

S4 Revision

Non-calculator:

1. Find the value of

- (a) $6.4 + 11 + 0.46$ (b) $1.4 - 0.67$ (c) $25.7 - 8.26$ (d) 133×20
(e) 0.025×500 (f) $41.6 \div 800$ (g) $3486 \div 600$ (h) 60% of £210
(i) 85% of £420 (j) $\frac{3}{8}$ of £5600 (k) $\frac{3}{4}$ of 214 m (l) $33\frac{1}{3}\%$ of 6600 kg
(m) $\frac{1}{4} + \frac{3}{5}$ (n) $2\frac{1}{2} - \frac{7}{8}$ (o) $4 \times 1\frac{3}{5}$ (p) $\frac{3}{5} \times 3\frac{1}{3}$ (q) $\frac{5}{6} \div 3\frac{1}{2}$

2. Find the value of

- (a) $6 - 11$ (b) $-2 + 15$ (c) $-5 - 8$ (d) -3×5 (e) -6×-10
(f) $12 \div (-4)$ (g) $-50 \div -5$

3. Simplify

- (a) $2(3x - 2) - 9$ (b) $3(4p + 2q) - 10p$ (c) $2 + 3(x - 3)$
(d) $4x + 3(x - 2y)$ (e) $5(m - 2) + 3(2 - 3m)$ (f) $2(a - 2c) + 3(3a - 4c)$

4.(i) Solve

- (a) $3 + 5p > 18$ (b) $2(2y - 3) = 14$ (c) $6(1 + 2w) < 5$
(d) $4x - 1 = 2x + 13$ (e) $5 + 6n = 2n - 3$ (f) $\frac{x}{2} + 3 \leq 5$

(ii) $2x - 3 < 15$. Find the values of x given it is a positive whole number.

5. Write in Scientific Notation

- (a) 21 000 000 (b) 3.66 million (c) 0.000 33 (d) 0.000 000 7

6. Write as ordinary numbers

- (a) 4.32×10^5 (b) 6×10^7 (c) 2.5×10^{-8} (d) 8×10^{-4}

7. (a) Newton's constant of gravitation is 6.674×10^{-11} . Write this as an ordinary number.

(b) In Science the Magnetic Constant is 0.000 001 257. Write this in Scientific Notation.

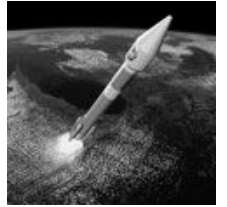
(c) A light year is a distance of 9 460 000 000 000 kilometres. Write this in Scientific Notation.

(d) The large Magellanic cloud is 1.69×10^{18} kilometres from Earth. Write this distance as an ordinary number.



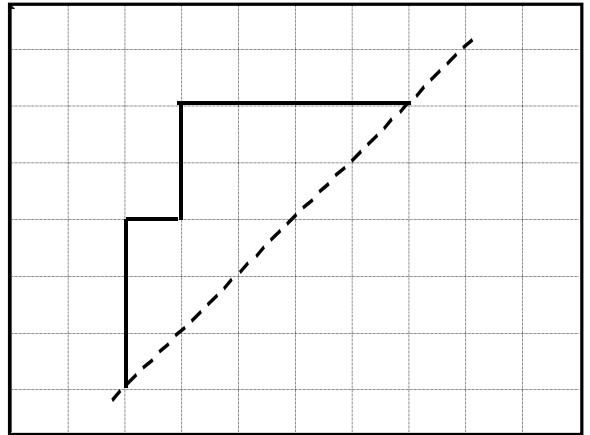
8. Give the answers to the following in Scientific Notation.

- (a) A rocket travels at a speed of 2.76×10^5 kilometres per hour. How far will the rocket travel in 8 hours?

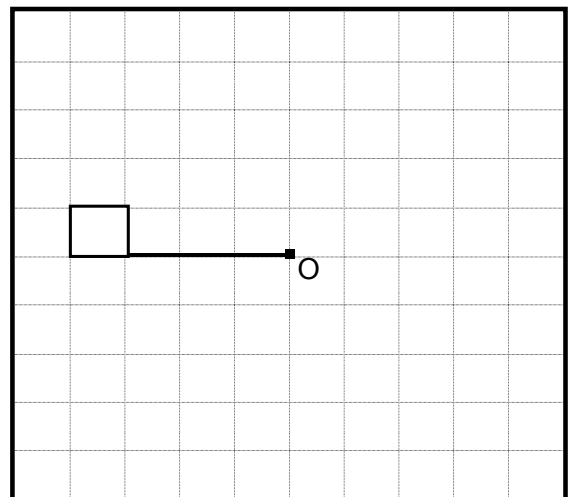


- (b) A magazine has a thickness of 1.89×10^{-4} metres. The magazine contains 70 sheets of paper. Calculate the thickness of one sheet of paper.

