Corbett's Conundrums

1st December

$x^2 - 6x + 13$ can never be less than what number?

Corbett maths

Corbett's Conundrums

2nd December

Solve the equation

$$x^{-1} + 5x^{-\frac{1}{2}} - 36 = 0$$

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Corbett's Conundrums

3rd December

Find all the solutions to

$$3^{2x^2 - x - 6} = 1$$

Corbett maths

Corbett's Conundrums

4th December

The interior angle of a regular polygon exceeds the exterior angle by 160°.

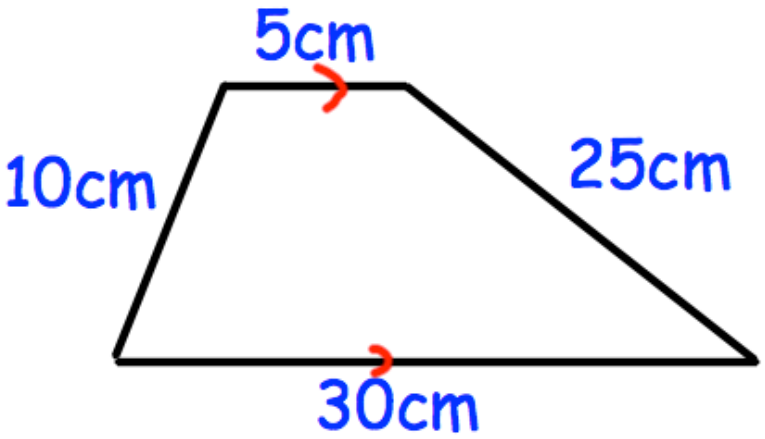
Find the number of sides.

Corbett maths

Corbett's Conundrums

5th December

Find the area of this trapezium in the form $a\sqrt{b}$ cm²



Corbett maths

Corbett's Conundrums

6th December

The positive integers y and 16 are such that their arithmetic mean exceeds their geometric mean by 2.

Find the possible values of y.

Corbett maths

Corbett's Conundrums

7th December

A circle with centre (2, -3) has the line $4y - 3x = 7$ as a tangent.

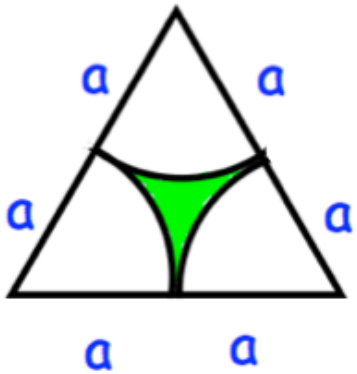
Find the radius of the circle.

Corbett maths

Corbett's Conundrums

8th December

Find the area of the shaded region.

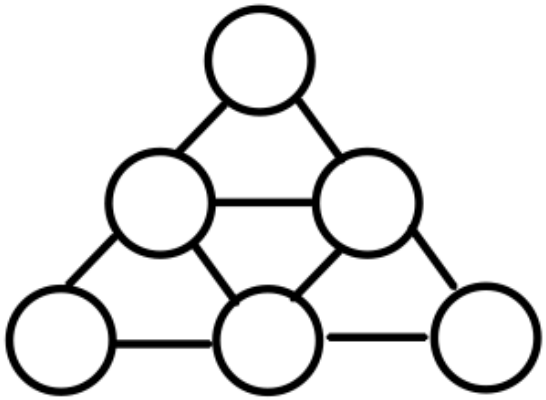


Corbett maths

Corbett's Conundrums

9th December

Fill in each circle with a prime number so that the sum of the large triangle equals 20 and each small triangle has the same sum.



Corbett maths

Corbett's Conundrums

10th December

How many numbers with two digits, which when reversed, produce a number which is 75% greater?

How many produce a number which is 25% greater?

Corbett maths

Corbett's Conundrums

11th December

$x = 4999(1 + 2 + 3 + \ldots + 5000)$
$y = 5000(1 + 2 + 3 + \ldots + 4999)$

Find the value of $x - y$

Corbett maths

Corbett's Conundrums

12th December

In a sack, there are seven sticks with lengths

2cm, 4cm, 5cm, 8cm, 10cm, 11cm and 19cm.

If three are picked at random, what is the probability that they can form a triangle?

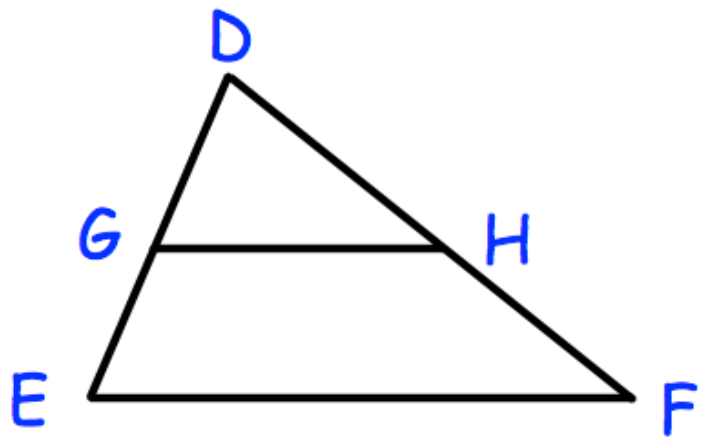
Corbett maths

Corbett's Conundrums

13th December

DG = 3cm and DE = 5cm.
GH is parallel to EF.

