Corbett's Conundrums

1st April

Find the value of

\[ \frac{a}{b^2} + \frac{b}{c^2} - \frac{c}{a^2} \]

when \( a = \frac{1}{2}, \quad b = 4, \quad c = -\frac{1}{5} \)
ABC is a rectangle. E and F are the midpoints of AD and AB.

$EF = \sqrt{5}$
$EC = \sqrt{17}$

Find BC.
Corbett's Conundrums

3rd April

\[ a = 999(1 + 2 + 3 + \ldots + 1000) \]
\[ b = 1000(1 + 2 + 3 + \ldots + 999) \]

Find \( a - b \)
Corbett's Conundrums

4th April

How many regular polygons have integral interior angles?

Research "octagon houses"
Corbett's Conundrums

5th April

Sam runs the school tuck shop. The Sam has some money on Monday morning. He doubles his money on Monday and spends £12 on stock. On Tuesday, he doubles his remaining money and spends another £12 on stock. On Wednesday, he doubles his remaining money and spends £12 on stock and now has nothing left.

How much did he have on Monday morning?
Corbett's Conundrums

6th April

What are the last three digits of

$$5^{2015}$$

Corbett maths
The line $y = \frac{1}{2} x + 3$ is reflected with mirror line $y = x$

Find the equation of the image.
How many two-digit numbers are there that are three times the product of their digits?
A man is 2 metres tall and walks around the earth. How many metres further does the top of his head travel than the bottoms of his feet?
Corbett's Conundrums

10th April

A triangle has sides $y$, $2y - 1$ and $5y - 3$

Find any values of $y$ which make the triangle isosceles
Corbett's Conundrums

11th April

In the triangle DEF, DE = 9cm, DF = 40cm and EF = 41cm.

Find the area of the inscribed circle of this triangle.
Shown below is a sector with radii 12cm and arc 9cm.

Find the area and perimeter of the sector. There is another sector that has the same area and perimeter.

Find the length of its radii and arc length.
Corbett's Conundrums

13\textsuperscript{th} April

A cube of sides 6cm is placed inside a sphere such that its eight vertices lie upon the surface.

Find the radius of the sphere.
Corbett's Conundrums

14<sup>th</sup> April

In a sale the normal selling price of a jumper is reduced by 20%. The shop owner still makes 4% profit above the price she paid for it.

What percentage profit would be made if the jumper was sold at the normal selling price?
A satellite makes a circular orbit around the earth at a constant altitude.

What change in altitude is needed to lengthen each orbit by one mile?
Corbett's Conundrums

16\textsuperscript{th} April

How many four digit numbers have all digits different?
DEF is an equilateral triangle with side $DE = 16$ cm. 
G is the midpoint of EF. 
H is the midpoint of DG. 
Find FH.
Divide 56 in the ratio $\sqrt{2} : \sqrt{8} : \sqrt{32}$
The cat moves **upwards** to reach the mouse. How many different routes are there?
Corbett's Conundrums

20th April

Given the sequence 2, 1, 3, 0, 4, -1, 5 ... ...

Find the product of the 20th and 21st terms
Beth bought 5 bananas and 3 peaches. If she bought 5 peaches and 3 bananas it would cost 8p more.

How much more expensive is a peach than a banana?
Corbett's Conundrums

22\textsuperscript{nd} April

Find a two digit number that is increased by 20\% when the order of the digits are reversed.
Find the length and width of a rectangle with perimeter 27cm and area 44cm².
Corbett's Conundrums

24th April

In a shop, croissants can be purchased in boxes of 6, 9 or 14.

It is not possible to purchase 11 croissants. 20 croissants could be purchased by buying a box of 6 and a box of 14.

Work out the largest number of croissants that cannot be purchased from the shop.
Corbett's Conundrums

25\textsuperscript{th} April

a varies inversely to the cube of b.

If a is doubled, what happens to b?
An equilateral triangle and a square have the same perimeter.

The area of the triangle is $9\sqrt{3}$ cm$^2$.

Find the length of the diagonal of the square.
Corbett's Conundrums

27\textsuperscript{th} April

Which is greater: $2x$, $x^2$ or $x^3$?
Corbett's Conundrums

28th April

Share 180 in the ratio $\sqrt{3} : \sqrt{27} : \sqrt{75}$
If \( x \$ y = xy + x + y \) and \( 3 \$ 5 = 2 \$ w \)

Find \( w \)
Corbett's Conundrums

30\textsuperscript{th} April

The sum of the ages of Harry and Louis is 41 years, of Louis and Niall 44 years, and of Niall and Harry 37 years.

How old is each?