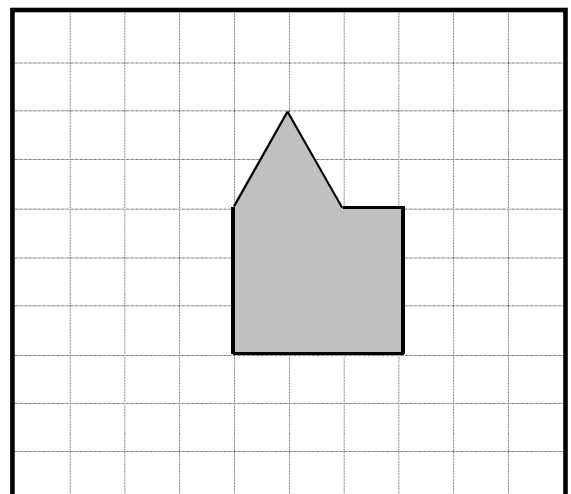
9. The shape opposite is to be reflected in the dotted line.
Copy and complete the diagram.



10. The shape opposite is rotated about the point O so that it has quarter turn symmetry.
Copy and complete the diagram.



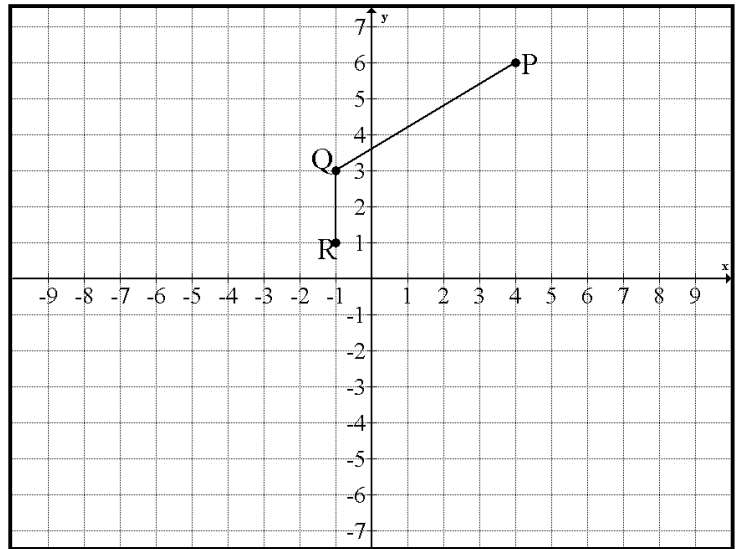
11. The shape opposite is enlarged by a scale factor of 2.
Draw this enlargement.



12. PQRS is a kite with P(4,6), Q(-1,3) and R(-1,1).

(a) Copy the diagram and plot the point S.

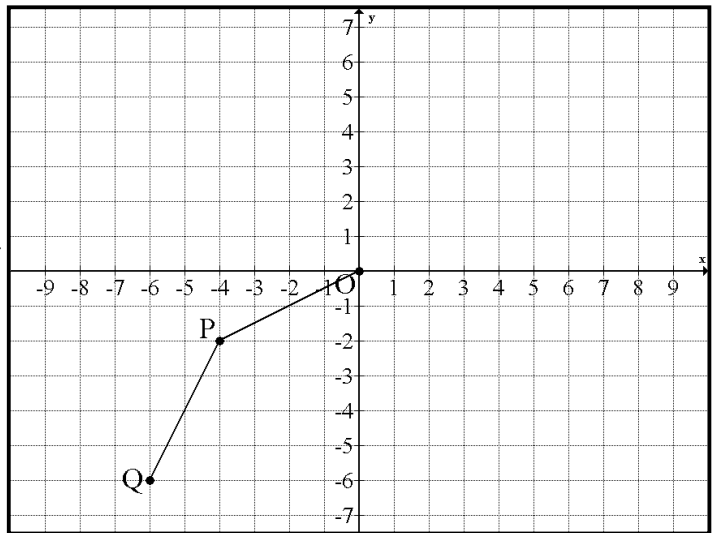
(b) Reflect PQRS in the y-axis.



13. P is the point (-4,-2) and Q is (-6,-6).

(a) OPQR is a rhombus.
Copy the diagram and find the point R.

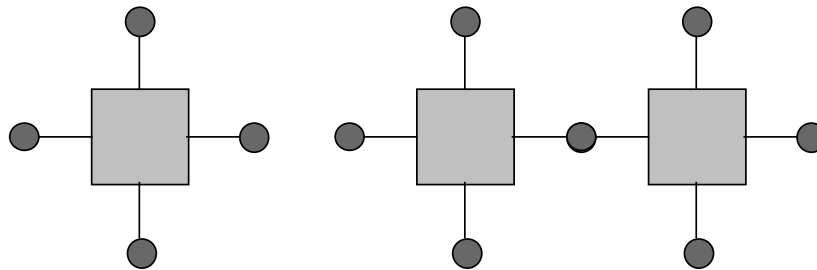
(b) Rotate OPQR through 180° about the point O.



14. (a) Plot the points A(-4,3), B(0,7) and C(6,3).

(b) Find a point D so that ABCD is a kite.

