Maths & Stats UWI Cave Hill

INTERNATIONAL DAY OF MATHEMATICS

MARCH 14

The Discipline of Mathematics celebrates the International Day of Mathematics

Solve any of the three π-day puzzles below and send your solution to MathsStatsUWICaveHill@gmail.com — the fastest solution to each puzzle wins $50.

Cross Number

Use the given clues to fill in this Cross Number puzzle. Remember, no entry in the grid may begin with "0". Arithmetic sequences have a common difference, such as 2, 5, 8, or 9, 7, 5.

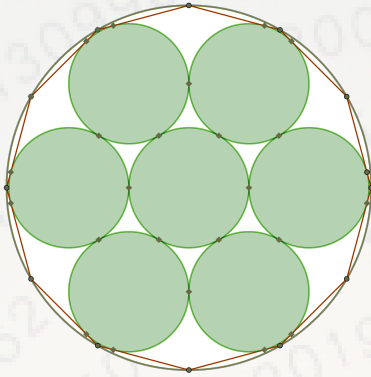### Clues Across

1 A prime number
4 100 less than 2-Down
6 Perfect cube
8 No clue needed!
9 Perfect cube

Clues Down

1 Product of the digits of 6-Across
2 1-Down divided by 3
3 Odd digits whose sum is over 40
5 Factor of the reverse of 6-Across
7 Digits form an arithmetic sequence

Seven Circles in a Dodecagon

In the figure on the left, a regular dodecagon (a polygon with 12 equal sides) is circumscribed by a large circle (the vertices of the dodecagon are shown as ●). Inside the dodecagon are seven circles (in green), all of the same radius, that are tangential to each other and/or the dodecagon, the points of tangency are shown as ◇.

What is the proportion of the area of these seven small circles (in green) to the area of the large (circumscribing) circle?

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Sudoku

Fill in the cells so that each row, column, and 3 × 3 square contains each of the numbers 1, 2, . . . , 9. A ▽ (in red) between cells means the product of those entries is greater than 23. A △ (in blue) means the product is less than 23. In addition, a 2 or 3 appears inside whenever the difference of those entries (in some order) is 2 or 3, respectively. Note that this means if there is no number, then those entries are not 2 or 3 apart from each other.