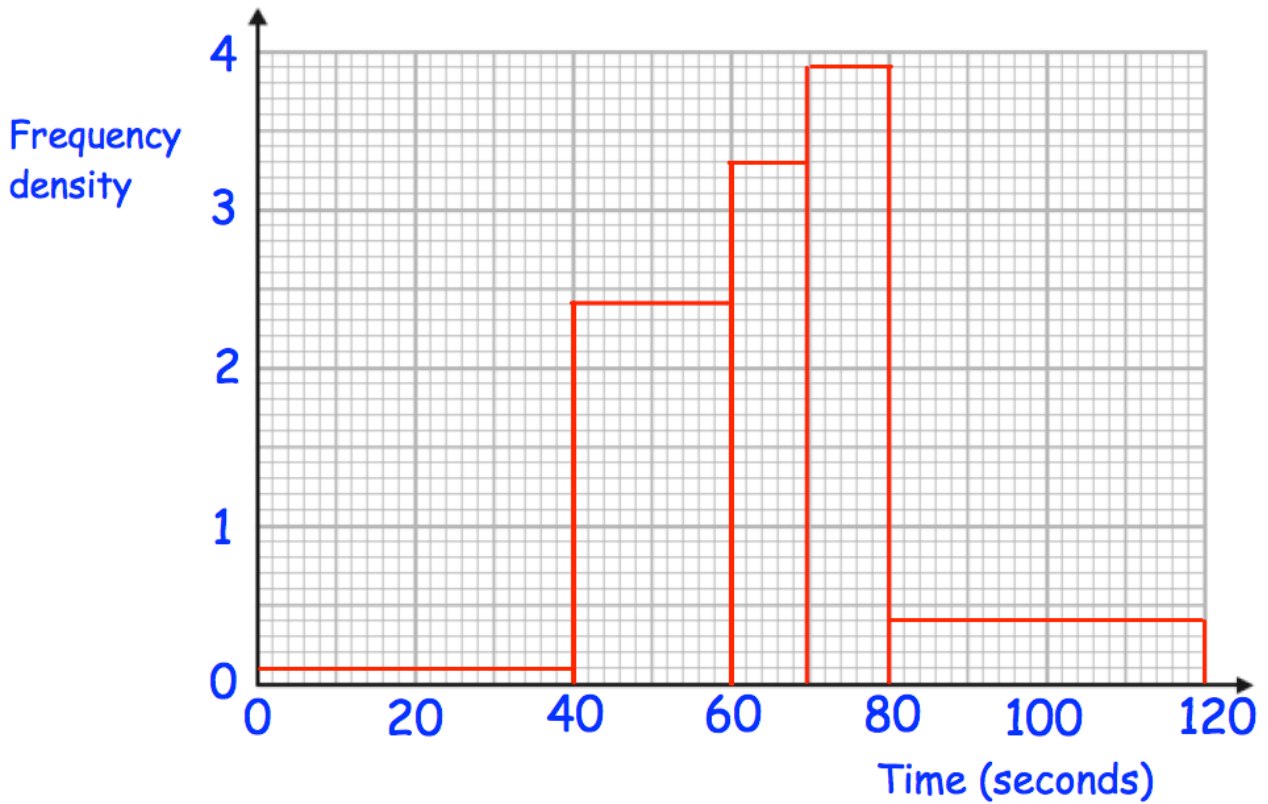


(2)

(b) Work out the number of days the bus should be late over a period of 80 days.

.....
(3)

29. The histograms shows information about the time taken by 140 students to complete a puzzle.



(a) Complete this frequency table.

Time, t seconds	Frequency
$0 < t \leq 40$	4
$40 < t \leq 60$	
$60 < t \leq 70$	33
$70 < t \leq 80$	
$80 < t \leq 120$	16

(2)

(b) Calculate an estimate of the median.

.....
(3)

30. Mrs Hampton is potting plants.
She is using two mathematically similar pots, the smaller is 10cm tall and the larger 14cm tall.

She has two bags of soil, each containing 30 litres of soil.

With the first bag, Mrs Hampton fills 20 small pots using all of the soil in the bag.



How many large pots can be filled completely using the second bag of soil?

.....
(5)

-
31. Declan ran a distance of 200m in a time of 26.2 seconds.