15. The diagram below shows an arrangement of squares and circles.



(a) Copy and complete the table for this arrangement.

Number of squares (S)	1	2	3	4	5	20
Number of Circles (C)			10			

(b) Write down a formula for finding the number of circles, C, if you know the number of squares, S.

(c) If the arrangement has 46 circles, how many squares are there?

Calculator section:

16. The heights, in centimetres, of 16 basketball players are

195 201 220 210 200 213 188 199
182 206 211 215 189 196 215 215

- (a) Show this information in a stem and leaf diagram.
- (b) Find the median height
- (c) Write down the modal height.
- (d) Write down the range of the heights.
- (e) Calculate the mean height.



17. The table shows the way in which 180 pupils travel to school.

	Boys	Girls
Car	15	18
Bus	30	10
Train	5	8
Walk	50	44

If a pupil is chosen at random in the school what is the probability that

- (a) The pupil is a boy?
- (b) The pupil is a girl who travels to school by car?
- (c) The pupil is a boy who walks to school?

18. A die is thrown 40 times. The results are shown below.

Throw	Frequency	Throw x Frequency
1	7	
2	6	
3	5	
4	8	
5	6	
6	8	



- (a) Calculate the mean throw.
- (b) Show the distribution of the throws in a bar chart.

19. The weights, in kilograms, of 6 new born puppies are

2.2 3.1 2.5 3.6 3.6 1.8

- (a) Calculate the mean weight of the puppies.
- (b) Another puppy is born. The mean weight of the 7 puppies is now 2.9 kilograms. Find the weight of the 7th puppy.



20. A formula is given as $p = ab + 2b^2$. Calculate p when $a = 5.1$ and $b = 2.5$

21. $A = \frac{x(x + y^2)}{x - y}$. Find A when $x = 35$ and $y = 15$.

22. The Khan family are buying a new kitchen costing £7200. The kitchen can be bought on hire purchase. The hire purchase price of the kitchen is 15% more than the cash price. The hire purchase agreement requires a deposit of 25% of the cash price followed by 60 equal monthly instalments.



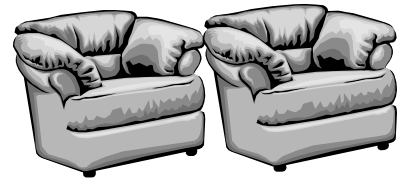
Calculate the cost of each instalment.

23. Calculate the simple interest on a sum of £4200 at 6.5% per annum for a period of 1 year and 8 months.

24. Michael borrows £1800 at a rate of interest of 11% per annum. How much will he owe altogether after 7 months?

25. In a survey of 250 people, 37 were left-handed. What percentage of people surveyed were left-handed.

26. A pair of armchairs costing £360 are sold in a sale for £252. Express the saving on the chairs as a percentage.

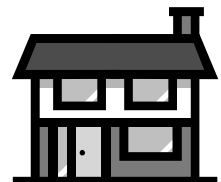


27. Sasha goes on holiday to Italy. She changes £750 into Euros. Given $\text{£}1 = 1.04$ Euros, calculate how many Euros Sasha will receive.



28. Brian goes to the USA on holiday. He changes £800 into dollars at the rate of $\text{£}1 = \$1.15$. While on holiday he spends 750 dollars and then changes the rest back to pounds at the rate of $\text{£}1 = \$1.12$. How much will he get, to the nearest pound?

29. Nadia has bought a new house valued at £165 000. She takes out building insurance at an annual rate of £2.75 per £1000. Calculate the annual premium Nadia will pay.



30. Sean insures his new set of golf clubs which are worth £260. The insurance company charge him £5.20 per £50. Calculate Sean's premium.

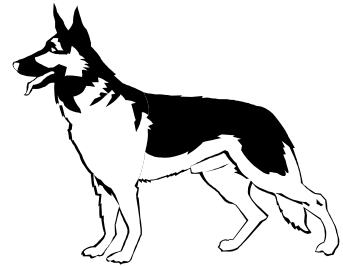


31. Simplify the following ratios.

(a) 8 : 18 (b) 32: 24 (c) 150 : 250 (d) 4 metres : 60 centimetres

32. Blue, red and green paint are mixed together in the ratio 3:4:2. If 14 litres of green paint is used, how much blue and how much red paint would be needed?

33. 78 people were asked if they owned a dog. The ratio of those with a dog to those without was 2:11. How many did not have a dog?



34. 420 children were asked to choose their favourite cartoon from The Simpsons, Family Guy and American Dad. The ratio of the choices was 6:5:3. How many children chose Family Guy as their favourite?

35. The number of badgers in Scotland this year has risen to 11440. This is a 4% rise on the number last year. How many badgers were there last year?

