

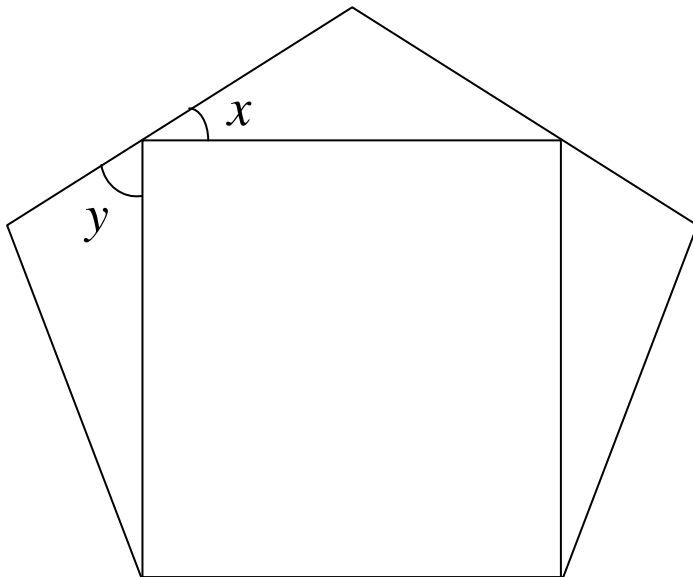


UKMT Team Maths Challenge 2011 National Final - Relay Race

A1

A rectangle is drawn in a regular pentagon.

What are the sizes of the angles marked x and y ?



Answer $x =$ $^{\circ}$ $y =$ $^{\circ}$



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A2

How many seconds are there in a quarter of a third of half an hour?



Answer	seconds
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A3

A pupil surveys the 60 cars in a car park and draws a pie chart of their colours.

6 of the cars are red, 30% are blue, one third are black and the rest are white.

What is the angle on the pie chart representing white cars?



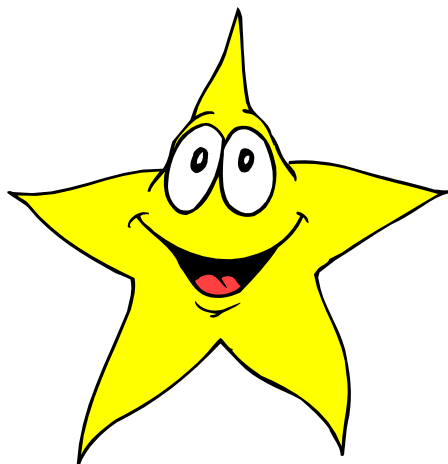
Answer

○



A4

Three consecutive even numbers are such that the difference between six times the smallest number and four times the largest number is equal to the middle number. What is the middle number?



Answer



A5

The point $(3, 4)$ is rotated clockwise 270° with the point $(2, 2)$ as the centre of rotation.

What are the coordinates of its image?



Answer (,)



A6

Harry's mathematical grandmother keeps a large bag of "one size fits all" socks in a dark cupboard. There are socks in red, blue, pink and green. How many socks must she take out to be sure of having a matching pair when Harry stamps in a puddle?



Answer



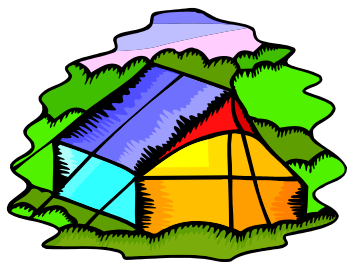
A7

An expedition group measures the distance between a bridge and their campsite on a map as 8 cm.

The scale of the map is 1 : 25 000.

They walk at an average speed of 4 km per hour.

How many minutes will it take them to reach the campsite from the bridge?

