

6.2 (page 367)

$$\begin{aligned} 8. \quad (B \cap A) \cup B &= \{2, 4, 6\} \cup \{2, 4, 6, 8\} \\ &= \{2, 4, 6, 8\} \\ &= B \end{aligned}$$

$$n[(B \cap A) \cup B] = n(B) = 4$$

$$\begin{aligned} 17. \quad n(A) &= 10 + 6 + 3 + 5 \\ &= 24 \end{aligned}$$

19. Before determining the number of elements in A or B , we need to find the number of elements in $A \cap B$.

$$n(A \cap B) = 6 + 3 = 9$$

So,

$$\begin{aligned} n(A \cup B) &= n(A) + n(B) - n(A \cap B) \\ &= 24 + 19 - 9 \\ &= 34 \end{aligned}$$

21. To find the number of elements in A but not in B , subtract $n(A \cap B)$ from $n(A)$.

$$n(A) - n(A \cap B) = 24 - 9 = 15$$

23. The number of elements in A or B or C is found by expanding the formula for finding the number of elements in A or C .

$$\begin{aligned} n(A \cup B \cup C) &= n(A) + n(B) + n(C) - n(A \cap B) - n(A \cap C) - n(B \cap C) + n(A \cap B \cap C) \\ &= 24 + 19 + 30 - 9 - 8 - 5 + 3 \\ &= 54 \end{aligned}$$

24. The number of elements that are in neither A nor B nor C can be written as

$$n(\overline{A \cup B \cup C}) = 5$$

$$\begin{aligned} 5. \quad A \cap B &= \{2, 4, 6\} \\ n(A \cap B) &= 3 \end{aligned}$$

$$\begin{aligned} 10. \quad n(A \cup B) &= n(A) + n(B) - n(A \cap B) \\ &= 14 + 11 - 6 \\ &= 19 \end{aligned}$$

$$\begin{aligned} 12. \quad n(A \cup B) &= n(A) + n(B) - n(A \cap B) \\ n(A \cap B) &= n(A) + n(B) - n(A \cup B) \\ &= 8 + 9 - 16 \\ &= 1 \end{aligned}$$

$$\begin{aligned} 14. \quad n(A \cup B) &= n(A) + n(B) - n(A \cap B) \\ n(B) &= n(A \cup B) - n(A) + n(A \cap B) \\ &= 29 - 10 + 5 \\ &= 24 \end{aligned}$$

$$\begin{aligned} 18. \quad n(B) &= 8 + 6 + 3 + 2 \\ &= 19 \end{aligned}$$

20. Before finding the number of elements in B or C , we need to determine the number of elements in C and the number of elements in $B \cap C$.

$$\begin{aligned} n(C) &= 20 + 5 + 3 + 2 = 30 \\ n(B \cap C) &= 3 + 2 = 5 \end{aligned}$$

So,

$$\begin{aligned} n(B \cup C) &= n(B) + n(C) - n(B \cap C) \\ &= 19 + 30 - 5 \\ &= 44 \end{aligned}$$

22. To find the number of elements in B but not in C , subtract $n(B \cap C)$ from $n(B)$.

$$n(B) - n(B \cap C) = 19 - 5 = 14$$

25. The number of elements in A and B and C is the number of elements common to all three sets.

$$n(A \cap B \cap C) = 3$$

26. The number of elements in U is found by adding the all the numbers given in the figure on page 367.

$$n(U) = 59$$

32. Before doing the problem, it is suggested that the sums of the rows and columns of the table are found.

- (a) The number who were not located in the Southeast is found by subtracting the CEOs in the Southeast from the 250 surveyed.

$$250 - (8 + 23 + 12) = 207$$

207 of the company's surveyed were not in the Southeast.

- (b) $n(\text{Communication row}) + n(\text{West column}) - n(\text{Communication companies in the West})$

$$93 + 53 - 20 = 126$$

126 CEOs responded Communication or West.

- (c) $n(\text{Northeast and Communication}) + n(\text{Northeast and Finance}) = 35 + 30 = 65$

65 CEOs responded that their companies were in the Northeast, but were not in Manufacturing.

- (d) $250 - [n(\text{Finance and Northeast}) + n(\text{Finance and Southeast})] = 250 - 30 - 12 = 208$

208 CEOs answered that their companies were in Manufacturing or Communications or in the Midwest or in the West.