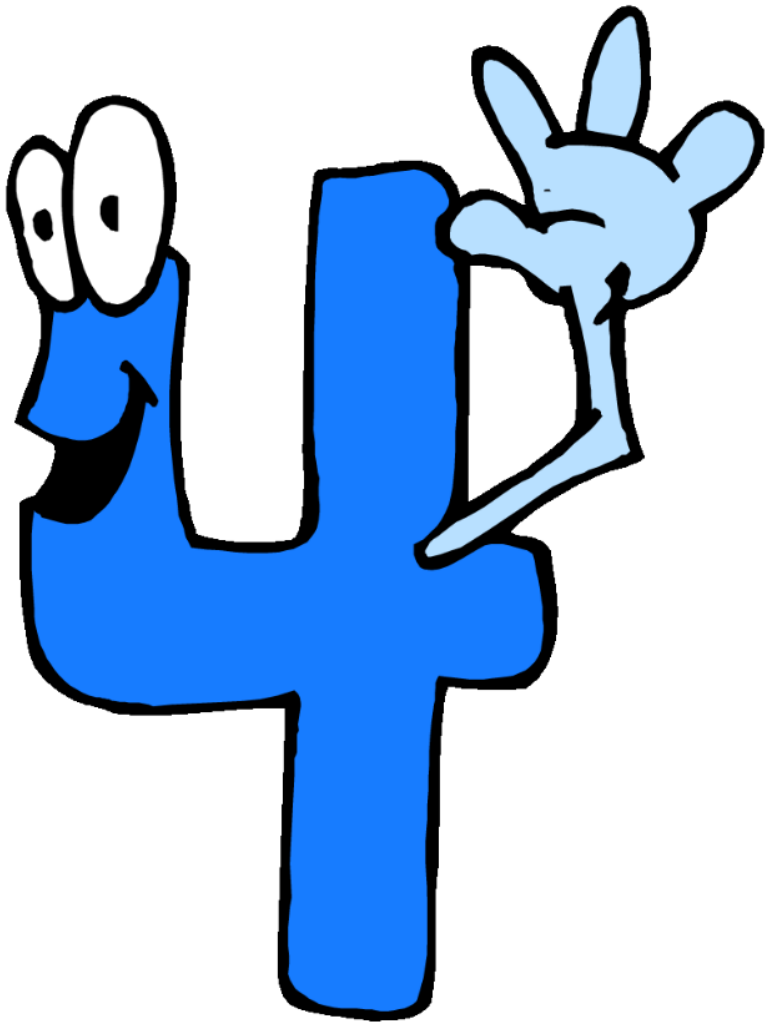
National 4



S4 Additional Resource Booklet

Basic Skills
Past Paper Questions
Non-Calculator

1.) Carry out the following calculations.

(*a*) $17{\cdot}3 - 14{\cdot}86$

(*b*) 23×6000

(*c*) $2680 \div 400$

(*d*) 80% of 54

2.) Carry out the following calculations.

(*a*) $9{\cdot}32 - 5{\cdot}6 + 4{\cdot}27$

(*b*) $37{\cdot}6 \times 8$

(*c*) $256{\cdot}9 \div 7$

(*d*) $7 \times 2\frac{1}{3}$

3.) Carry out the following calculations.

(*a*) $437{\cdot}5 - 95{\cdot}61$

(*b*) $18{\cdot}4 \times 700$

(*c*) $0{\cdot}258 \div 6$

(*d*) Find $\frac{2}{3}$ of 24

4.) Carry out the following calculations.

(*a*) $14{\cdot}6 - 3{\cdot}21 + 5{\cdot}3$

(*b*) $2{\cdot}44 \times 90$

(*c*) $76{\cdot}8 \div 6$

(*d*) $\frac{1}{4} + \frac{1}{3}$

5.) (*a*) Find 16·7 + 5·83.

(*b*) Find 9 × 2·13.

(*c*) Find 70% of 340.

6.) Carry out the following calculations.

(*a*) 306·5 − 214·78

(*b*) 9·53 × 300

(*c*) 2·58 ÷ 4

(*d*) 70% of 26

7.) A box contains counters numbered from 1 to 14.

A counter is chosen at random.

What is the probability that this counter has a number greater than 9?

8.) (*a*) Find $16{\cdot}7 + 5{\cdot}83$.

(*b*) Find $9 \times 2{\cdot}13$.

(*c*) Find 70% of 340.

9.) Solve algebraically the inequality

$$8x - 5 > 67.$$

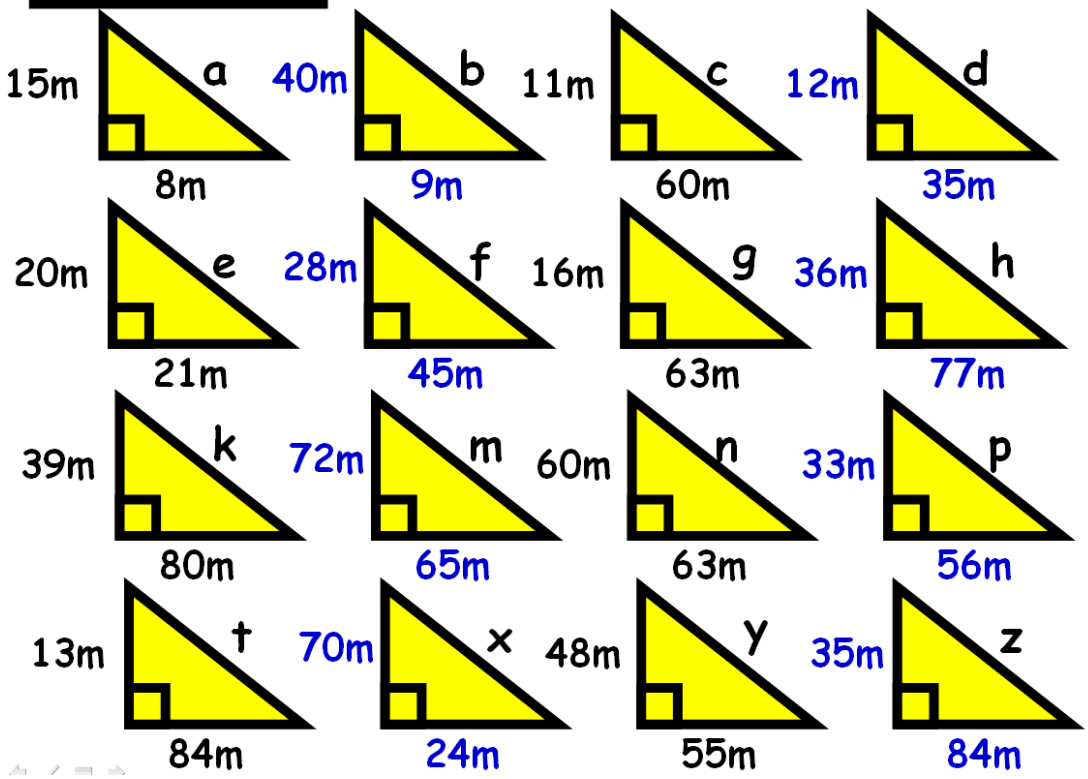
10.) (*a*) Find $8{\cdot}31 - 5{\cdot}6$.

(*b*) Find $0{\cdot}029 \times 400$.

