



UKMT Team Maths Challenge 2012 Regional Final - Relay Race

A1

What percentage of the whole numbers between 21 and 40 inclusive are prime?

Answer

%



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A2

Each letter represents a single digit number.

$$A \times B = 10$$

$$A < B$$

$$C = 2A + B$$

$$D = C - B$$

Find the value of $D + C$.

Answer



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A3

A jeweller is making a pendant from a circular disc of silver with radius 3 cm. From it he cuts out a circular disc of diameter 1 cm. What fraction of the area of the original disc is removed?

Answer



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A4

A shop is selling special Olympic 50p coins for £1.25
What percentage profit over the face value of the coin
do they make?

Answer

%



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A5

What are the coordinates of the point where the line $y = 2x$ crosses the line joining points $(0, 3)$ and $(3, 0)$?

Answer (,)



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A6

Jenny has a packet of 48 sweets. She gives $\frac{5}{8}$ of them to Sue, who shares them equally with Ann. How many more sweets does Jenny now have than Ann?

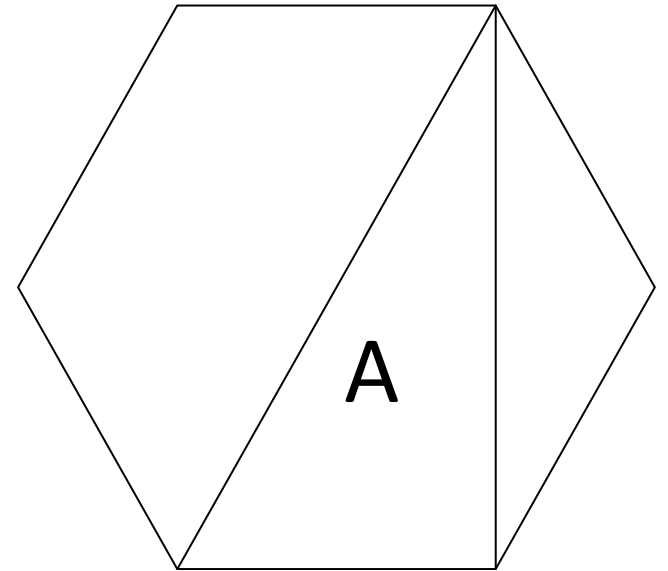
Answer



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A7

What fraction of the area of the regular hexagon is the area of triangle A?



Answer



A8

A set of five different prime numbers has mean 8, median 5 and a range of 15. What are the five prime numbers?

Answer	,	,	,	,
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A9

I think of a positive whole number, square it and take away 17. The answer is between 120 and 130. What was the number I thought of?

Answer



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A10

The password for a computer has four different letters in alphabetical order, chosen from A to F. How many possible passwords are there?

Answer



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A11

Dynamic Dan walks up and over a hill walking 8 km at an average speed of 3 km an hour. Lazy Lou walks round the hill at the same average speed and arrives 10 minutes later than Dan. How far did Lou walk?

Answer

km



A12

Points A , B and C have coordinates $(5, 2)$, $(8, 2)$ and $(8, 4)$. Rectangle $ABCD$ is rotated 90° anticlockwise about point D . What are the coordinates of the image of C after the rotation?

Answer (,)



A13

My gym gives the maximum safe heart rate as $(220 - \text{age})$. They recommend working at 60% of maximum heart rate. What would this working rate be for a 25 year old?

Answer



A14

An efficient student calculates that each time he recites his 7 times table he is 5% faster than the previous time. He takes 200 seconds on the first attempt. How long does he take on the fourth attempt? Give your answer to the nearest whole number of seconds.

Answer

seconds



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A15

How long is one billion seconds? Give your answer to the nearest multiple of ten years.

(one billion = one thousand million)

Answer	years
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B1

In a set of cards numbered from 1 to 25 inclusive only the even multiples of 3 are blue. What percentage of the cards are not blue?

Answer	%
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B2

In isosceles triangle PQR angle P measures 40 degrees.

What are the three possible sizes of angle Q ?

Answer $^{\circ}$, $^{\circ}$ or $^{\circ}$



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B3

A bar of chocolate costs 21p. I buy as many as I can with a £2 coin.

How much change do I receive?

Answer

p



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B4

Joe lists all the factors of 18 together with all the factors of 24.

How many different numbers are in his list?

Answer



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B5

The price of a long distance telephone call is 65p after prices have been increased by 30%.

What was the price before the increase?

