Task 2

1) How many ways can 12 students in a class take 3 different tests if 4 students are to take each test?

- Solution:

  3! = 3 * 2 * 1 = 6

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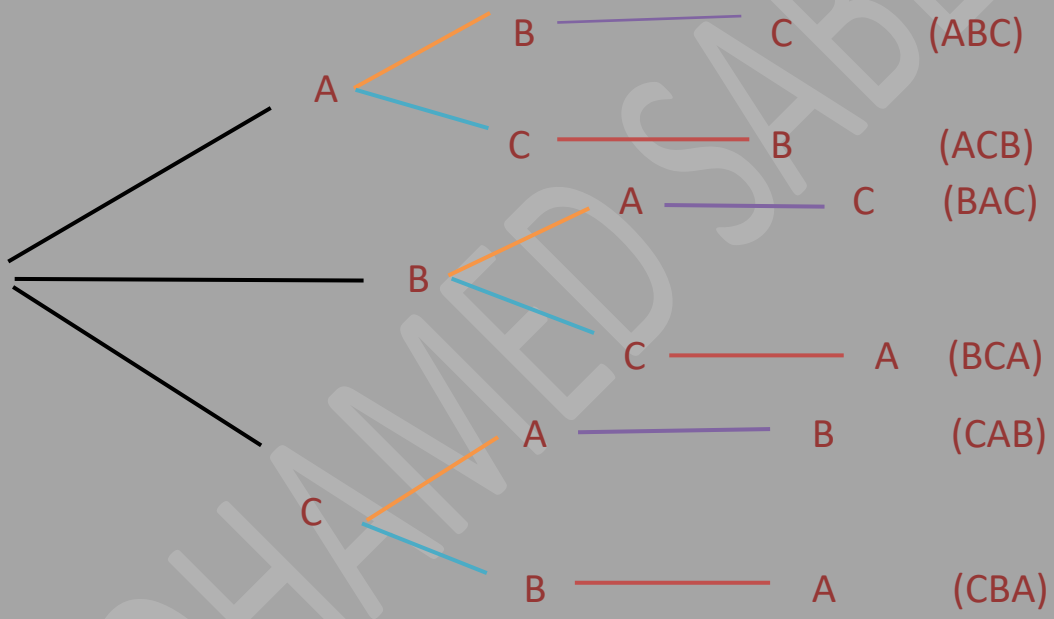
2) Construct the tree diagram for the number of permutations of { a , b , c }.

- Solution:



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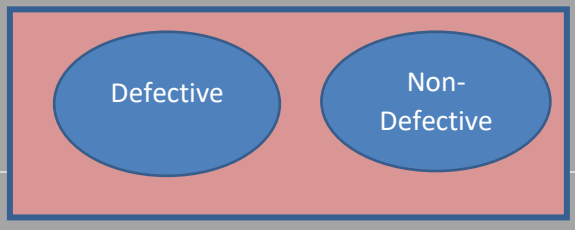
3) Consider two items be selected randomly from a box that has containing 12 items. From these 12 items, 4 items are defective. If A is the event represents that '' both the two items are defective '' while B represents that '' both the two items are non-defective ''

- Solution:

I. P(A) and P(B) = $P(A \cap B) = 0$



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II. P(at least one item is defective) =

1 – P(non-defective) = 1 – P(B) = 1 – 14/33 = 19/33

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4) A box contains three 15 items of which five are defective. If three items are chosen at random from this box, find the probability that:

- Solution:
  I. None of the three selected items is defective = 10/15 * 9/14 * 8/13 = 24/91

  II. Exactly one item of the three items is defective = 5/91

  III. At least one item of the three items is defective = 1 – P(non – defective) = 1 – 24/91 = 67/91

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5) A class contains 10 boys and 20 girls of which half the boys and half the girls have from Mansoura. Find the probability that a person chosen randomly is a boy or from Mansoura university.

- Solution:
  p(A) = 10/30 = 1/3
  p(B) = 5/30 = 1/6
  p(A∪ B) = 1/3 + 1/6 – 1/6 = 1/3

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6) Let A and B be events with p(A) = 3/8, p(B) = 1/2, and p(A intersection B) = 1/2;

I. $P(A^c) = 1 - P(A) = 1 - 3/8 = 5/8$

II. $P(B^C) = 1 - P(B) = 1 - 1/2 = 1/2$

III. $P(\bar{A} \cap \bar{B}) = P\overline{(A \cup B)} = 1 - [\ P(A) + P(B) - P(A \cap B)\ ] = 1 - (3/8 + 1/2 - 1/2) = 5/8$

IV. $P(\bar{A}$ union $\bar{B}) = p\overline{(A \cap B)} = 1 - 1/2 = 1/2$

V. P(A intersection $\bar{B}$) = P(A-B) = $P(A) - P(A \cap B) = 3/8 - 1/2 = -1/8$ (السؤال فيه خطأ)

VI. P(B intersection $\bar{A}$) = p(B-A) = $P(B) - P(A \cap B) = 1/2 - 1/2 = 0$

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7) When you are rolling a pair of (fair) dice three times. What is the probability that, least one of the three tries, you roll a 7?

- Solution:

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8) If $\Sigma p(x)$ = k^2 – 8, find the value of k ?

- Solution:

K^2 = 9

K = 3

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9) If A and B are mutually exclusive events, p(A) = 0.35 and p(B) = 0.45 , find p(A′ ∩ B′)

- Solution:

  p(A′ ∩ B′) = 1 – (p(A) + p(B)) = 1 – (0.35 + 0.45) = 0.20

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