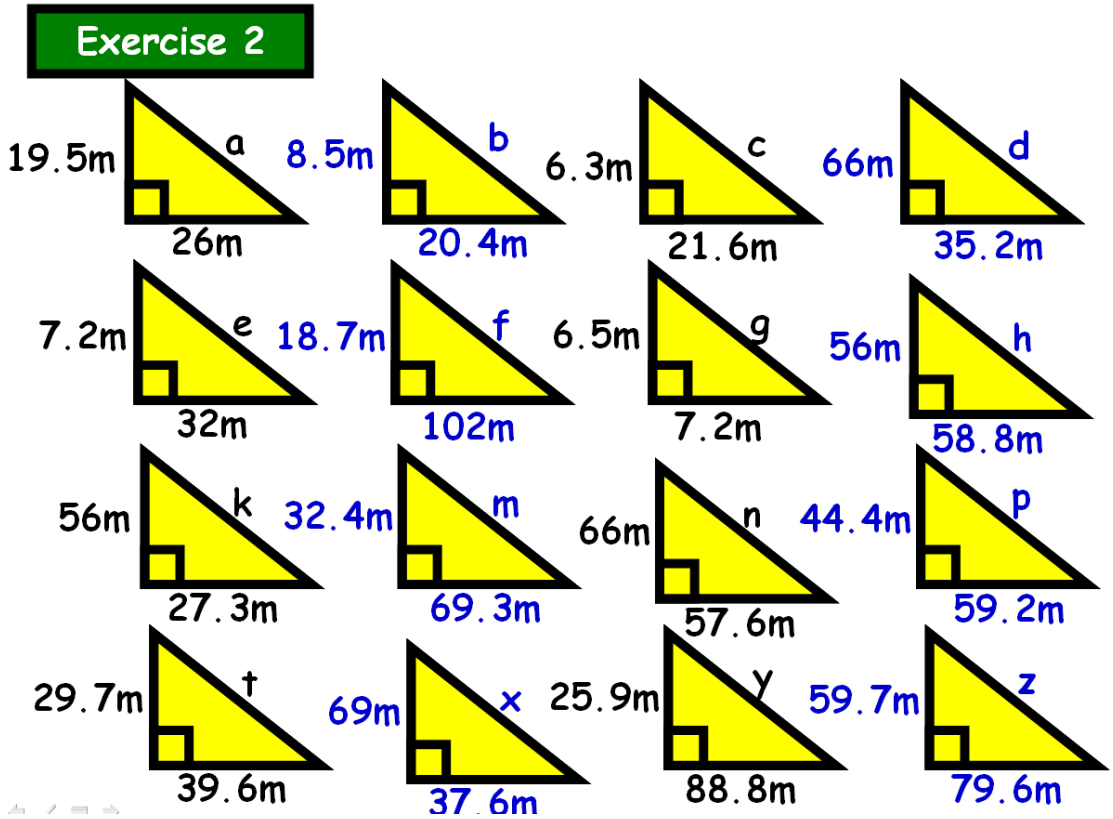
(*c*) Find $\frac{2}{7}$ of 434.