The distance of 200m was measured to the nearest 10 metres.

The time of 26.2 was measured to the nearest tenth of a second.

Work out the upper bound for Declan's average speed.

.....m/s
(2)

32. Factorise fully

$$w^2y + wy^2$$

.....
(2)

33. (a) Factorise $x^2 + 14x - 51$

.....
(2)

(b) Factorise $2w^2 - 9w + 4$

.....
(2)

(c) Factorise $x^2 - 121$

.....
(2)

34. (a) Solve $y^2 + 9y + 2 = 8y + 58$

.....
(2)

(b) Solve $5x^2 + 19x - 4 = 0$

.....
(2)

35. Solve the equation $x^2 - 2x - 9 = 0$

Give your answers to two decimal places.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$
(3)

36. The n th term of a sequence is $4n - 7$

(a) Write down the first three terms of the sequence.

1st term $\dots\dots\dots$, 2nd term $\dots\dots\dots$, 3rd term $\dots\dots\dots$
(2)

(b) What is the difference between the 150th and 151st terms?

$\dots\dots\dots$
(1)

The last term of this sequence is 393.

(c) How many terms are there in this sequence?

$\dots\dots\dots$
(2)

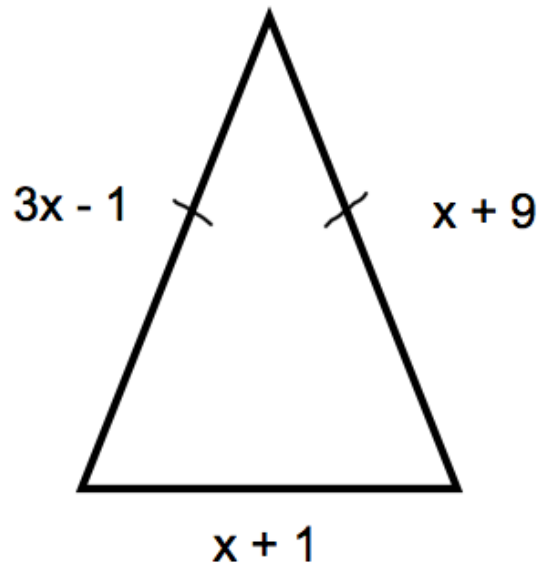
37. Here are the first 5 terms of a quadratic sequence

9 17 29 45 65

Find an expression, in terms of n , for the n th term of this quadratic sequence.

.....
(3)

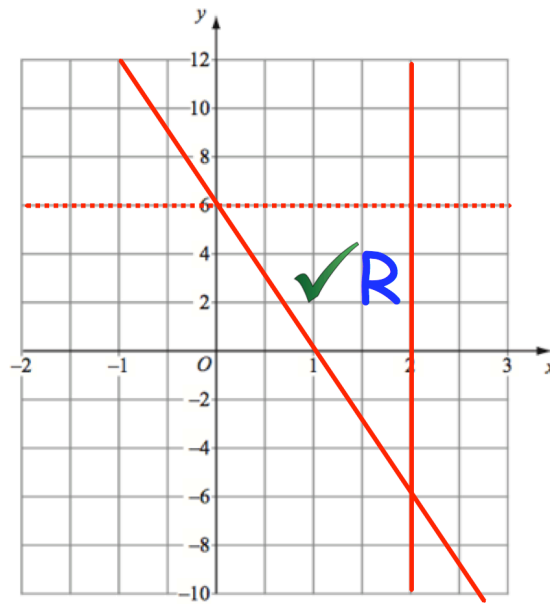
38. Shown below is an isosceles triangle. Each side is measured in centimetres.



Find the perimeter of the triangle

.....
(4)

39.



The region labelled R satisfies three inequalities.

State the three inequalities

.....

.....

.....

