

Answer on Question #76575 – Math – Statistics and Probability

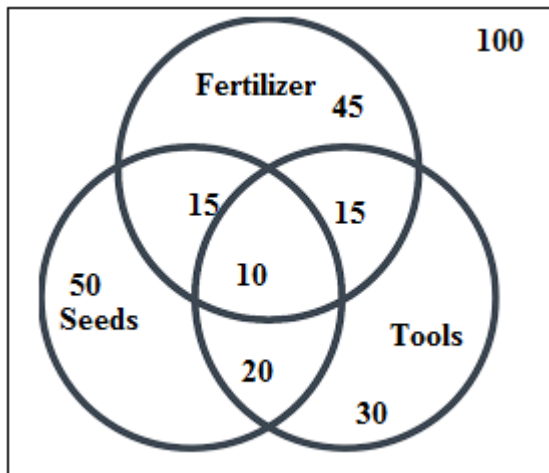
Question

On a particular weekend, 100 customers made purchases at Green Thumb Garden supply store. Of these 100 customers 30 purchased tools, 45 purchased fertilizer, 50 purchased seed, 15 purchased seeds and fertilizer 20 purchased seeds and tools 15 purchased tools and fertilizer 10 purchased tools, seeds and fertilizer. Represent the above information on a Venn diagram. (ii) Determine how many customers purchased:

- a) only tools
- b) seeds and tools but not fertilizer,
- c) tools and fertilizer but not seeds,
- d) neither seeds, tools, nor fertilizer

Solution

A Venn diagram:



a)

$$\begin{aligned} n &= n(\text{Tools}) - n(\text{Tools and Fertilizer}) - n(\text{Tools and Seeds}) + n(\text{Tools and Seeds and Fertilizer}) = \\ &= 30 - 15 - 20 + 10 = 5 \end{aligned}$$

Other method is

$$n = 30 - 10 - (15 - 10) - (20 - 10) = 5$$

b)

$$n = n(\text{Tools and Seeds}) - n(\text{Tools and Seeds and Fertilizer}) = 20 - 10 = 10$$

c)

$$n = n(\text{Tools and Fertilizer}) - n(\text{Tools and Seeds and Fertilizer}) = 15 - 10 = 5$$

d)

$$\begin{aligned} n &= n(U) - n(\text{Tools or Seeds or Fertilizer}) \\ &= n(U) \\ &\quad - (n(\text{Tools}) + n(\text{Seeds}) + n(\text{Fertilizer}) - n(\text{Tools and Seeds}) \\ &\quad - n(\text{Tools and Fertilizer}) - n(\text{Seeds and Fertilizer}) \\ &\quad + n(\text{Tools and Seeds and Fertilizer})) = 100 - (45 + 50 + 30 - 15 - 15 - 20 + 10) \\ &= 15 \end{aligned}$$

Answer: a) 5; b) 10; c) 5; d) 15.