Sub Topic: Counting Principal, Permutations and Combinations

After the pandemic of 2020 had subsided, Amanda has decided to go out for a meal with friends.

(a) Amanda wants to impress her friends that she has not seen in eight months. If she owns 10 shirts, 8 pairs of pants and 11 pairs of shoes, state the number of different outfits she will have to choose from. (2 marks)

(b) Amanda is riding her bike to meet up with up with her friends at a pizza restaurant. When she arrives she will need to lock her bike to the bike rack out front. If she is using a dial lock with the numbers 0 to 35 on the face and it takes 3 of these numbers to unlock the lock, find the number of possibilities there are to unlock the lock. (2 marks)

(c) When Amanda and her friends are ordering their pizzas, they notice that there are 20 different toppings they can add to a pizza with sauce and cheese. Everyone at the table agrees that two additional toppings is the way to go. Find the number of different pizzas they have to choose from with two additional toppings. (3 marks)

Mark scheme:

(a) Using the counting principle: (10)(8)(11) = 880 (M1)(A1)

(b) Using permutations (because the order of the numbers matter) : (M1)(A1)
$_{36}P_3 = \frac{36!}{(36-3)!} = 42{,}840$

(c) Using combinations (because the order of the toppings does not matter): (M1)(A1)
$_{20}C_2 = \frac{20!}{(20-2)!2!} = 190$