Pythagoras

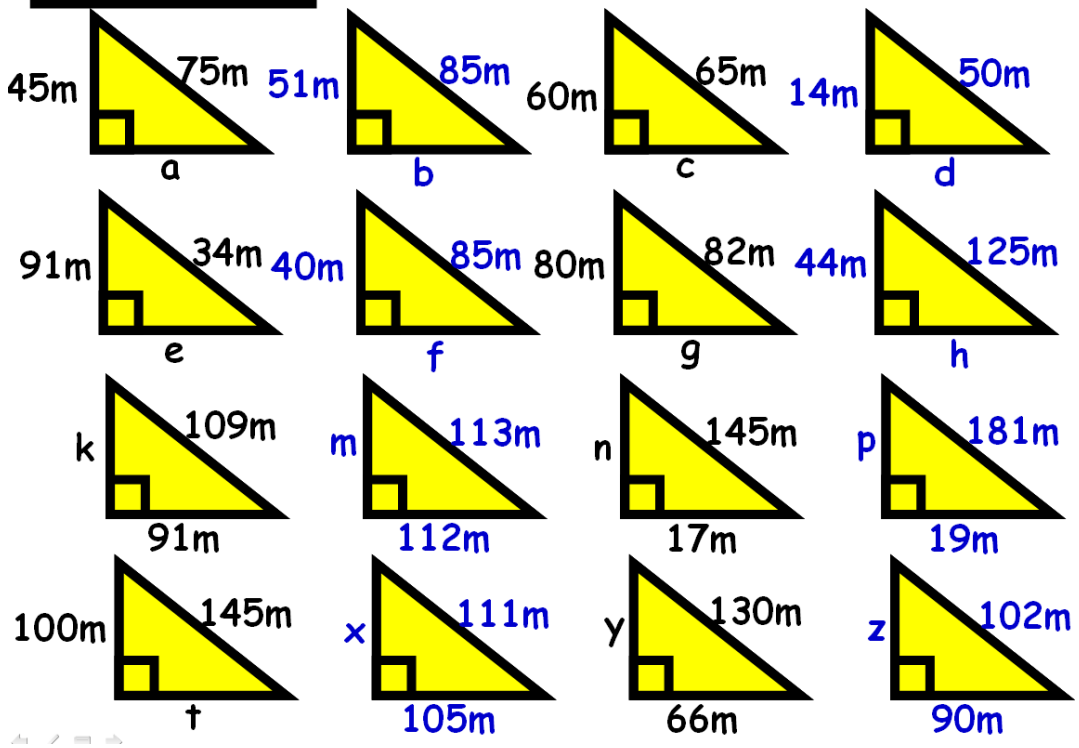
Exercise 1



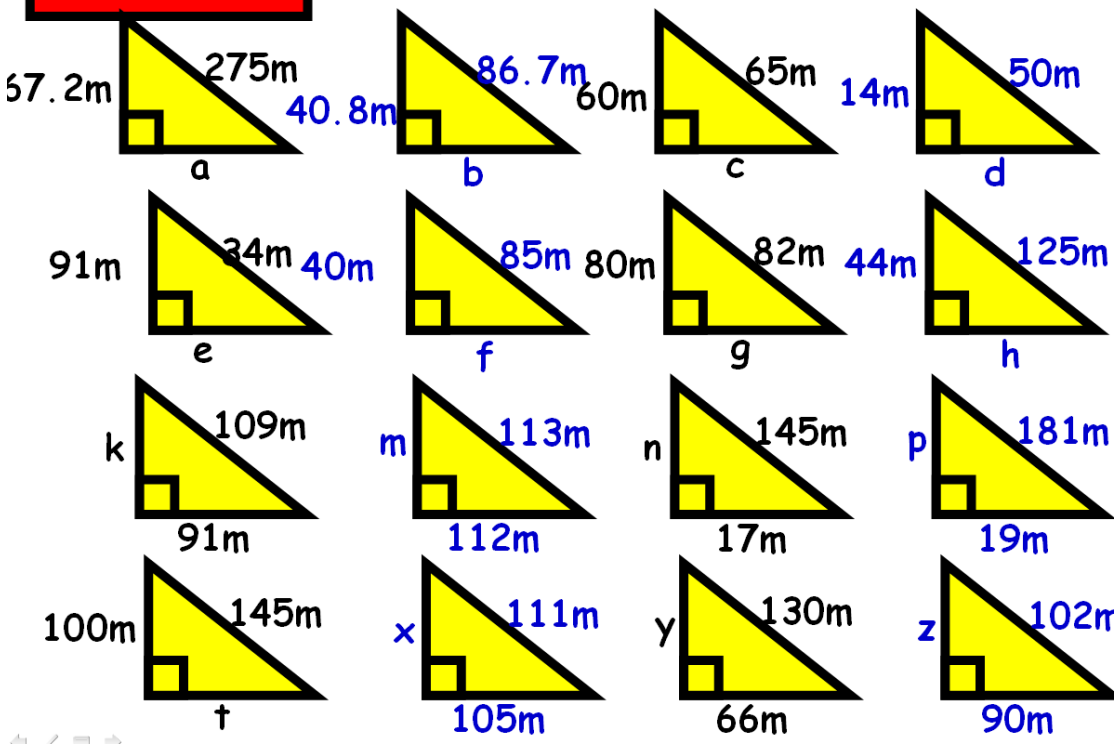
Exercise 2



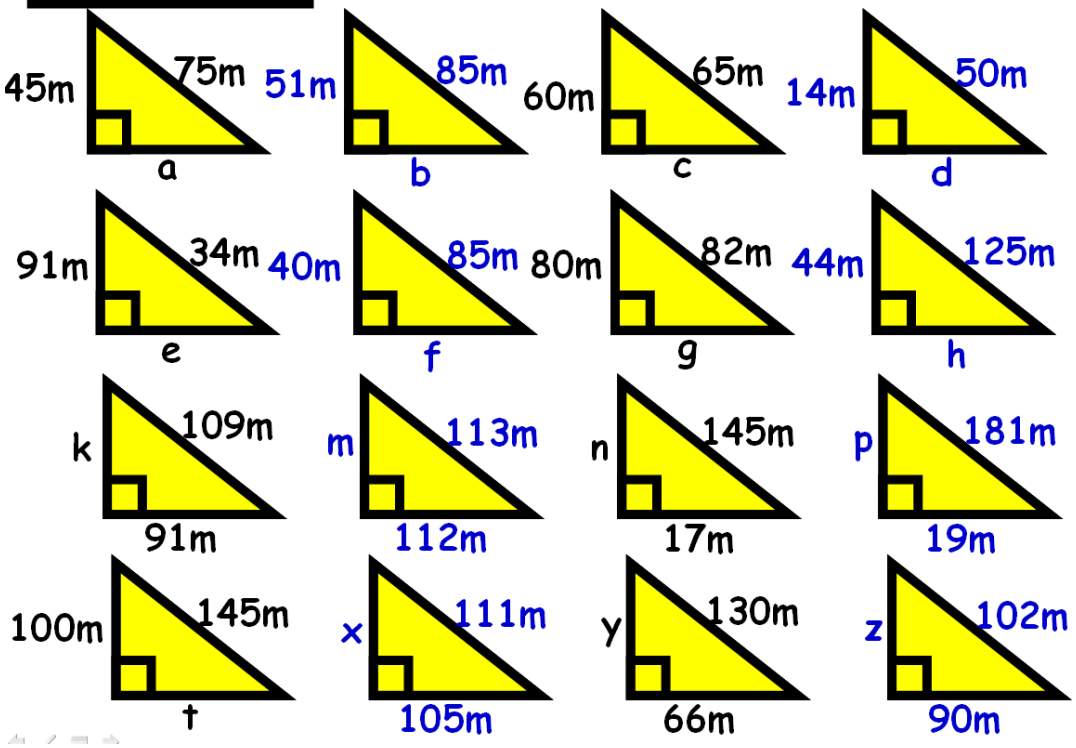
Exercise 3



Exercise 4



Exercise 5


45m
75m
a
51m
85m
b
60m
65m
c
14m
50m
d
91m
34m
e
40m
85m
f
80m
82m
g
44m
125m
h
k
109m
91m
m
113m
112m
n
145m
17m
p
181m
19m
100m
145m
t
x
111m
105m
y
130m
66m
z
102m
90m

10. The table below shows the marks of 12 pupils in a class test and in the final examination.

Class test	25	27	34	18	23	11	28	38	16	20	14	26
Final exam	52	60	70	40	45	27	61	80	40	45	33	60

(a) Show this information on a scattergraph.
(b) On your diagram draw a line of best fit.
(c) Niruz scored 35 in the class test. Use your line to estimate her mark in the final exam.

11. The table below shows the ice cream sales in a café and the temperature at the time of the sales.

Temperature (^{0}C)	14	21	24	18	28	27	20	16	22	11
Number of ice creams	25	37	46	33	55	52	38	26	39	15

(a) Show this information on a scattergraph.
(b) Describe the relation between temperature and ice cream sales.
(c) On your diagram draw a line of best fit.
(d) One day the temperature was 25^{0}C. Use your line to estimate the number of ice creams sold that day.

12. A gardener records the number of greenfly in his garden over a period of weeks during the summer months.. The table below shows the results.

Week	1	2	3	4	5	6	7	8	9	10	11	12
No. of greenfly	25	34	38	42	44	47	48	52	56		58	59

(a) Show this information on a scattergraph.
(b) On your diagram draw a line of best fit.
(c) In week 10 the gardener forgot to record the number of greenfly. Use your line to estimate the number of greenfly that week.

13. The table below shows the value of a car and its age.

Age of car(years)	1	2	3	4	5	6	7	8	9
Value (£ thousands)	11	9.5	9.1	8	7.5	7.2	6.5		5.8

(a) Show this information on a scattergraph.
(b) On your diagram draw a line of best fit.
(c) Describe the relation between age and value.
(d) Use your line to estimate the value of the car when it is 8 years old.

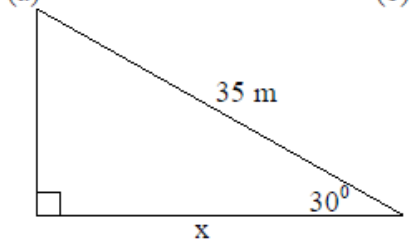
14. The table below shows the average cost of a weekly break to Paris over the last 10 years.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cost(£)	430	470	510	520	580	610	650		720	750

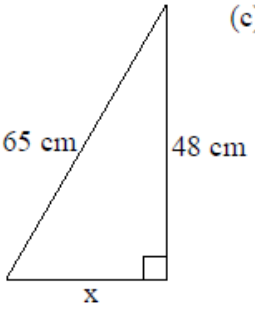
(a) Show this information on a scattergraph.
(b) On your diagram draw a line of best fit.
(c) Use your line to estimate the cost of a weekly break in Paris in 2010.

1. Calculate x in each triangle below

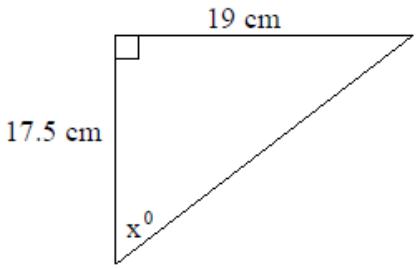
(a)



(b)

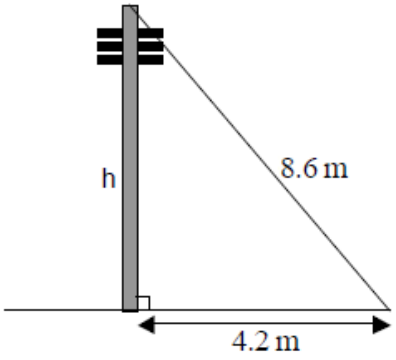


(c)



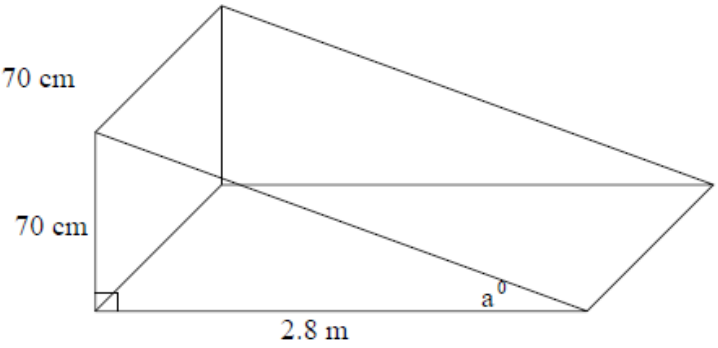
2. A telegraph pole is connected to the ground by wires. Each wire is 8.6 metres long and is fixed to the ground 4.2 metres from the pole.

Use this information to calculate the height of the telegraph pole.



3. A ramp 2.8 metres long is at a height of 70 cm at its highest point.

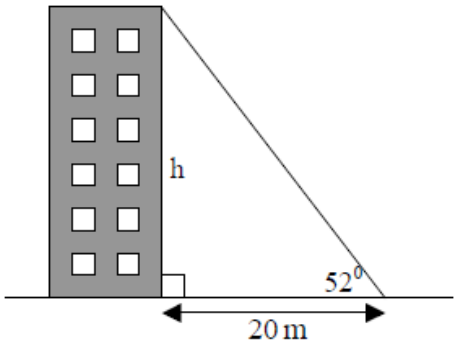
Calculate, a°, the angle the ramp makes with the ground.



4. The diagram opposite shows a block of flats.

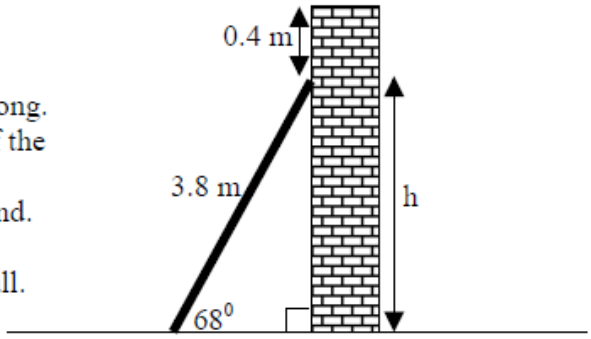
From a distance of 20 metres the angle of elevation to the top of the flats is 52^0.

Calculate h, the height of the block of flats.

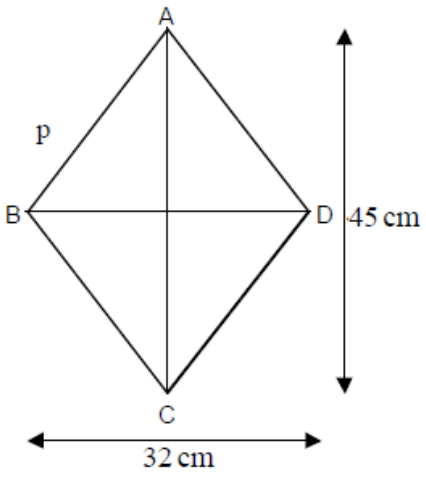


5. A wall is supported by a wooden beam 3.8 m long.
The beam meets the wall o.4 m from the top of the wall.
The beam makes an angle of 68^0 with the ground.

