3. Given A, B, C ⊆ S where

S = {x ∈ N | x ≤ 50}

A = {x ∈ S | (∃y ∈ Z)(x = 4y)

B = {x ∈ S | (∃y ∈ Z)(∃z ∈ Z)(5y + xz = 3)

C = {x ∈ S | (∃y ∈ N)(x = 3y + 2)

Find

a) |A ∪ B ∪ C|

S = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50}

A = {4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48}



B = {10, 15, 20, 25, 30 , 45}

C = {5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50}

ANSWER:

|A ∪ B ∪ C| = {20}

b) |℘(A ∪ B) × C’|

S = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50}

C’ = {1, 2, 3,4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24, 25, 27, 28, 30, 31, 33, 34, 36, 37, 39, 40, 42, 45, 46, 48, 49}

ANSWER:

(A ∪ B) = 40

|℘(A ∪ B)| = 2^(40 - 1) = 2^39

|C’|= 34

|℘(A ∪ B) × C’| = [2^(39) × 34]