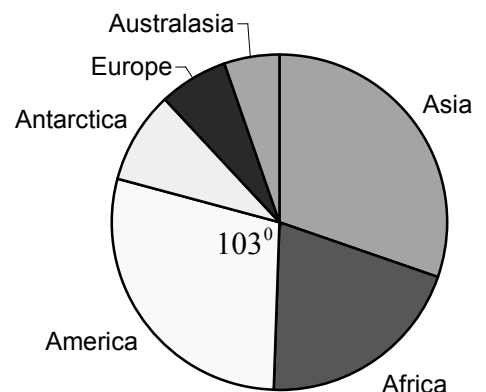


36. Crime figures issued recently in Scotland showed that this year serious crime was up by 6% on last year. If there were 33920 reported cases this year how many cases were reported last year?



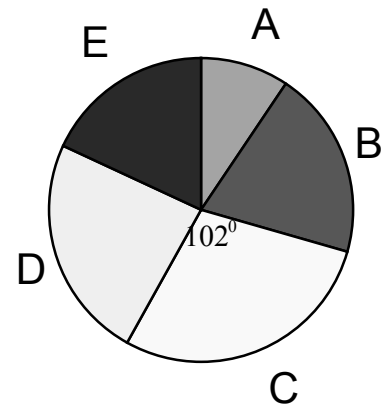
37. The pie chart shows the relative sizes of the continents of the world. The total land mass of the world is 1.47×10^8 square kilometres.

- (a) Write this land mass as an ordinary number.
(b) Calculate the land mass of the continent of America. **Give your answer to the nearest whole number**



38. 240 students sit an Economics exam.
The grades obtained by the students are shown in the pie chart opposite.

How many students obtained a Grade C?



39. 600 people are surveyed on the mode of transport they use to get to work.
The table shows the results.

Show the information in a pie chart.

Mode	No. of people
Train	80
Bus	130
Car	300
Cycle	20
Walk	70

40. The length of time, in minutes, patients have to wait in a dentist's surgery is recorded.

Construct a pie chart to illustrate this information.

Time	Number of patients
Less than 10	27
11 – 20	21
21 – 30	15
Over 30	9

41. Mark is driving from Glasgow to London, a distance of 390 miles.
His average speed for the journey is 52 miles per hour.
If he leaves Glasgow at 1145, when will he arrive in London?

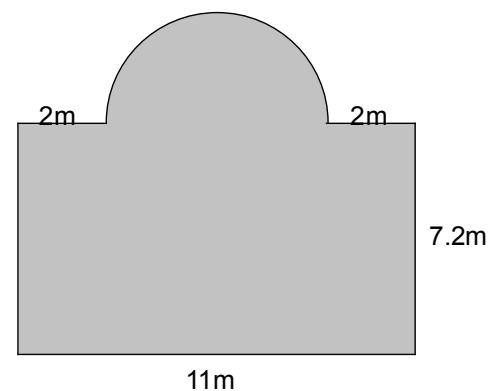


42. An aeroplane travels at an average speed of 480 kilometres per hour.
Calculate the distance travelled by the aeroplane in a time of 2 hours and 40 minutes.



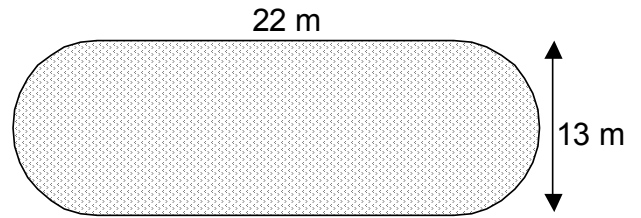
43. The floor plan of a room is in the shape of a rectangle and a semi-circle.

Calculate the area of the floor.



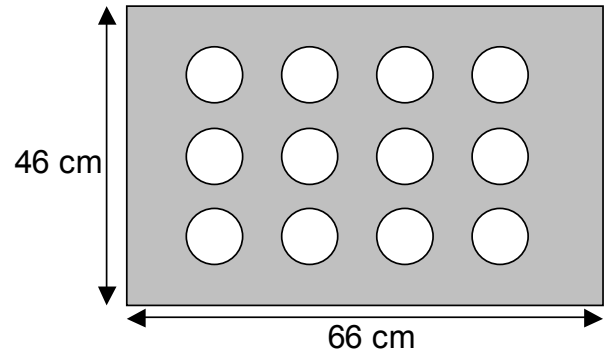
44. A lawn is in the shape of a rectangle with semi-circular ends.

Calculate the area of the lawn.

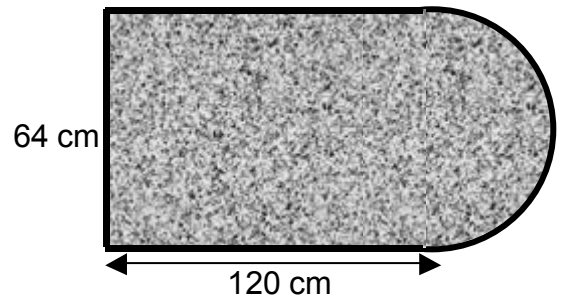


45. A rectangular metal plate has length 46 centimetres and breadth 66 centimetres. 12 identical circular holes of diameter 8 centimetres are cut from the plate, as shown.

Calculate the area of the plate after the holes have been removed.