The area of triangle DGH is $6cm^2$
Find the area of GHFE



Corbett maths

Corbett's Conundrums

14th December

Continue the pattern

1
11
21
1211
111221
...
...
...

Corbett maths

Corbett's Conundrums

15th December

Coloured cards are associated with numbers as follows: Blue 2, Red 3, Green 5 and White 7.

Some cards are selected and the product is 70560.

How many of each colour are selected?

Corbett maths

Corbett's Conundrums

16th December

- Which is larger 2^{100} or 3^{75} ?

Corbett maths

Corbett's Conundrums

17th December

After completing the "cross-number puzzle," find the sum of all nine integers.

	D_1	D_2	D_3
A_1	1		
A_2			
A_3			9

Across

A_1: A prime number

A_2: A multiple of 53

A_3: A perfect number

Down

D_1: A power of 5

D_2: A power of 2

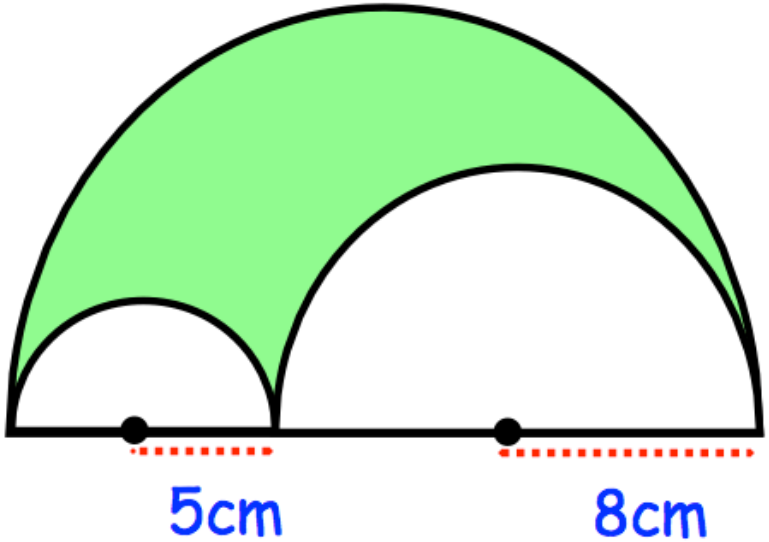
D_3: A power of 3

Corbett maths

Corbett's Conundrums

18th December

Find the perimeter and area of the shaded region bounded by the 3 semi-circles.



Corbett maths

Corbett's Conundrums

19th December

Let f(x) = the total number of factors of x.

f (f(20) + f(36) + f(96) + f(15)) = ?

Corbett maths

Corbett's Conundrums

20th December

The sides of a right angled triangle are:

$w - y$, w and $w + y$

Find the ratio of w to y.

Corbett maths

Corbett's Conundrums

21st December

There are four pairs of positive integers (x, y) such that $x^2 - y^2 = 225$

Find these pairs

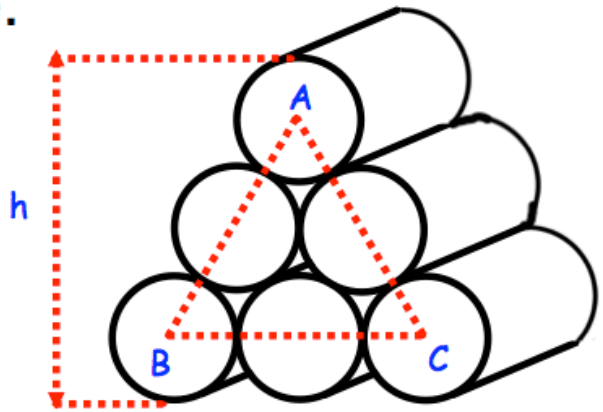
Corbett maths

Corbett's Conundrums

22nd December

Six cylinders, each of radius 1.2m and length 8m, are stacked as shown. The centres of the ends of the cylinders are labelled A, B and C.

(a) Find the length of AB
(b) Calculate h, the height of the stack.
(c) Calculate the volume.



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Corbett's Conundrums

23rd December

If you add the square of Chelsea's age to the age of Jamie, the sum is 81. However if you add the square of Jamie's age to the age of Chelsea, the result is 297.

Find Chelsea's and Jamie's ages.