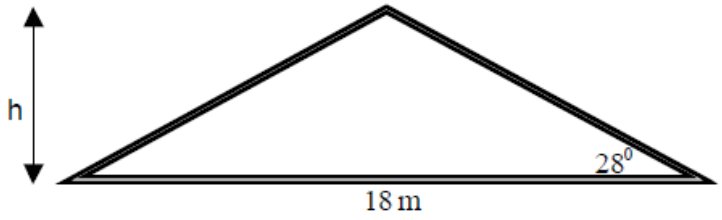
Calculate h and hence find the height of the wall.



6. ABCD is a rhombus whose diagonals are 32 cm and 45 cm.
Calculate p, and hence find the perimeter of this rhombus

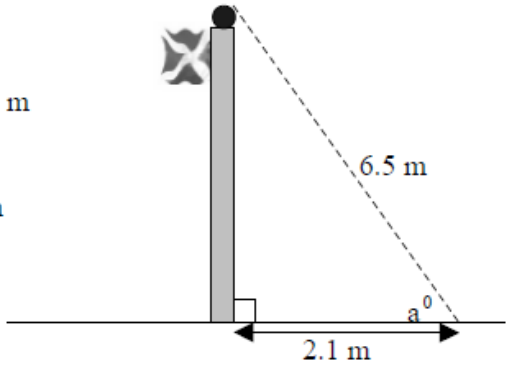


7. The diagram shows the end view of the roof of a house which is in the shape of an isosceles triangle.
Calculate h, the height of the roof.

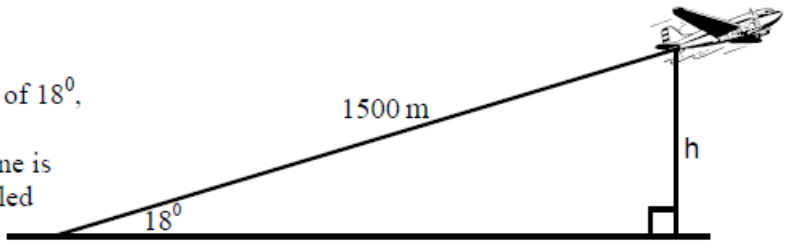


8. The diagram shows a flagpole. From a distance of 2.1 m the distance to the top of the flagpole is 6.5 m.

Calculate the size of the angle a^0, the wire makes with the ground.

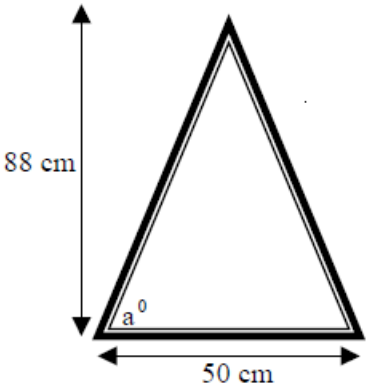


9. An aeroplane takes off at an angle of 18^0, as shown opposite.
Calculate the height, h, the aeroplane is above the ground after it has travelled 1500 metres.



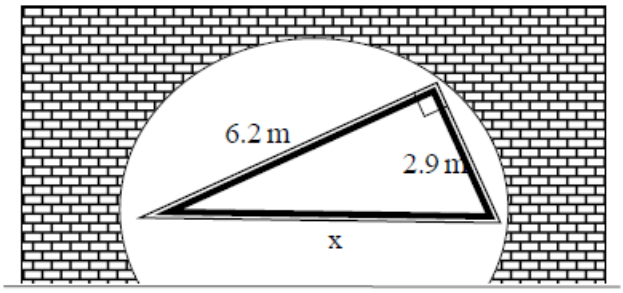
10. The front of a display case is in the shape of an isosceles triangle. The height of the case is 88 cm and the width of the base is 50 cm.

Calculate the size of angle a^0.

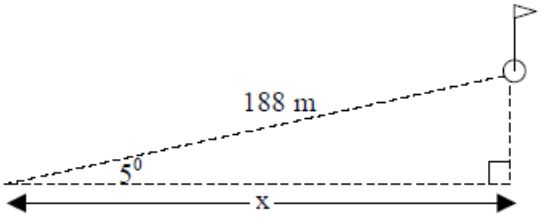


11. A tunnel under repair is supported by. metal girders as shown.

Calculate the length x, of the longest girder.

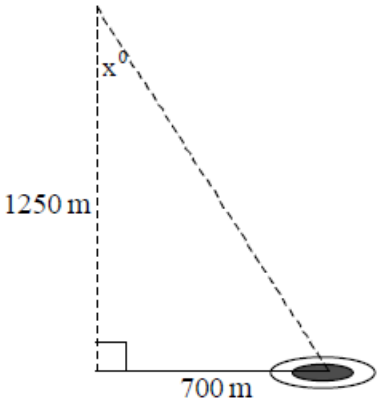


12. A golfer is 188 metres from a hole. He hits the ball and it travels off course at an angle of 5^0.
Use the information in the diagram to find x, the distance the golfer hit the ball.

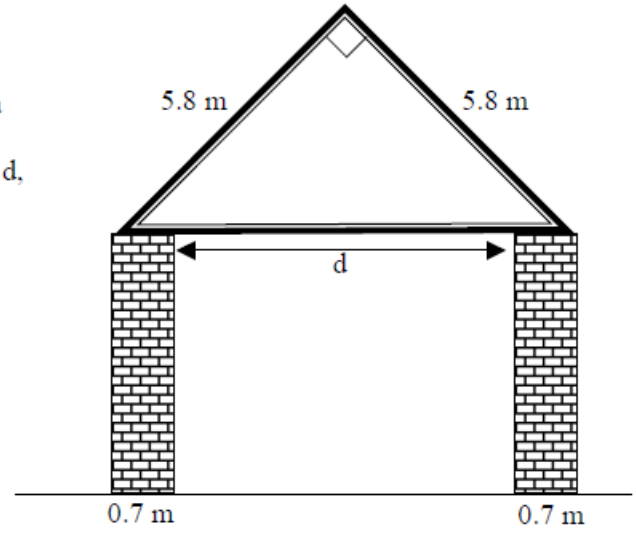


13. A parachutist is 1250 metres above the ground. He is aiming to hit a target marked by a red circle, as shown in the diagram.

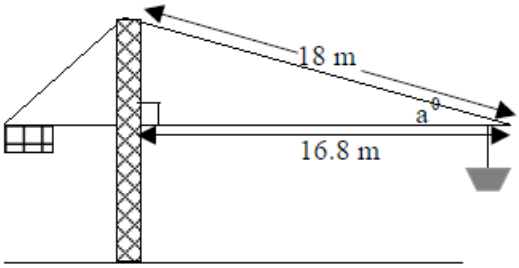
Calculate x^0, the size of the angle of his descent.



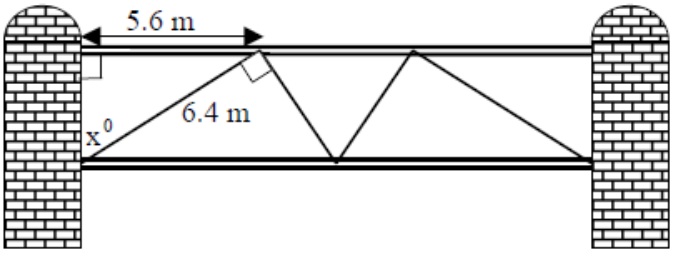
14. The diagram shows the walls and roof of a barn.
Given the information in the diagram find d, the distance between the walls of the barn.



15. The diagram shows a crane.
Given the information in the diagram find the size of angle a^0.



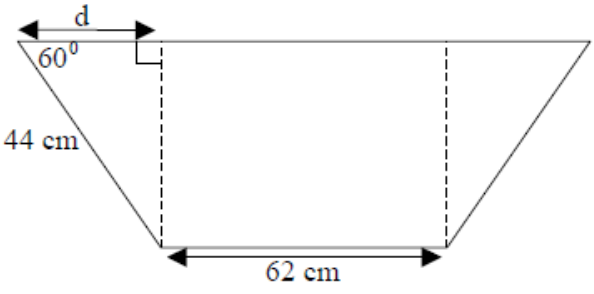
16. The diagram below shows a bridge. The bridge is supported by girders 6.4 metres long, as shown.