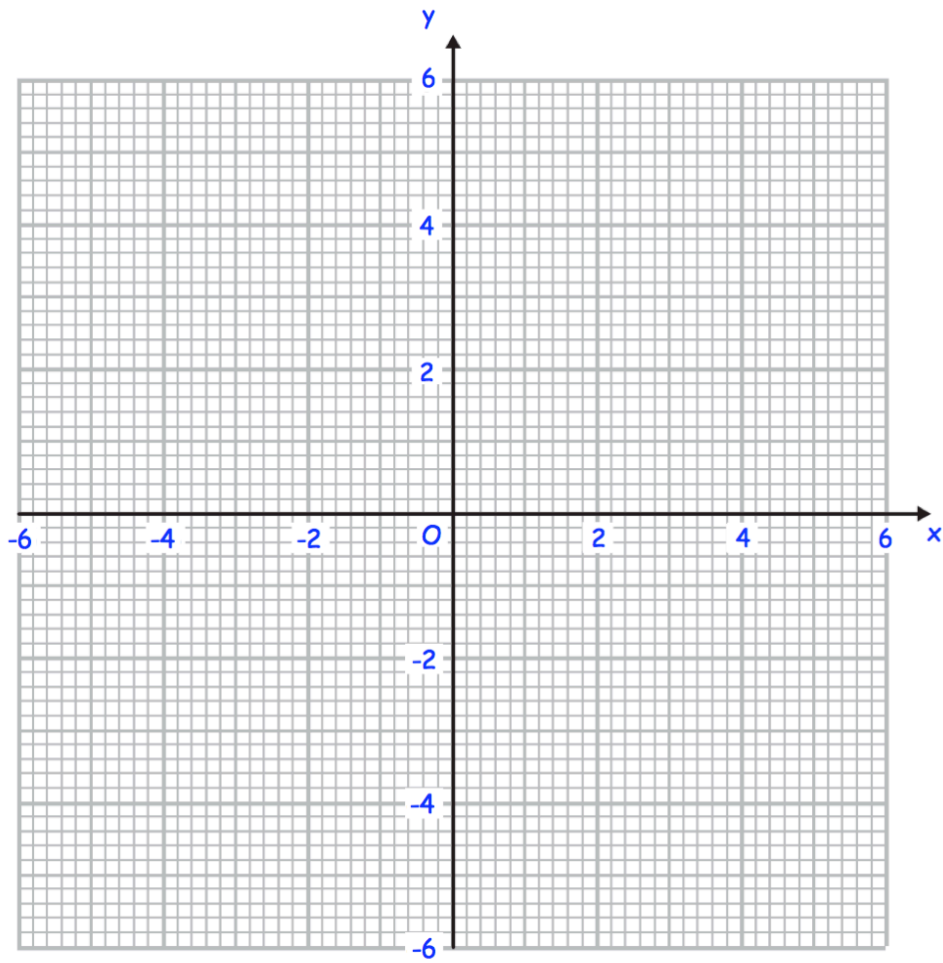
(3)

40. Solve the inequality $x^2 + 2x - 35 > 0$

.....

(3)

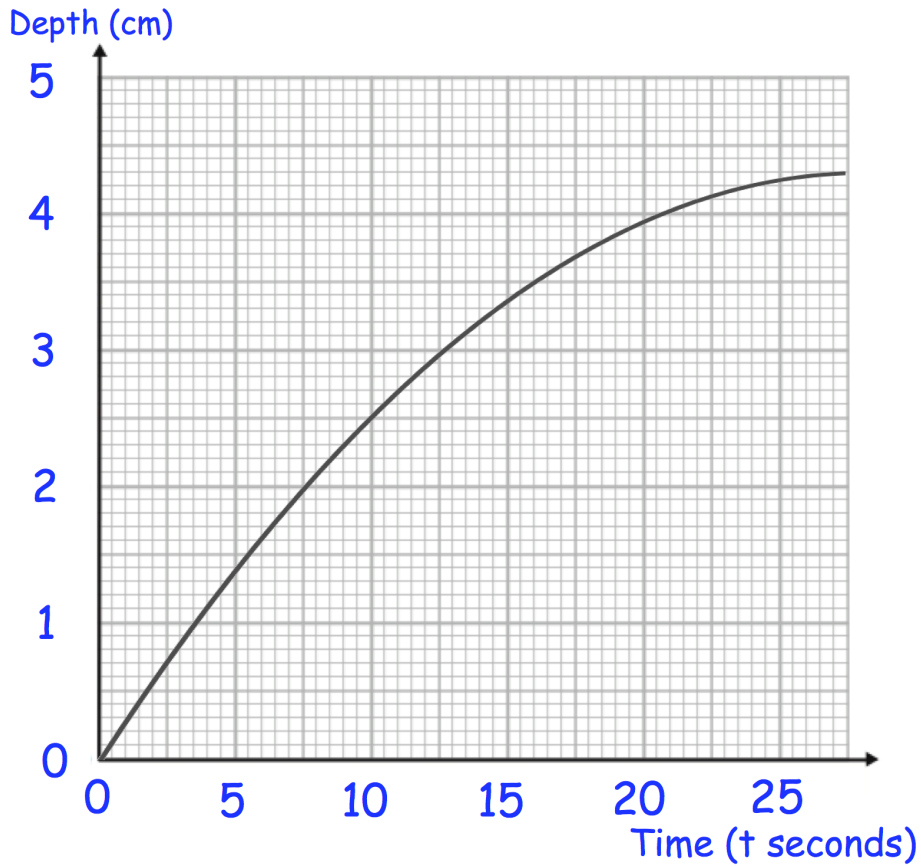
41. Draw the circle with equation $x^2 + y^2 = 16$