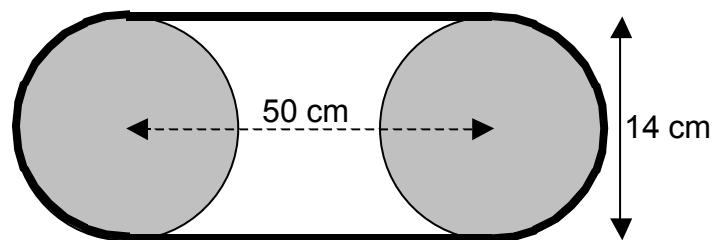


46. Amanda has a worktop in her kitchen in the shape of a rectangle with a semi-circular end. The edging round the outside of the worktop is to be replaced. Calculate the length of edging required.



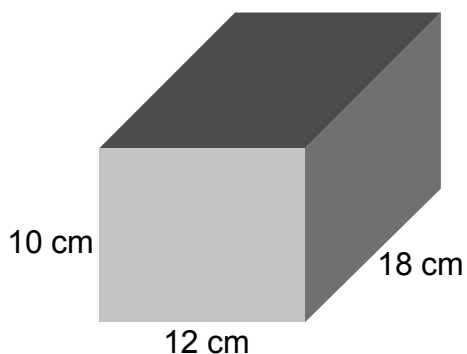
47. The diagram below shows the fan belt from a machine. The belt passes around 2 wheels whose centres are 50 cm apart. Each wheel is 14 cm in diameter.

Calculate the total length of the fan belt.

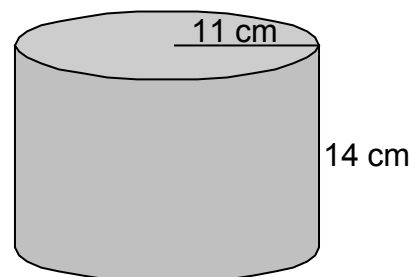


48. Calculate the volume of each shape below.

(a) Cuboid

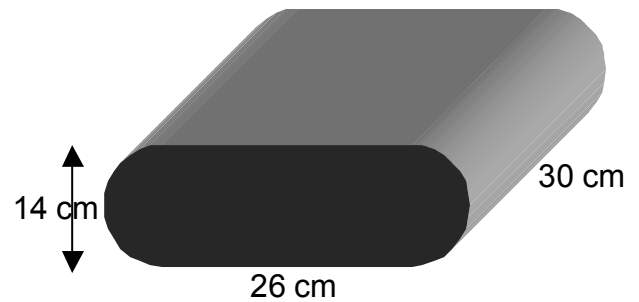


(b) Cylinder

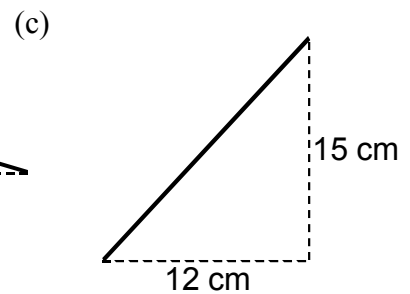
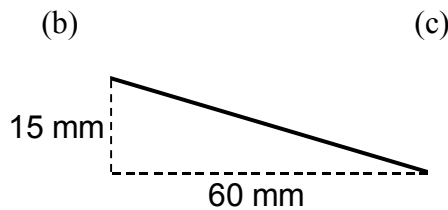
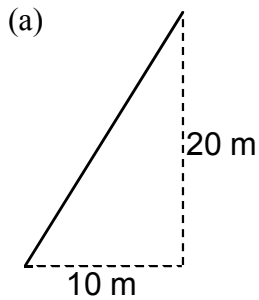


49. The cross-section of the shape opposite consists of a rectangle with semi-circular ends.

Calculate the volume of this shape.



50. Calculate the gradient of each line below.



51. A line has equation $y = 2x - 4$.

(a) Copy and complete the table below.

x	4	0	-2
y			

(b) Draw this line on a graph.

(c) Write down the gradient of the line $y = 2x - 4$

52. A line has equation $y = -3x + 2$.

(a) Copy and complete the table below.

x	3	0	-1
y			

(b) Draw this line on a graph.

(c) Write down the gradient of the line $y = -3x + 2$

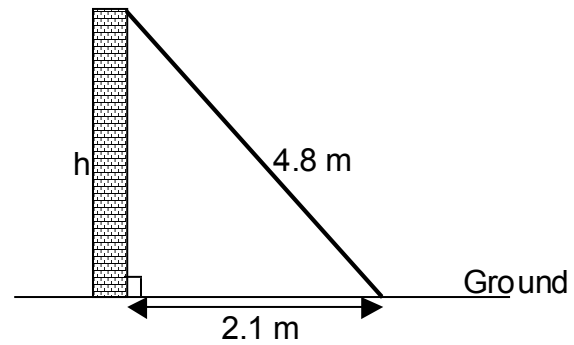
53. The rate R at which water flows through a pipe varies directly as the square root of the diameter D of the pipe.
If $R = 12000$ gallons per hour when a 2.56 foot diameter pipe is used, find an equation connecting R and D . Find R if D is changed to a 3.24 feet diameter pipe.