Calculate x^0, the angle the girder make with the wall.

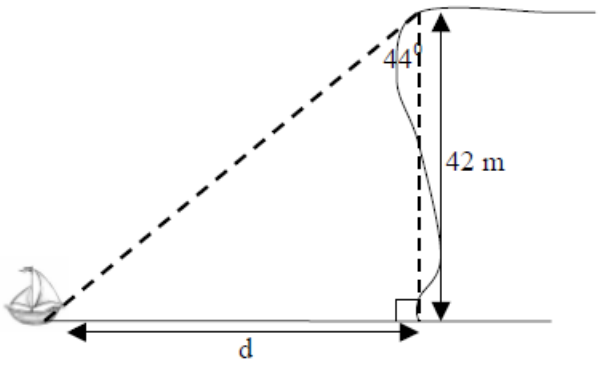
17. The diagram shows the end view of a water trough. The base of the trough is 62 cm long and the sloping side of the trough is 44 cm.
Calculate

(a) the distance d.
(b) the width of the top of the trough.



18. From the top of a cliff, 42 metres high, the angle to a yacht out at sea is 44^0.

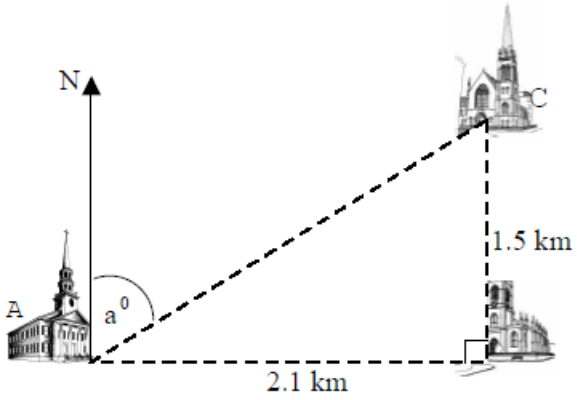
Calculate d, the distance the yacht is from the base of the cliff.



19. The diagram shows three churches.

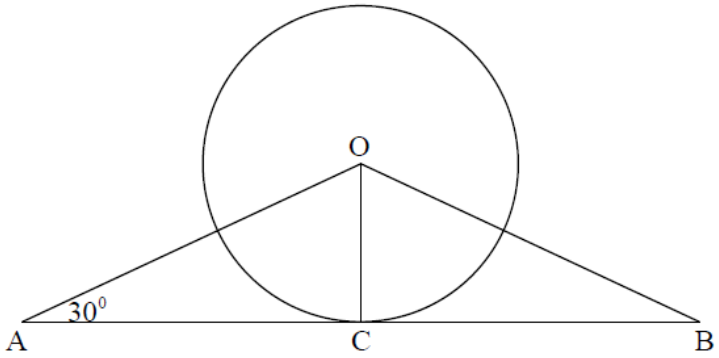
Church B is 2.1 kilometres due east of church A.
Church C is 1.5 kilometres due north of church B.

Calculate a^0, the bearing of church B.
C from church A.



1. Triangle AOB is isosceles.
AB is a tangent to the circle.
Angle CAO is 30^0.

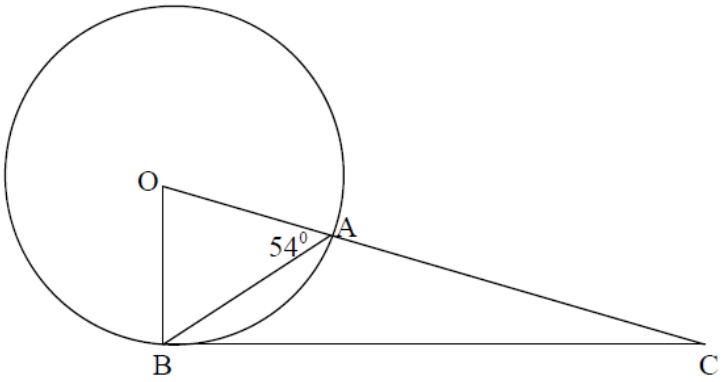
Calculate the size of angle BOC.



2. In the triangle opposite

OB is a radius of the circle
BC is a tangent to the circle
Angle OAB = 54^0.

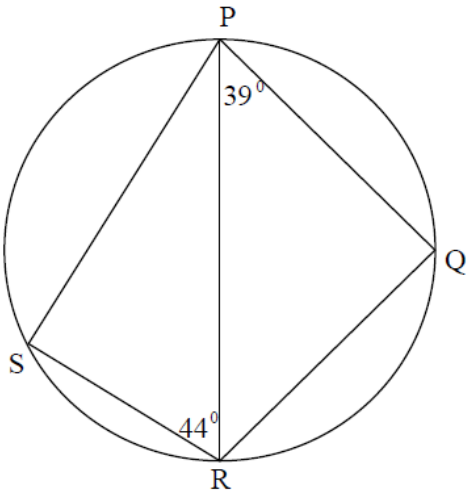
Calculate angle BCA.



3. PR is a diameter of the circle.

Angle PRS is 44^0
Angle QPR is 39^0.

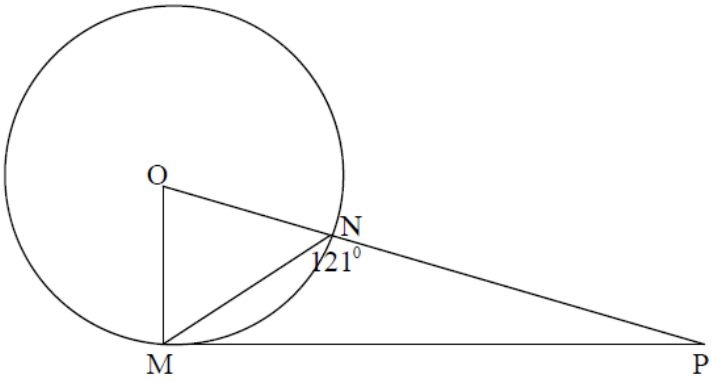
Calculate the size of angle SRQ.



4. In the diagram

OM is a radius of the circle
MP is a tangent to the circle
Angle MNP = 121^0

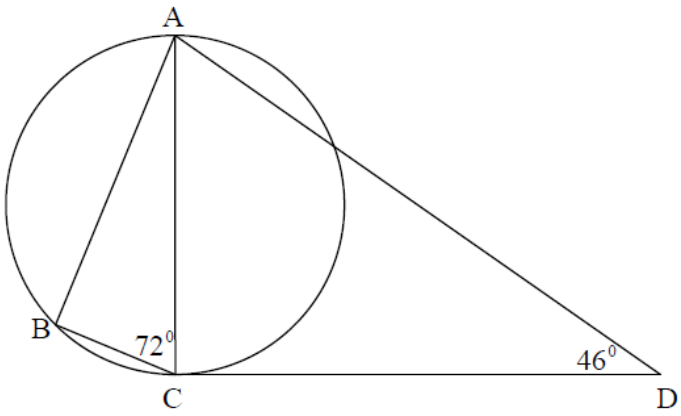
Calculate angle MPN.



5. AC is a diameter of the circle.
CD is a tangent to the circle.

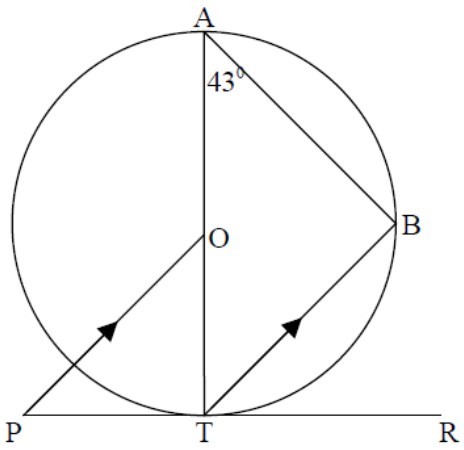
Angle ACB = 72^0.
Angle CDA = 46^0.

Calculate the size of angle DAB.



