

12 Days of ChrisMATH — Day 4

Today's ChrisMATH puzzles are in honour of Dr. Aggarwala. It is the 13th day after he passed away at the age of 92 and is significant as it marks the end of the mourning period in Hindu culture.

Dr. Aggarwala came to Calgary in 1966 as part of the first team of university professors in the math department. He taught mostly calculus, including a special area of calculus called differential equations. He also did research in mathematics. What is research in mathematics? It is solving math problems that no one else has ever solved before. Dr. Aggarwala worked on new math problems relating to physics and, in his retirement, relating to infectious diseases. There were so many new problems that he wanted to solve. He would be the first one to say that math is hard but so beautiful and satisfying when you unlock the key to a problem.

He loved asking young people about math and wrote a textbook on calculus to help students understand the subject. But he was not only interested in mathematics! He loved philosophy and politics and music and art and anything related to how humans understand and interact with the world. He came to every Renert School performance from the day it opened until his first granddaughter graduated from there in June of 2023. He would have told you to do whatever you love, as long as you keep learning.

Level 1:

$$\begin{array}{r} \text{❄} + \text{❄} + \text{❄} = 13 \\ \text{❄} + \text{❄} + \text{❄} = 92 \\ \text{❄} + \text{❄} + \text{❄} = 270 \\ \text{❄} + \text{❄} + \text{❄} = ? \end{array}$$

Level 2:

$$\begin{array}{r} \text{snowflake} + \text{snowflake} + \text{snowflake} = 13 \\ \text{snowflake} + \text{snowflake} + \text{snowflake} = 92 \\ \text{snowflake} + \text{snowflake} = ? \end{array}$$

Level 3:

Find the largest integer $(\dots, -3, -2, -1, 0, 1, 2, 3, \dots)$ value of snowflake such that

$$\text{snowflake} \times \text{snowflake} \times \text{snowflake} - 92$$

is a multiple of

$$\text{snowflake} - 92$$