54. The exposure E seconds required for a film varies directly as the square of the **stop** f used. It is found that $E = 1/100$ when $f = 8$. Find an equation connecting E and f and use it to find E when $f = 16$.

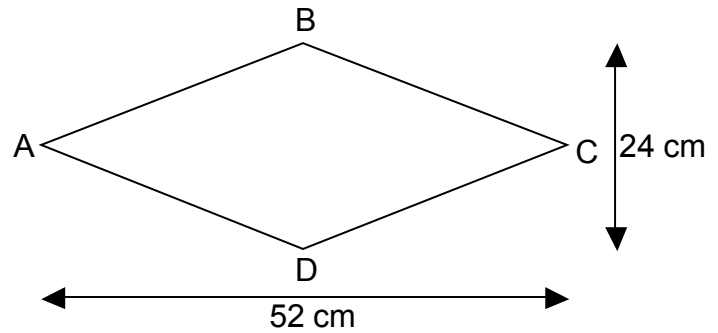
55. A ladder 4.8 metres long is resting against the top of a wall, as shown.

Calculate the height of the wall.



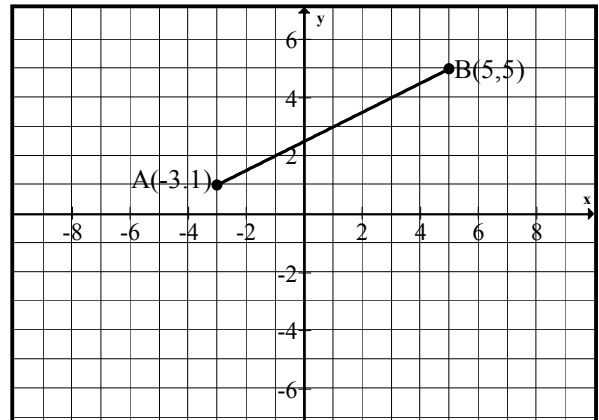
56. The diagram opposite shows a rhombus ABCD.

Given the information in the diagram, calculate the length of AB.

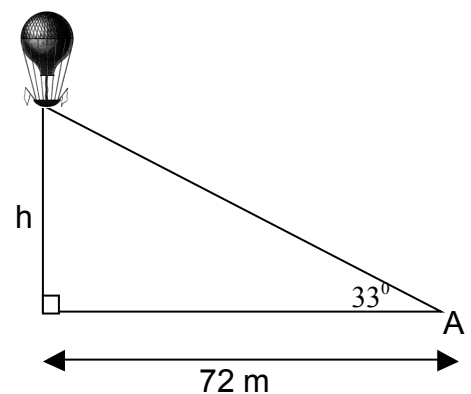


57. The diagram opposite shows the points A(-3,1) and B(5,5).

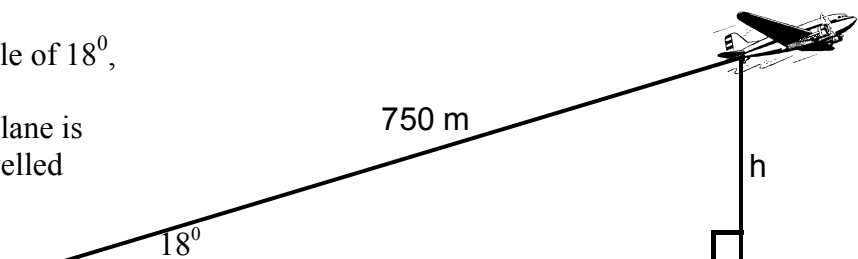
Calculate the distance between these points.



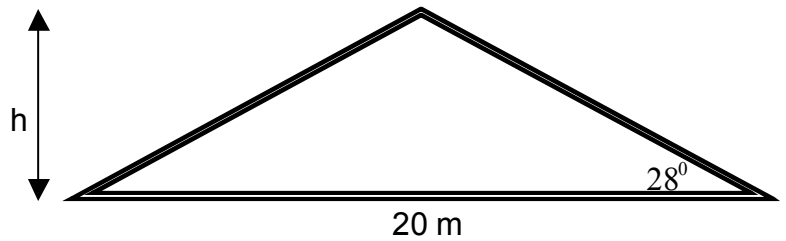
58. Umair is looking at a hot air balloon in the sky. From his position at A, the angle of elevation to the balloon is 33° . Calculate h , the height the balloon is above the ground.



59. An aeroplane takes off at an angle of 18° , as shown opposite. Calculate the height, h , the aeroplane is above the ground after it has travelled 750 metres.