Answer

p



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B6

$$U + K + M + T = 18$$

$$2U + K + M = 17$$

$$U + K + T = 16$$

$$3T = 15$$

Find the values of U , K , M and T .

Answer $U =$ $K =$ $M =$ $T =$



B7

One day a mathematical grandmother calculates that the mean age of her five grandchildren is 7.2 years.

Almost immediately she has a phone call to tell her that a new grandchild has been born.

What is the mean age of her grandchildren now?

Answer

years



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B8

When I find the square root of a number and add 17 the answer is 30. What was the number I started with?

Answer



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B9

What are the coordinates of the point where the line joining points $(0, 4)$ and $(4, 0)$ crosses the line $y = x + 2$?

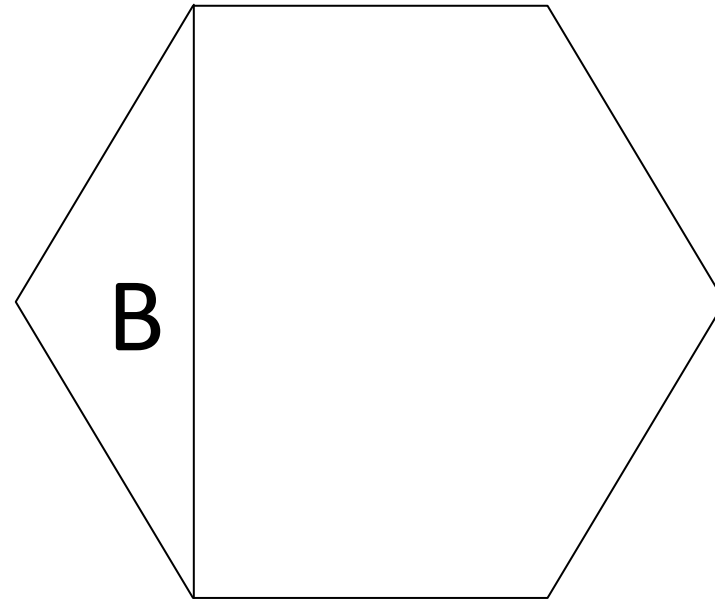
Answer (,)



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B10

What fraction of the area of the regular hexagon is the area of triangle B?



Answer



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B11

Thirty-two children were asked if they liked chocolate or toffee ice creams or both. Three liked only chocolate, 21 liked both, while two liked neither. How many liked only toffee ice cream?

Answer



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B12

How long is one million minutes? Give your answer to the nearest whole number of years.

Answer	years
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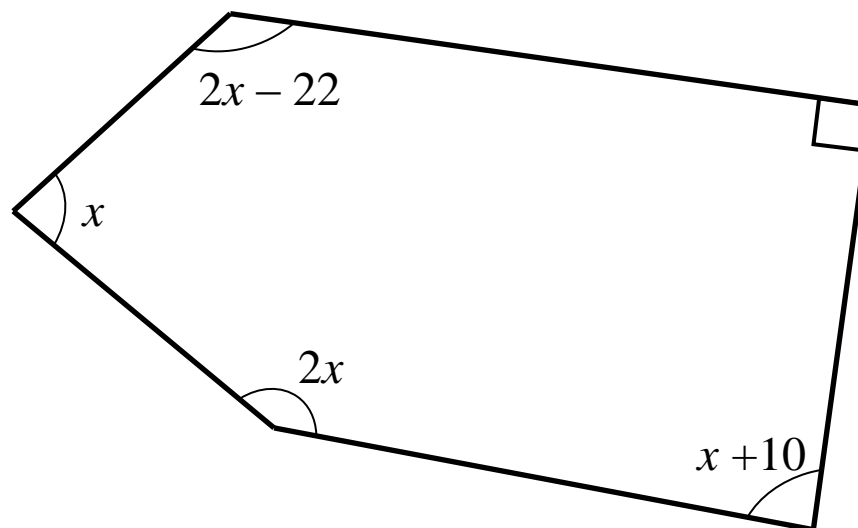


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B13

All the angles are given in degrees.

Calculate the value of x .



Answer $x =$



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B14

A pop star earns a fee of £1 800 000 for a song lasting 3 min 30 sec.

How much does she earn per second? Give your answer to the nearest multiple of £100.

Answer £



B15

A slug 10 mm long travelling at 1 mm per second is overtaken by a snail 20 mm long travelling at 2.5 mm per second, both heading for the same lettuce leaf in a straight line.

How long does it take, from the snail's nose first reaching the slug's tail, until its tail finally passes the slug's nose?

Answer

seconds



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