Bonus Puzzle #1

MATH 125 — Calculus 1
due Friday, Feb 8

Please print your name:

Puzzle. McDonalds used to sell Chicken McNuggets in boxes of 6, 9, or 20.

Obviously one could purchase exactly 15 nuggets by buying a box of 6 and a box of 9. Or, one could purchase 21 nuggets by buying two boxes of 6 and a box of 9.

(a) Could you purchase exactly 47 nuggets? If so, how?

(b) Could you purchase exactly 22 nuggets? If so, how?

(c) What is the largest number for which it is impossible to purchase exactly that number of nuggets?

(d) Nowadays, nuggets are also sold in boxes of 4. What is the largest number for which it is then impossible to purchase exactly that number of nuggets?

Bonus challenge. Suppose, instead, only boxes with 7, 15 or 25 nuggets are sold. What is the largest number for which it is impossible to purchase exactly that number of nuggets?

This is a famous problem and you can easily find the solution to the puzzle online.

For instance, check out the Numberphile video: https://www.youtube.com/watch?v=vNTSugyS038

To collect a bonus point (worth 1% towards a midterm exam, or an extra dropped quiz, whichever is more valuable):

- Send me an email with your solution to the bonus challenge (involving 7, 15 and 25 nuggets).
- Include some words of explanation (in particular, argue why your number is indeed the largest).
- Send that email by Friday, February 8.

Armin Straub
straub@southalabama.edu