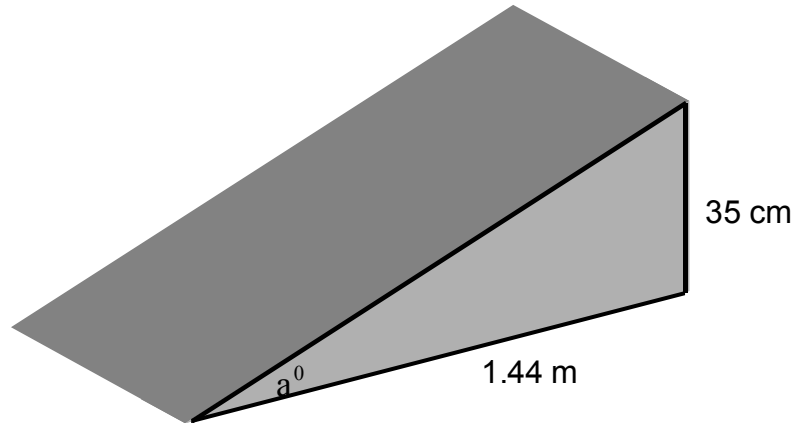


60. The diagram shows the end view of the roof of a house which is in the shape of an isosceles triangle. Calculate h , the height of the roof.

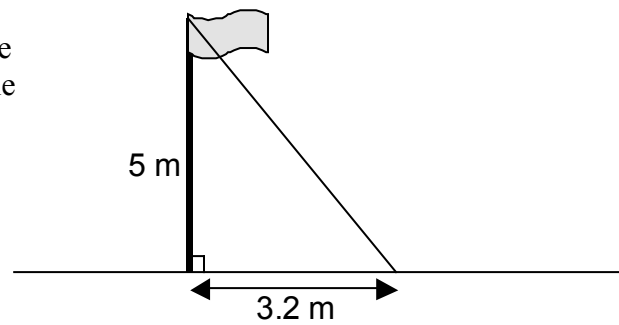


61. The diagram opposite shows a ramp outside a building. The side view of the ramp is a right angled triangle.

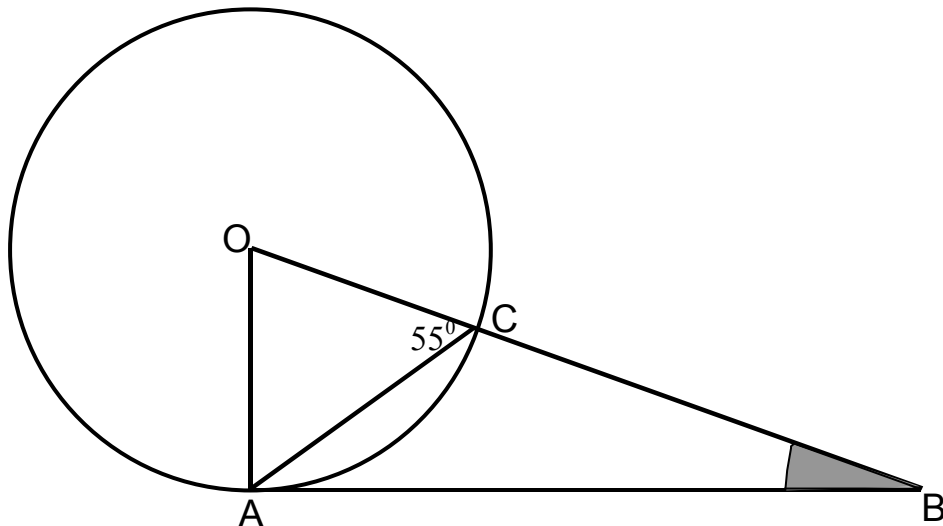
Calculate, a° , the angle made by the ramp with the ground



62. A flagpole 5 metres high is supported by a metal wire which is connected to the ground, 3.2 metres from the flagpole. Calculate the size of the angle the wire makes with the ground.



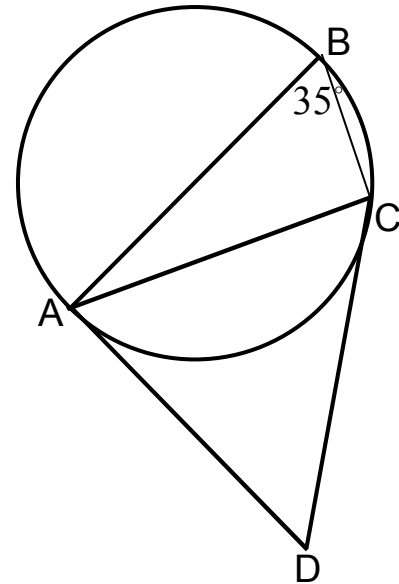
63.



- AB is a tangent to the circle at A
- OB intersects the circle at C
- Angle $OCA = 55^\circ$

Calculate the size of angle OBA .

64. In the diagram AB is a diameter of the circle.
AD is a tangent to the circle and the lines AD and CD are equal in length.
Angle ABC = 35° .



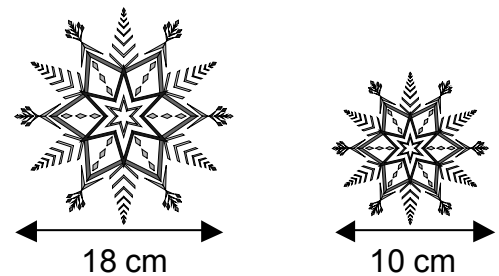
Calculate the size of angle ADC.