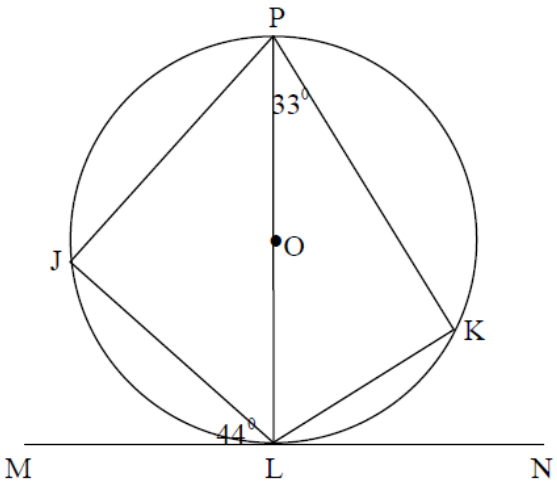
6. PTR is a tangent to the circle, centre O.
Angle BAT = 43^0.
PO is parallel to TB.

Calculate the size of angle OPT.



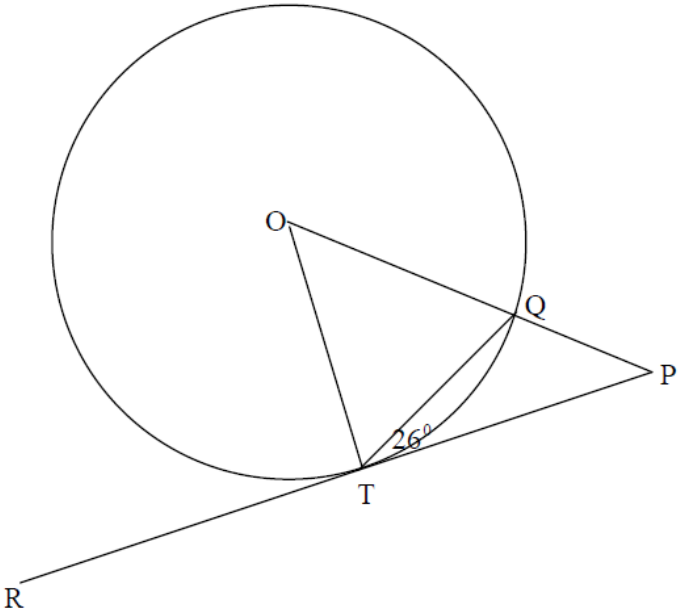
7. MLN is a tangent to the circle, centre O.
Angle JLM is 44^0.
Angle KPL is 33^0.

Find the size of angle KLJ.



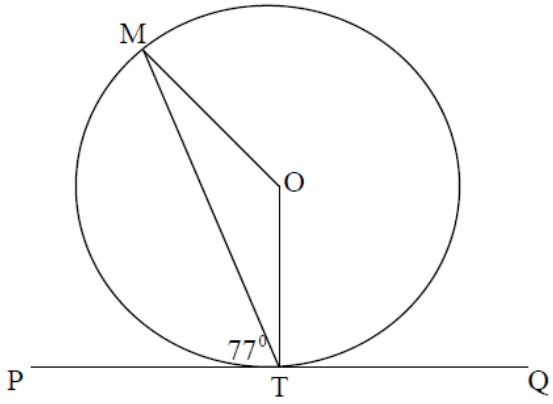
8. RP is a tangent to the circle, centre O.
Angle QTP is 26^0.

Calculate the size of angle OPT.



9. PTQ is a tangent to the circle, centre O.
Angle MTP = 77^0.

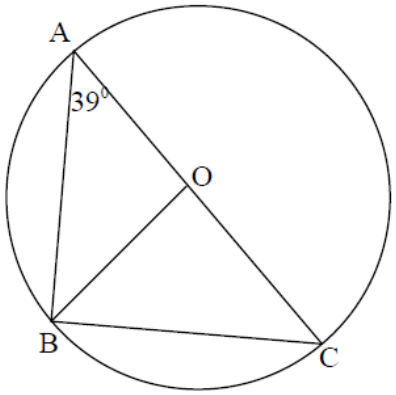
Calculate the size of angle MOT.



10. In the diagram O is the centre of the circle.

AC is a diameter.
B is a point on the circumference.
Angle BAC = 39^0.

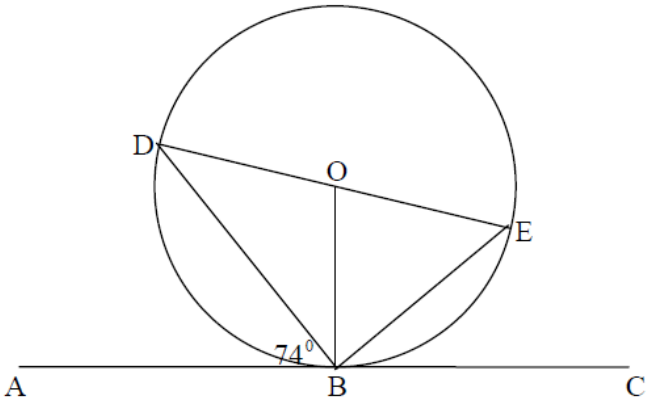
Calculate angle BOC.



11. The diagram shows a circle centre O.
AC is a tangent to the circle.

Angle DBA is 74^0.

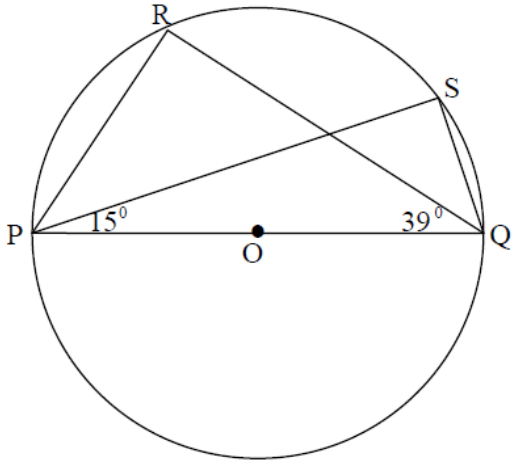
Calculate the size of angle BOE.



12. PQ is a diameter of the circle, centre O.
R and S are points on the circumference.

Angle SPQ is 15^0.
Angle RQP is 39^0.

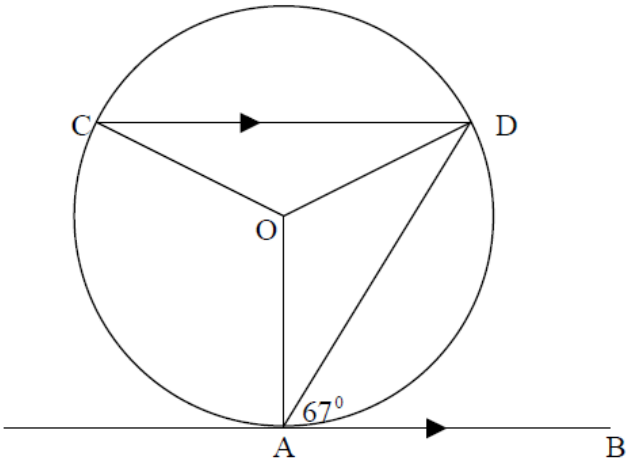
Calculate the size of angle RPS.



13. AB is a tangent to the circle, centre O.
CD is parallel to AB.

Angle DAB = 67^0.

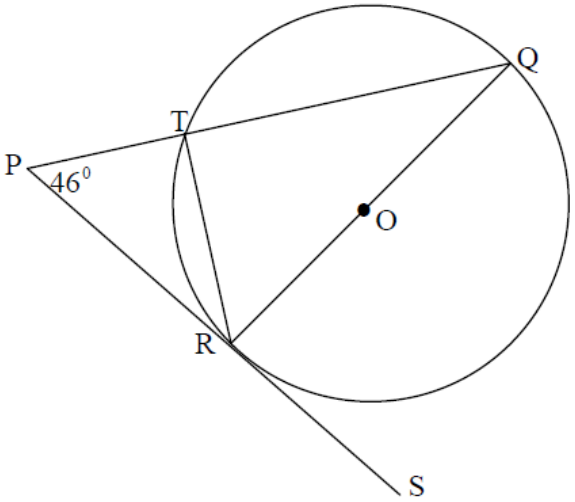
Calculate the size of angle CDO.



14. A circle, centre O, is shown.

QR is a diameter.
PS is a tangent to the circle.
Angle RPT = 46^0.