Corbett maths

Corbett's Conundrums

24th December

Find

$$\sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}$$

to infinity

Corbett maths

Corbett's Conundrums

25th December

Solve for a, b and c.

$$a + b + c = 12$$
$$3a + 2b + c = 26$$
$$4a + 3b + c = 32$$

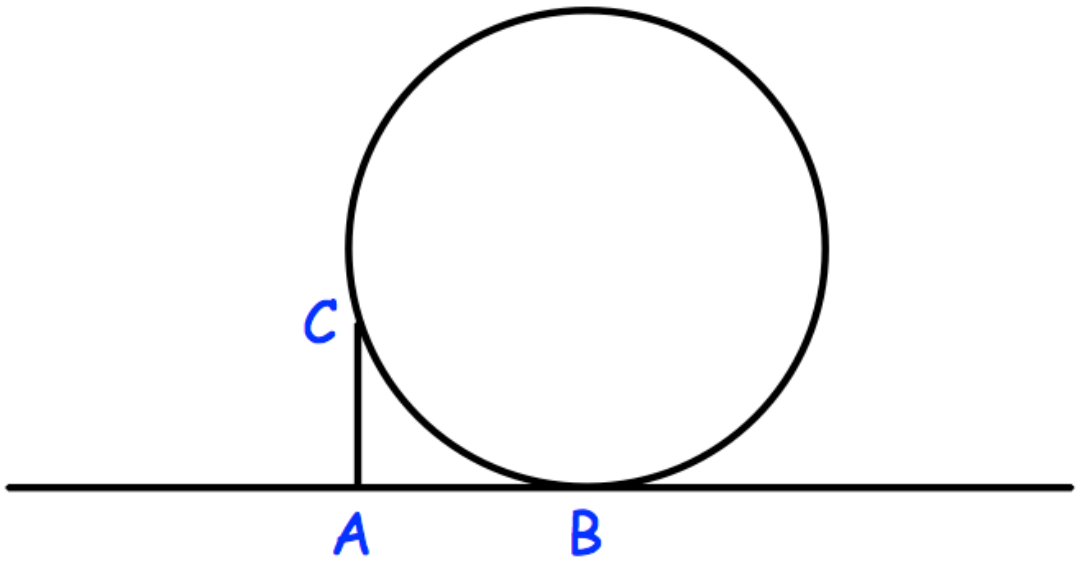
Corbett maths

Corbett's Conundrums

26th December

AB is a tangent to the circle.
Angle BAC is 90°, AC = 6cm and AB = 18cm.

Find the radius of the circle.



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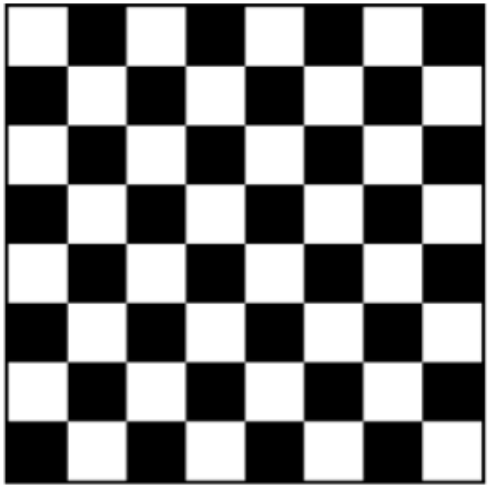
Corbett's Conundrums

27th December

How many squares, in total, can be found on a chess board?



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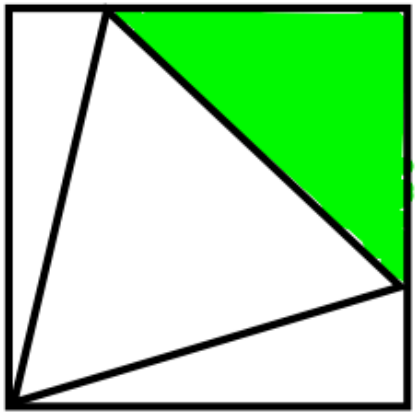
Corbett's Conundrums

28th December

An equilateral triangle is inscribed in a square below.

What is the ratio of the area of the equilateral triangle to the area of the shaded triangle?



Corbett maths

Corbett's Conundrums

29th December

When a number is divided by 3 the remainder is 2.
When it is divided by 4 the remainder is 3.
When it is divided by 5 the remainder is 4.

What is the smallest possible number which satisfies these conditions?

Corbett maths

Corbett's Conundrums

30th December

A square, regular hexagon and an equilateral triangle all have the same perimeter.

Find which polygon has the greatest area.

Corbett maths

Corbett's Conundrums

31st December

Choose any four digit number, where the first digit is larger than the last.
Reverse your number and subtract it from your original.
Taking your answer, add it to it's reverse.
Note your final answer and repeat this process five more times.

Try to make conjectures about your starting number and the final answer.

Try to prove algebraically.

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