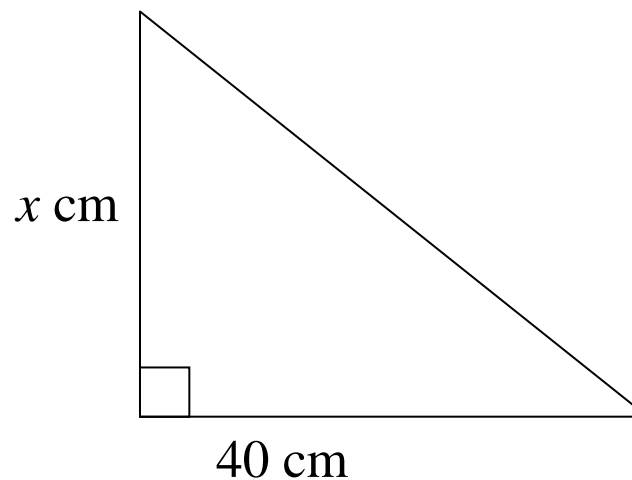
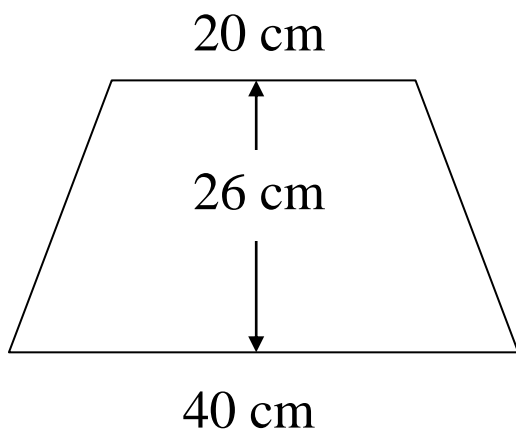


Answer



A8

The area of the trapezium is equal to the area of the triangle. Find the value of x .



Answer	cm
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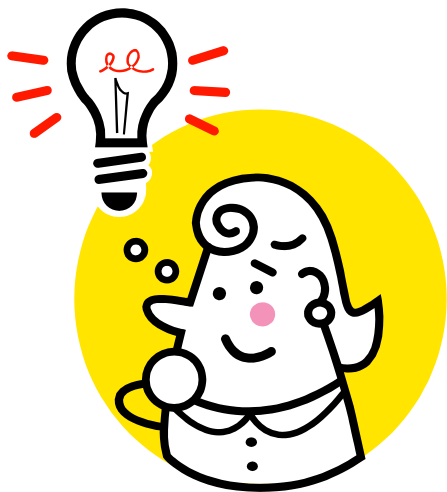


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A9

Two prime numbers have a product of 899 and a difference of 2.

What is their sum?



Answer



A10

I cycle to work at an average speed of 15 mph and get a lift home in a car with an average speed of 30 mph.
What is my overall average speed for these two journeys?



Answer

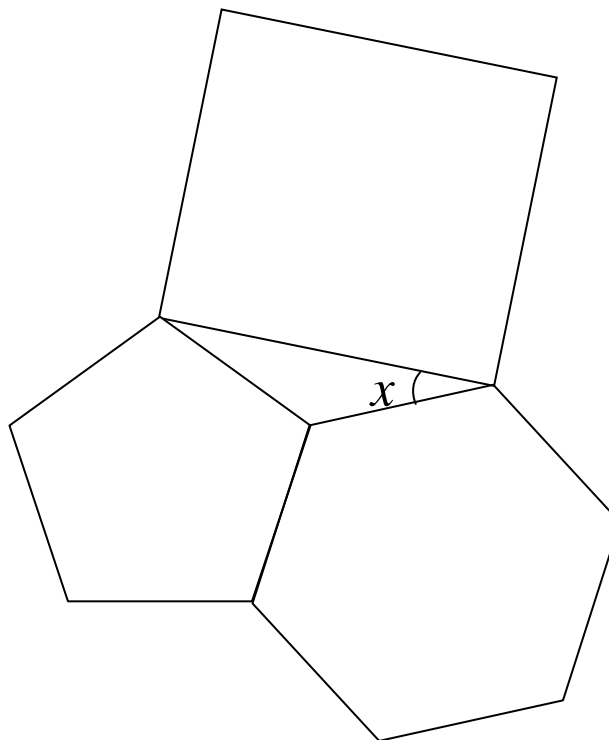
mph



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A11

Three regular polygons join together as shown in the diagram. What is the size of the angle between the square and the hexagon?



Answer



A12

‘A rose-red city half as old as Time,
One billion years ago the city’s age
Was just two-fifths of what Time’s age
Will be a billion years from now.’

According to this, how old is the rose-red city now?



Answer

billion years



A13

A pile of eight boxes has a total weight of 312 kg.