(2)

42. Jack is filling a container with water.

The graph shows the depth of the water, in centimetres, t seconds after the start of filling the container.



(a) Calculate an estimate for the gradient of the graph when $t = 15$ seconds.

.....
(3)

(b) Describe fully what your answer to (a) represents

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

(c) Explain why your answer to (a) is only an estimate

.....
(1)

43. Solve

$$\frac{1}{x+3} - \frac{1}{x+1} = 2$$

.....
(5)

44.

The functions $f(x)$ and $g(x)$ are given by the following:

$$f(x) = 8 - 3x$$

$$g(x) = 4x$$

(a) Calculate the value of $gf(3)$

.....
(2)

(b) Find $f^{-1}(x)$

.....
(2)

45.

(a) Show that the equation $x^3 + 2x = 1$ has a solution between $x = 0$ and $x = 1$

(2)

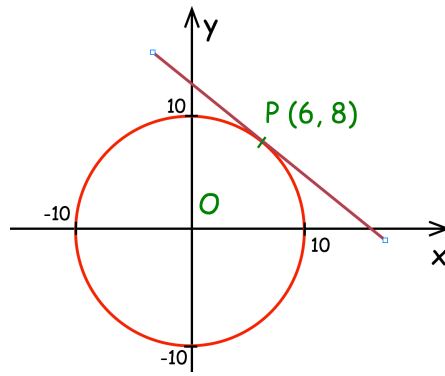
(b) Show that the equation $x^3 + 2x = 1$ can be rearranged to give $x = \frac{1}{2} - \frac{x^3}{2}$

(1)

(c) Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{1}{2} - \frac{x_n^3}{2}$ twice to find an estimate for the solution of $x^3 + 2x = 1$

(3)

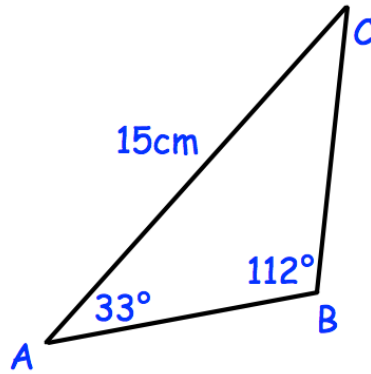
46. Here is a circle, centre O , and the tangent to the circle at the point $(6, 8)$.



Find the equation of the tangent at the point P .

.....
(4)

47. (a)

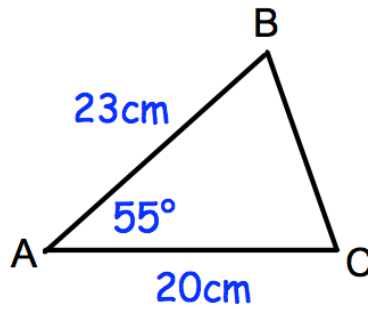


In triangle ABC the length of AC is 15cm.
Angle ABC = 112°
Angle BAC = 33°

Work out the length of BC.