65. A photograph and its enlargement are similar in shape.
The smaller photograph has an area of 60 cm^2 .



Calculate the area of the larger photograph.

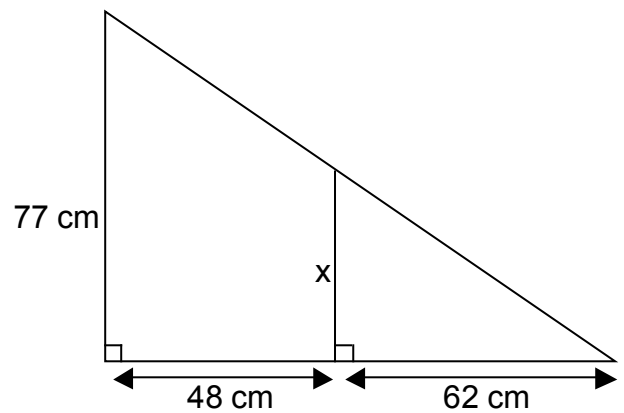
66. Two Christmas decorations are mathematically similar in shape.
The larger decoration has an area of 162 cm^2 .



Calculate the area of the smaller decoration.

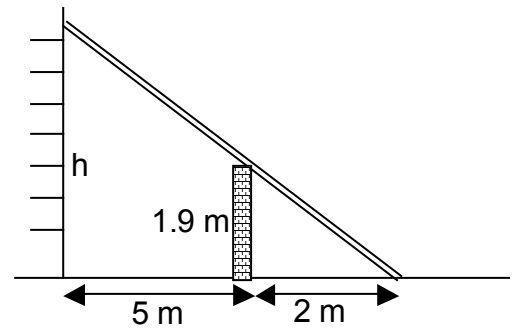
67. The diagram shows the design for an attic window.

Given the information in the diagram, find the value of x .



68. The foot of a window cleaner's ladder is 2 metres from the base of a wall and rests against a block of flats, a further 5 metres away.

How far up the block of flats does the ladder reach?



69. John is a mechanic. He can fit 12 spark plugs in 40 minutes. How many spark plugs can John change in one and a half hours?



70. Armando can make pizzas at a rate of 6 every 20 minutes. How many pizzas can Armando make in 50 minutes?



71. The table below shows the marks of a group of pupils in both Maths and Physics examinations.

Maths	24	35	23	46	12	17	12	33	28	29	45	48	40	8
Physics	30	43	25	49	11	18	17	38	30	33	43	48	46	9

- (a) Show this information on a scattergraph.
 (b) Describe the connection between the Maths and Physics marks.
 (c) Draw a line of best fit line on your diagram.
 (d) Use your line of best fit to estimate the Physics mark of a pupil who scored 20 in Maths.
72. The number of wins and the number of points for teams in a football league are given in the table below.

Number of wins	5	2	3	8	7	4	10	9
Number of points	18	6	9	28	26	15	35	31

- (a) Show this information on a scattergraph.
 (b) Describe the connection between the number of wins and the number of points.
 (c) Draw a line of best fit line on your diagram.
 (d) Another team had 6 wins. Use your line of best fit to estimate the number of points this team would have.
73. Saqib works in a electrical shop. He is paid £8.60 per hour. He is also paid time and a half for any overtime he works. How much would Saqib earn for working 6 hours overtime?

74. Laura works in a hairdressers. She is paid £7.50 per hour and her normal working hours are 9am to 5pm, Monday to Friday.
The table below shows the number of hours she worked one week.

Day	Start	Finish
Monday	9.00	5.00
Tuesday	9.00	6.00
Wednesday	9.00	5.00
Thursday	8.30	5.30
Friday	8.30	6.00

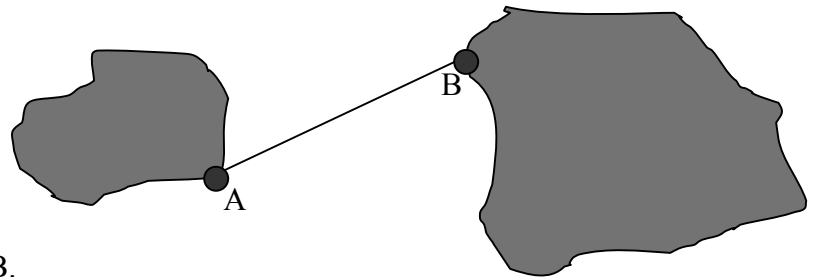


When Laura works overtime she is paid at double time.

Calculate Laura's total wage for the week above.

75. The diagram shows two ports A and B on adjacent islands.

If the scale of the drawing is 1: 1250000 calculate the actual distance between the ports A and B.



76. The diagram shows a map of part of Southern France.
Given the scale of the map is 1:1300000, find the actual distance from Marseille to Toulon.