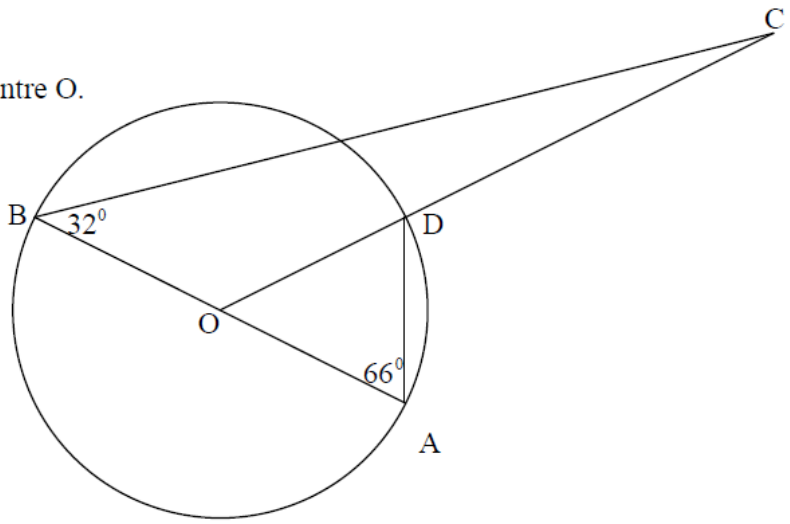
Calculate the size of angle TRS.



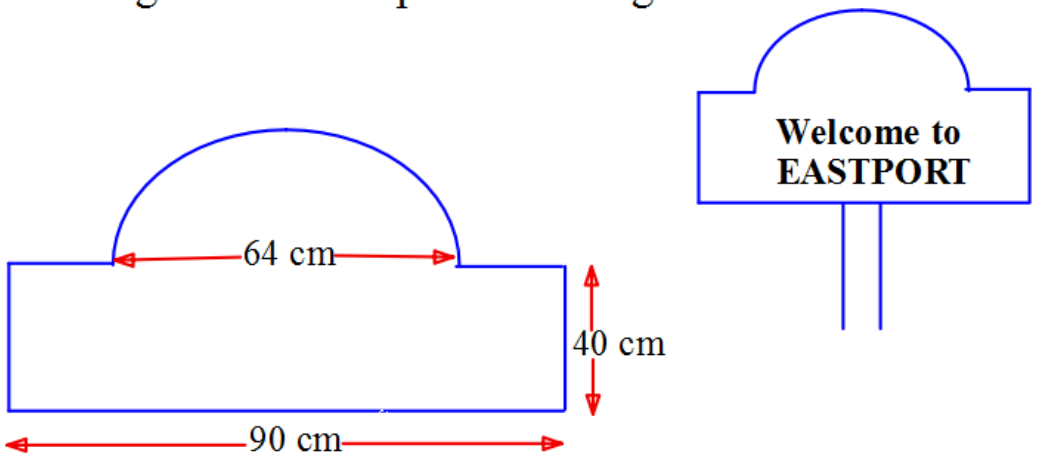
15. AB is the diameter of a circle, centre O.
OC intersects the circle at D.

Angle CBO = 32^0.
Angle DAB = 66^0.

Calculate the size of angle BCO.

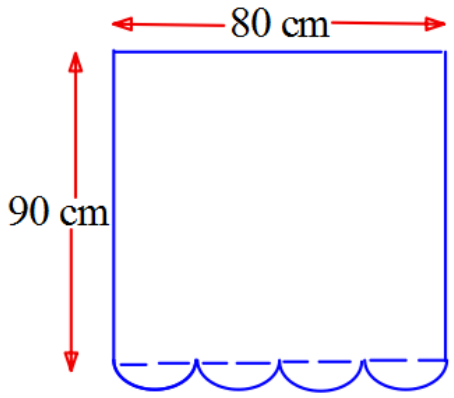


11. This sign is in the shape of a rectangle and a semi-circle.



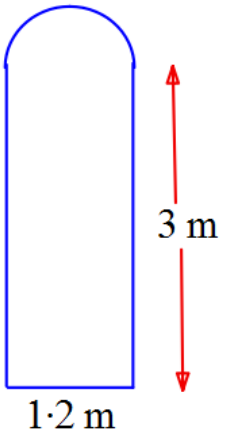
Calculate the area of the sign.
Give your answer to the nearest square centimetre.

12. This window blind is in the shape of a rectangle with four equal semi-circles at the bottom.
It has braid down the two sides and round the bottom.



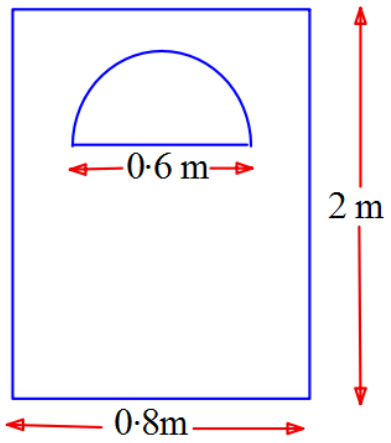
Calculate the total length of braid needed for this blind.
Give your answer to the nearest centimetre.

12. The diagram below shows a window.



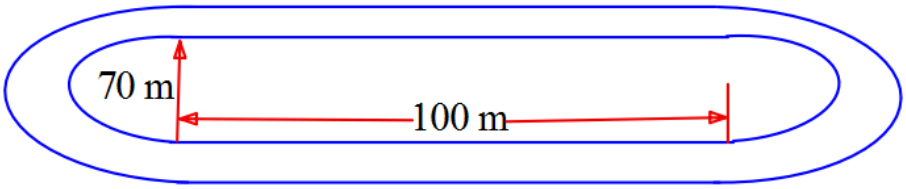
The window consists of a rectangle and a semi-circle.
Calculate the area of this window.
Give your answer in square metres correct to 2 decimal places.

14. The diagram below shows a rectangular door with a window.



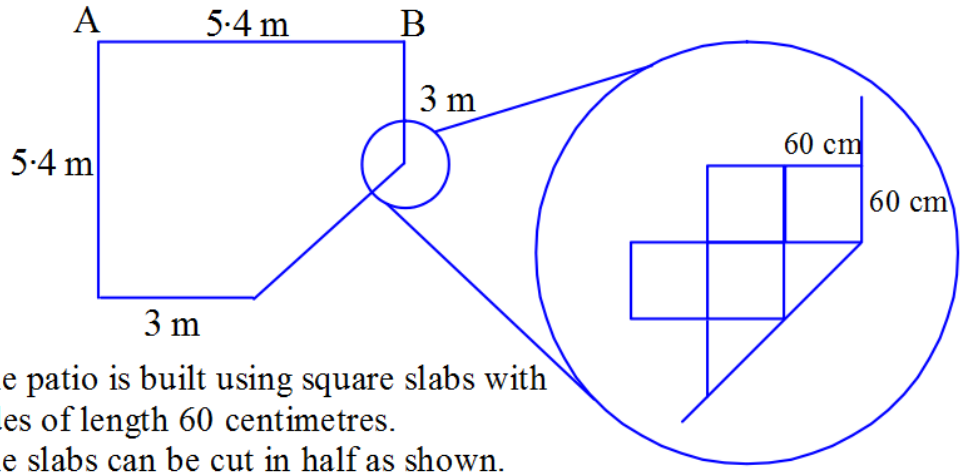
The window is in the shape of a semi-circle and is made of glass.
The rest of the door is made of wood.
Calculate the area of the wooden part of the door.
Give your answer in square metres correct to 2 decimal places.

11. The diagram below shows a speedway track.



The straights are each 100 metres long.
The bends are semi-circles as shown.
Calculate the perimeter of the inside of the track.

15. The diagram below shows a plan of a patio.



The patio is built using square slabs with sides of length 60 centimetres.
The slabs can be cut in half as shown.

(a) How many slabs fit exactly along edge AB?

(b) How many slabs are needed altogether to build the patio?

Calculations in Social Context

4. Jenna is buying a car. The cash price is £11,500. It can be bought on hire purchase by paying a deposit of 20% of the cash price and 36 installments of £300.

   Find the total hire purchase price of the car.

9. The manager of the central hotel is buying new televisions for each of the hotel's 50 bedrooms. Two suppliers offer him the following deals.

ELECTRO	**KOSTCUTS**
Televisions £199.99 each	Televisions £210 each Get one free for every ten you buy

Which supplier offers the lower price for the 50 televisions?
You must show all your working.

7. Walter is a double glazing salesman.
   Each month he earns £500 **plus** 5% commission on all his sales.
   Calculate the value of his sales in a month when his
   total earnings were £1900.

9. The box office takings at cinemas in the UK and the USA from showing "The Spartans" are shown below.

"THE SPARTANS" Box office takings	
UK	£10,230,000
USA	$15,800,000

Exchange rate: £1 = $1·52

Change the box office takings in the USA to pounds sterling.
Give your answer to the nearest thousand pounds.