.....cm
(3)

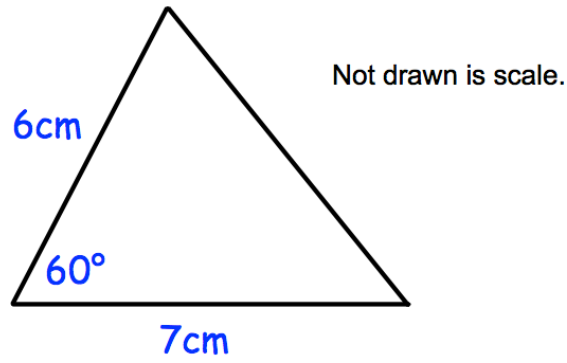
(b)



Calculate the length of BC.

.....cm
(3)

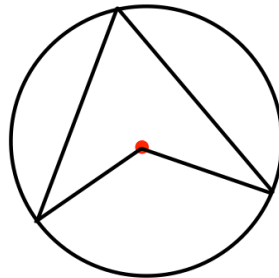
48.



Calculate the area of the triangle.

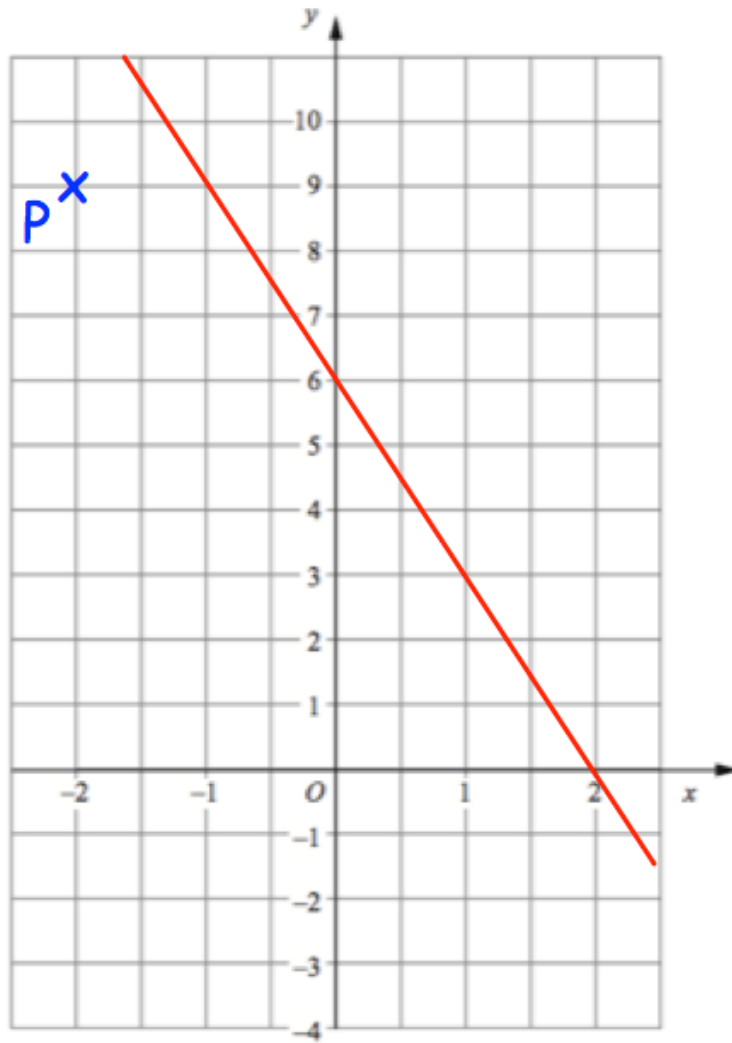
.....cm²
(2)

49.



Prove that the angle at the centre is twice the angle at the circumference.

50. (a)



(a) Find the equation of L.

.....
(3)

The point P has coordinates $(-2, 9)$.

(b) Find an equation of the line that is parallel to L and passes through P.

.....
(2)

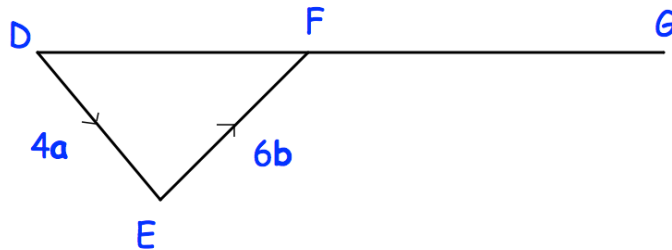
- (b) The straight line K has equation $y = 2x - 5$
 The straight line J is perpendicular to line K and passes through the point $(-4, 8)$.

