Answer Workshop 8 (Counting)

1. Ans: 26^7.
2. Ans: 26^6.
3. Ans: 26^5.
4. Ans: $2 \cdot 26^6$.
5. Ans: $26^6 + 26^6 - 26^5$.
6. Ans: $4 \cdot 26^5$.
7. Ans: $2 \cdot 26^6 + 2 \cdot 26^6 - 4 \cdot 26^5$.
8. Ans: $25 \cdot 26^5$.
9. Ans: $5 \cdot 26^6 + 5 \cdot 26^6 - 25 \cdot 26^5$.
10. Ans: $3 \cdot 26^4$.
11. Ans: 21^7.
12. Ans: $5 \cdot 7 \cdot 21^6$.
13. Ans: First count the number of words that contain both *A* and *B*. This number is $8 \cdot 7 \cdot P(24,6)$. Therefore the answer is equal to total number of words of length eight minus the number of words of length eight that have both *A* and *B*:
    Ans: ➔ $P(26,8) - 8 \cdot 7 \cdot P(24,6)$.
14. Ans: 2^9.
15. Ans: 2^8.
16. Ans: $2 \cdot 2^{10} - 2^8$.
17. Ans: $\binom{12}{4}$.
18. Ans: $\binom{9}{4}$.
19. Ans: 7!.
20. Ans: 6!.
21. Ans: $2 \cdot 6!$.
22. Ans: $5 \cdot 4 \cdot 5!$.
23. Ans: $2 \cdot 5!$.
24. Ans: 6!.
25. Ans: $5 \cdot 6!$.
26. Ans: $7! - 2 \cdot 6!$.
36. Ans: 2^{10}.
37. Ans: 2^6.
38. Ans: $\binom{10}{6}$.
39. How many bit strings of length 10 have equal numbers of 0s and 1s?
    Ans: $\binom{10}{5}$.
40. How many bit strings of length 10 have more 0s than 1s?
    Ans: $\binom{10}{6} + \binom{10}{7} + \binom{10}{8} + \binom{10}{9} + \binom{10}{10} = \frac{2^{10} + \binom{10}{5}}{2}$.
41. Ans: 30!.

42. Ans: $\binom{30}{4}$.

43. Ans: $\binom{10,15}{4,5,6}$.

44. Ans: $15! \cdot 5! \cdot 10!$.

45. Ans: (a) $\binom{35}{5}$. (b) $\binom{20,15}{4,5,6}$.

64. Ans: $30!$.

65. Ans: $10! \cdot 12! \cdot 8!$.

66. Ans: $\binom{30}{7}$.

67. Ans: $\binom{10,12}{4,6,8}$.

68. Ans: 26^8.

69. Ans: 26^6.

70. Ans: $26 \cdot 26^6$.

71. Ans: $8 \cdot 25^7$.

72. Ans: $26^8 - 25^8$.

73. Ans: $26^7 + 26^7 - 26^6$.

74. Ans: $C(25,6)$.

75. Ans: $P(25,6)$.