When a new box is added to the pile the mean weight increases by 5 kg.

What is the weight of the new box?

Answer	kg
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A14

In this grid each row and column has one each of the numbers 1 to 3, and one each of the letters A to C.

No combination of letters and numbers is repeated.

Complete the grid.

A3		B
		2
	A	



A15

A gardener is planting hanging baskets. The baskets are white, green or brown. She fills each one with red, white or blue lobelia and red or white geraniums.

How many different baskets can she make with the basket, lobelia and geranium all different colours?



Answer



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B1

Find the value of $p^2 - 3q$ when $p = -3$ and $q = -4$.

Answer



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B2

I am thinking of a number.

If I subtract it from 10 then double the result, I get the same answer as when I double the number, add 4 and then divide the result by 3.

What is the number?



Answer

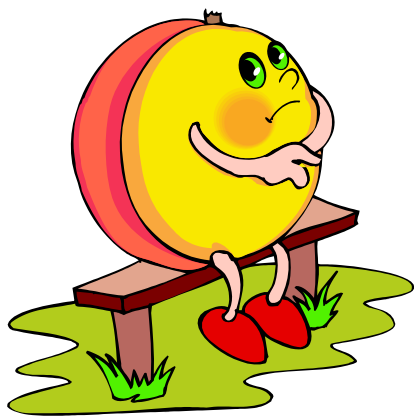


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B3

Four friends are sitting on a bench to have their photo taken. Una will not sit next to Kay, Tom will not sit next to Matt, and Kay will not sit next to Tom.

Which two friends sit at the ends of the bench?



Answer

and



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B4

The first Regional Final this year was on Monday the 14th of February. How many Sundays were there between the first Regional Final and this National Final?



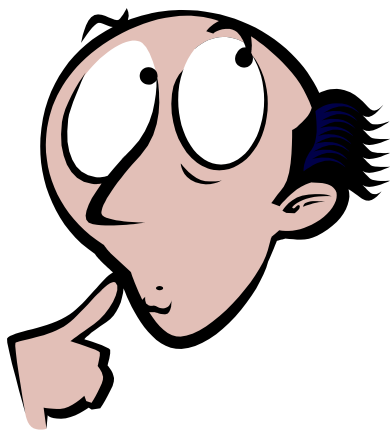
Answer



B5

The point $(2, 6)$ is rotated anticlockwise 90° with the point $(1, 4)$ as the centre of rotation.

What are the coordinates of its image?

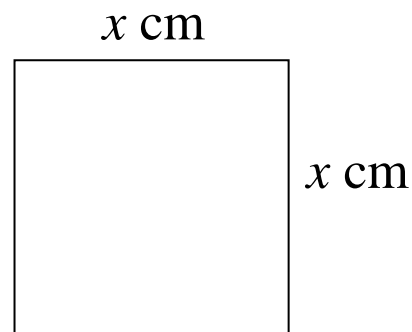
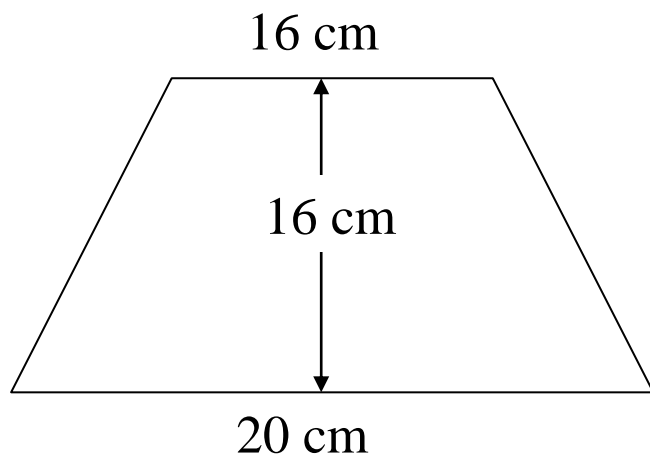


Answer (,)



B6

The area of the trapezium is twice the area of the square. Find the value of x .