Find the equation of line J

.....
(3)

51. DFG is a straight line.

$\overrightarrow{DE} = 4\mathbf{a}$ and $\overrightarrow{EF} = 6\mathbf{b}$



- (a) Write down the vector \overrightarrow{DF} in terms of \mathbf{a} and \mathbf{b}

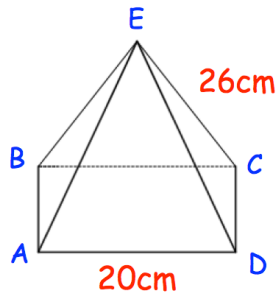
.....
(1)

(b) $DF : FG = 2:3$

Work out the vector \overrightarrow{DG} in terms of \mathbf{a} and \mathbf{b}
 Give your answer in its simplest form.

.....
(2)

52. Shown below is a square based pyramid.
The apex E is directly over the centre of the base.



AD = 20cm

CE = 26cm

- (a) Work out the length of AC

.....cm
(2)

- (b) Calculate angle CAE

.....°
(2)

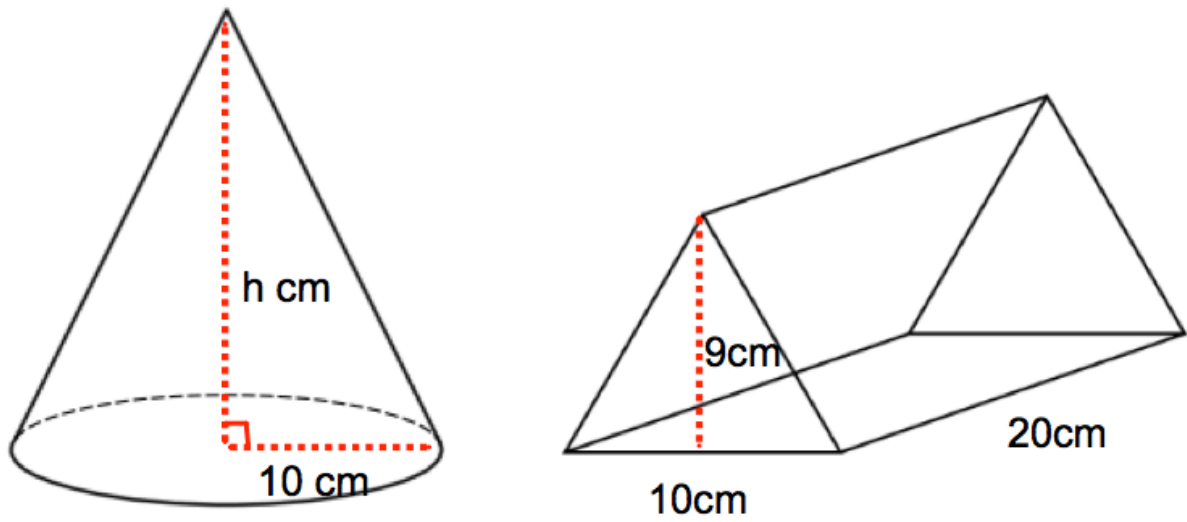
- (c) Work out the height of the pyramid

.....cm
(2)

- (d) Calculate the volume of the pyramid

.....cm³
(2)

53. Shown is a cone and a triangular prism.



Both solids have the same volume.

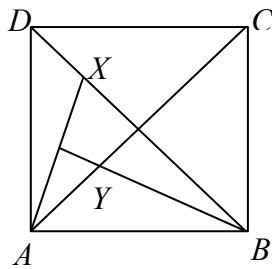
Calculate the height of the cone.

.....cm
(3)

54. There are 8 sweets in a bag.
Three sweets are red, three sweets are blue and two sweets are green.
- Three sweets are selected at random **without** replacement.
- Calculate the probability that the sweets are **not** all the same colour.

.....
(4)

55. ABCD is a square, X is a point in the diagonal BD and the perpendicular from B to AX meets AC in Y.



Prove that triangles AXD and AYB are congruent.

(4)

56. Prove $(2n + 9)^2 - (2n + 5)^2$ is always a multiple of 4

(4)

57. Solve the simultaneous equations

$$2x + y = 5$$

$$2x^2 + y^2 = 11$$