5. Geena is buying a new car. Her local garage has the following special offer on new cars.

SPECIAL OFFER
on new cars
3 ITEMS FREE

Choose any THREE of these items up to a maximum value of £850.

CD player	*£150*
Air conditioning	*£300*
One year's insurance	*£400*
Central Locking	*£200*
Electric Sunroof	*£350*

(a) One combination of items is shown in the table below.
Complete the table to show **all** possible combinations of items available under this offer.

CD player	*Air Conditioning*	*One Year's Insurance*	*Central Locking*	*Electric Sunroof*	*Total Value*
✓		✓	✓		£750

(b) Geeta wants all five of these items.
She is willing to pay for the extra two items.
What is the least amount she must pay?

8. The full premium for John to insure his car last year was £480.
This year the premium has increased by one third.
John also recieves a 20% discount on **this year's** premium.
How much will John pay to insure his car this year?

4. Jane is going to Switzerland and wants to change £500 into Swiss francs.
Two travel agents offer the following exchange rates.

TRAVELSON	**SOLLAR**
£1 = 2·46 Swiss francs	**£1 = 2·50 Swiss francs**
No comission	**2% comission payable**

(a) How many Swiss francs would Jane receive from Travelsun for £500?

(b) Which travel agent will give Jane more Swiss francs for her £500?
Show clearly all your working.

10. An art dealer paid £120 for an oil painting.
He sold it for £150.
Express the profit as a percentage of what he paid for the painting.

5. A room in the Hotel Royale in Paris costs 130 euro's per night.
The exchange rate is 1·58 euro's to the pound.

(a) Find the cost of the hotel room per night in pounds and pence.

Mr and Mrs McQueen are going to Paris.
Their return flights cost £59 each.

(b) Find the total cost of their flights and a 3 night stay at the Hotel Royale in pounds and pence.

10. Gail wants to insure her computer for £2400.
The insurance company charges an annual premium of £1·25 for each £100 insured.

(a) Calculate the annual premium.

(b) Gail can pay her premium monthly.
If she does this she is charged an extra 4%.
Calculate the monthly premium.

2. A cooker can be bought by paying a deposit of £59 followed by 12 instalments of £45.
Calculate the total price of the cooker.

6. A shop sells artificial flowers.
The prices of individual flowers are shown below.

Variety	Price
Carnation	£2
Daffodil	£3·50
Lily	£4
Iris	£3
Rose	£4·50

Zara wants to
- buy 3 flowers
- choose 3 different varieties
- spend a **minimum** of £10

One combination of flowers that Zara can buy is shown in the table below.

Carnation	Daffodil	Lily	Iris	Rose	Total Price
		✓	✓	✓	£11·50

Complete the table to show **all** the possible combinations that Zara can buy.

Ryan wants to take out a life insurance policy.
The insurance company charges a monthly premium of £2·50 for each £1000 of cover.
Ryan can afford to pay £90 per month.
How much cover can he get?

9. Andy buys a bottle of aftershave in Spain for 38·50 euro's.
The same bottle of aftershave costs £25·99 in Scotland.
The exchange rate is £1 = 1·52 euro's.
Does he save money by buying the aftershave in Spain?
Explain your answer.

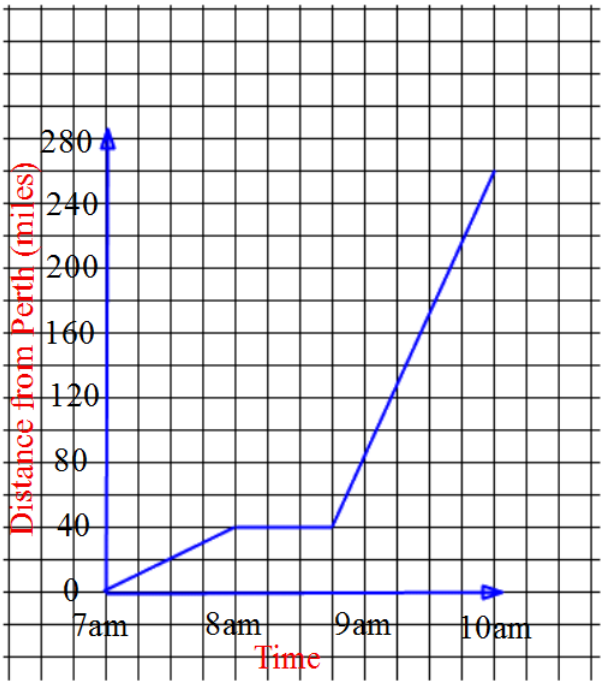
Distance, Speed and Time

Stirling (depart)	2140
London (arrive)	0615

2. Part of the timetable of the overnight bus from Stirling to London is shown opposite.

   How long does the journey from Stirling to London take?

6. Andrea leaves home in Perth at 7am and drives 40 miles to Edinburgh Airport where she then catches a flight to Dublin. Her journey is shown on the graph below.



(a) How long does she spend waiting at Edinburgh Airport?

(b) Calculate the average speed of her journey from Edinburgh to Dublin.

6. Ali drove overnight 406 miles from Galashiels to Portsmouth to catch a ferry to France.
   His average speed for the journey was 56 miles per hour.
   He arrived in Portsmouth at 0630.
   At what time did he leave Galashiels?

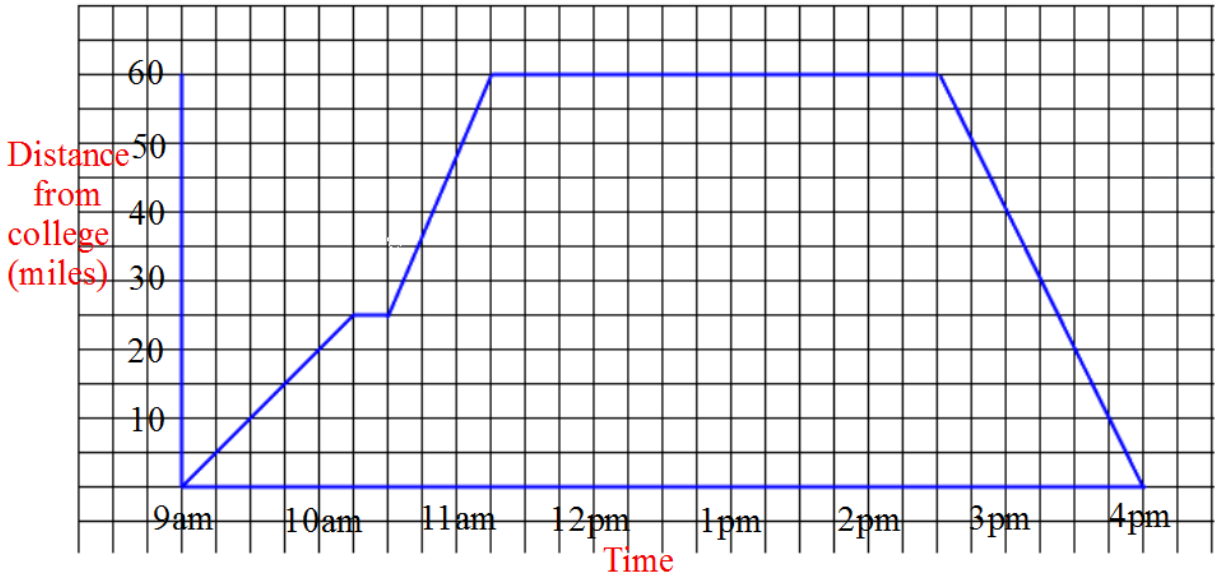
3a) An inner-city coach left Aberdeen at 10.40am and reached Inverness at 1.25pm. How long did the journey take?

b) The average speed of the coach during the journey was 40 miles per hour. Find the distance between Aberdeen and Inverness.

3. An overnight train left London at 2040 and reached Inverness at 0810 the next day.
The distance travelled by the train was 552 miles.
Calculate the average speed of the train.

2. Joyce is going on holiday. She must be at the airport by 1.20pm. It takes her 4 hours 30 minutes to travel from home to the airport. What is the latest time that she should leave home for the airport?

3. A group of students visit a theme park.
The graph below shows their journey.
They set off from the college at 9am and arrive back at 4pm.



a) How long did the students spend at the theme park?
b) Calculate the average speed, in miles per hour, of the students' return journey.