Answer

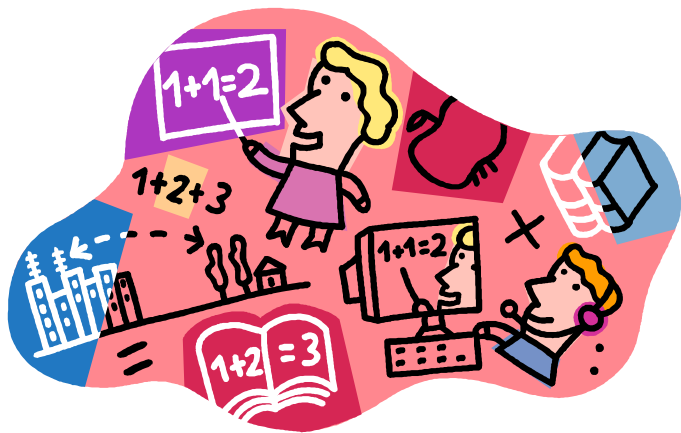


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B7

Two prime numbers have a product of 1591 and a difference of 6.

What is their sum?



Answer



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B8

H is a regular hexagon; T is an equilateral triangle.

The area of H is 6 times the area of T.

Find the ratio perimeter of H : perimeter of T.



Answer :

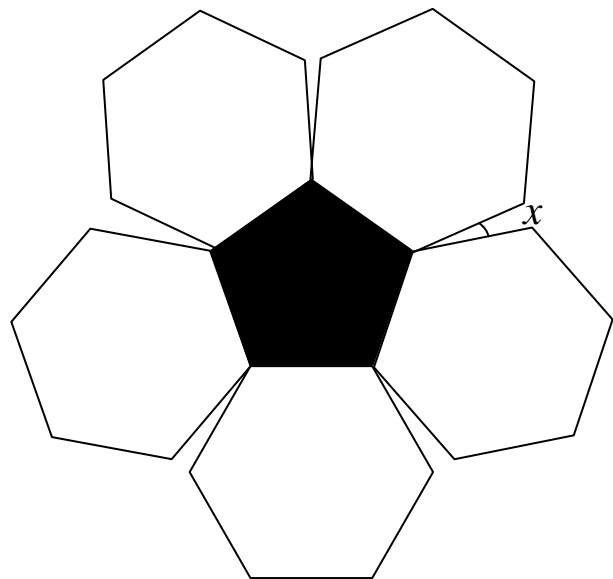


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B9

Part of the pattern for making a football has five regular hexagons around a regular pentagon.

What is the size of the angle, x° , between the hexagons?



Answer





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B10

Four As and two Bs have the same value as two Cs.

Three As and two Cs have the same value as three Bs.

How many As have the same value as a B and a C together?



Answer

As



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B11

The following are 11 consecutive prime numbers.

What is their sum?

$$157+163+167+173+179+181+__+193+197+199+211$$



Answer



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B12

Three consecutive numbers are such that the total of twice the smallest number and three times the middle number is four times the largest number. Find the value of the middle number.



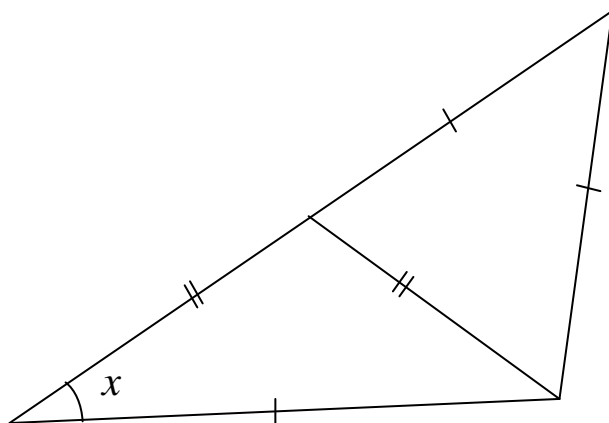
Answer



UKMT Team Maths Challenge 2011 National Final - Relay Race

B13

Find the size of the angle marked x .



Answer	0
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B14

A mathematical grandfather keeps a large bag of “one size fits all” socks in a dark cupboard. There are socks in red, blue, pink and green. How many socks must he take out to be sure of having two matching pairs?



Answer



B15

An athlete runs 200 metres in 45 seconds in a training session, then 400 metres in the next 75 seconds. What is her average speed for the total run in km/h?



Answer

km/h