

CSC165H1 Problem Set 0

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Question 2

- CSC165H1 S Mathematical Expression and Reasoning for Computer Science Lindsey Shorser
- CSC148H1 S Introduction to Computer Science Jonathan Calver
- MAT137Y1 Y Calculus with Proofs Alfonso Gracia-Saz
- MAT223H1 S Linear Algebra I Alfonso Gracia-Saz
- LIN102H1 S Introduction to Linguistics: Sentence Structure and Meaning Susana Bejar, Volha Kharytonava
- PHL233H1S Philosophy for Scientists Alexander Koo

Question 3

Let

$$S_1 = \{108, 148, 165, 207, 209, 236, 258, 263, 369, 373\}$$

and

$$S_2 = \{x \mid \exists k \in \mathbb{Z}, x = 4k\}$$

So,

$$S_1 \setminus S_2 = \{165, 207, 209, 258, 263, 369, 373\}$$

Question 4

p	q	r	$\neg(p \wedge q \wedge r) \iff (p \implies q)$
F	F	F	T
F	F	T	T
F	T	T	T
F	T	F	T
T	T	T	F
T	T	F	T
T	F	F	F
T	F	T	F

Question 5

Using the identity for all $n \in \mathbb{N}$ and all $d, k \in \mathbb{R}$

$$\sum_{i=0}^{n-1} (di + k) = nk + \frac{dn(n-1)}{2}$$

$$\sum_{i=0}^{n-1} (4i - 315) = -315n + \frac{4n(n-1)}{2}$$

We want this to equal 2020 temporarily,

$$\begin{aligned} 2020 &= -315n + \frac{4n(n-1)}{2} \\ &= -634n + 4n^2 - 4040 \end{aligned}$$

Using the quadratic formula:

$$n = \frac{634 \pm \sqrt{(-634)^2 - 4(4)(-4040)}}{2(4)}$$

$$n \approx \begin{cases} 164.63 \\ -6.13 \end{cases}$$

Since $n \in \mathbb{N}$,

$$n = 165$$

Plugging n back into the equation:

$$-315(165) + \frac{4(165)(165-1)}{2} = 2145 > 2020$$

which was what I wanted to show.