1.1. Algebra of Sets and Counting Methods

Answers:

1. a. $\frac{11!}{4!4!2!1!}$

   b. $\frac{8!}{4!2!1!}$

   c. $\frac{11!}{4!4!2!1!} - \frac{8!}{4!2!1!}$

   d. $\frac{5!}{2!}$

2. $8!.10_{P_3}.2!$

3. $7!.10_{P_3}.2!$

4.

   a. 4_{P_2}

   b. $4 \times 5_{P_3} = 4 \times 5 \times 4 \times 3 = 240$

5.

   a. $5!.2! = 240$

   b. $4! \times 3_{P_2} = 24 \times 6 = 144$

6. $\frac{4P_3}{2!} X\, 3! = 72$

7. $\frac{7!}{2!}$

8. a. $\frac{10!}{2!2!}$

b. $\frac{10! \times 9}{8}$

9. a. 118

b. ${}^{19}C_2$

10. a. 216

b. 120

c. 60

d. 91

11. $4! \times 2!$

12. NAAIG

13.

Possibilities	Permutations	Combination
All different letters	24	1
2 different, 2 alike	12	3
1 different, 3 alike	4	3
Total	40	7

14.

Possibilities	Permutations	Combination
All different letters	${}^{8}\boldsymbol{P}_{4}$	${}^{8}\boldsymbol{C}_{4}$
2 alike and 2 others alike	${}^{3}\boldsymbol{C}_{2}\ \frac{4!}{2!2!}$	${}^{3}\boldsymbol{C}_{2}$
2 alike and 2 different	${}^{3}\boldsymbol{C}_{2}\,{}^{7}\boldsymbol{C}_{2}\ \frac{4!}{2!}$	${}^{3}\boldsymbol{C}_{2}\,{}^{7}\boldsymbol{C}_{2}$

15. a. ${}^{5}\boldsymbol{P}_{3}$

b. 5^3

c. 36

d. 75

e. 24

f. 50

e. $5!$

f. 5^5

16. a. 36

b. 3×5^3