

- [§6.1] 1. (a) $18 \cdot 325 = 5,850$
(b) $18 + 325 = 343$
2. $27 \cdot 37 = 999$
4. $12 \cdot 2 \cdot 3 = 72$
7. $26^3 = 17,576$
8. $26 \cdot 25 \cdot 24 = 15,600$
16. $26^4 - 25^4 = 66,351$
20. (a) $\left\lfloor \frac{31}{3} \right\rfloor - \left\lfloor \frac{5}{3} \right\rfloor = 9$ integers: $\{6, 9, 12, 15, 18, 21, 24, 27, 30\}$.
(b) $\left\lfloor \frac{31}{4} \right\rfloor - \left\lfloor \frac{5}{4} \right\rfloor = 6$ integers: $\{8, 12, 16, 20, 24, 28\}$.
(c) $\text{lcm}(3, 4) = 12 \implies \left\lfloor \frac{31}{12} \right\rfloor - \left\lfloor \frac{5}{12} \right\rfloor = 2$ integers: $\{12, 24\}$.
25. (a) $10^3 - 10 = 990$
(b) $\frac{10^3}{2} = 500$
(c) $9 \cdot 3 = 27$
27. $3^{50} = 717,897,987,691,852,588,770,249$
33. (a) $21^8 = 37,822,859,361$
(b) $21 \cdot 20 \cdots 15 \cdot 14 = 8,204,716,800$
(c) $5 \cdot 26^7 = 40,159,050,880$
(d) $5 \cdot (25 \cdot 24 \cdots 20 \cdot 19) = 12,113,640,000$
(e) $26^8 - 21^8 = 171,004,205,215$
(f) $(5 \cdot 8) \cdot 21^7 = 72,042,541,640$
(g) $26^7 - 21^7 = 6,230,721,635$
(h) $26^6 - 21^6 = 223,149,655$
34. (a) $2^{10} = 1,024$
(b) $3^{10} = 59,049$
(c) $4^{10} = 1,048,576$
(d) $5^{10} = 9,765,625$
35. (a) None
(b) $5! = 120$
(c) $6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 = 720$
(d) $7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 = 2,520$

44. $C(10, 4) \cdot 3! = 1,260$

47. (a) $5! \cdot 2 = 240$

(b) $6! - (5! \cdot 2) = 480$

(c) $\frac{6!}{2} = 360$

[§6.3] 1. $\{a, b, c\}, \{a, c, b\}, \{b, a, c\}, \{b, c, a\}, \{c, a, b\}, \{c, b, a\}$

3. $6! = 720$

4. (a) $\{1, 2, 3\}, \{1, 2, 4\}, \{1, 2, 5\}, \{1, 3, 2\}, \{1, 3, 4\}, \{1, 3, 5\}, \{1, 4, 2\}, \{1, 4, 3\}, \{1, 4, 5\}, \{1, 5, 2\}, \{1, 5, 3\}, \{1, 5, 4\}, \{2, 1, 3\}, \{2, 1, 4\}, \{2, 1, 5\}, \{2, 3, 1\}, \{2, 3, 4\}, \{2, 3, 5\}, \{2, 4, 1\}, \{2, 4, 3\}, \{2, 4, 5\}, \{2, 5, 1\}, \{2, 5, 3\}, \{2, 5, 4\}, \{3, 1, 2\}, \{3, 1, 4\}, \{3, 1, 5\}, \{3, 2, 1\}, \{3, 2, 4\}, \{3, 2, 5\}, \{3, 4, 1\}, \{3, 4, 2\}, \{3, 4, 5\}, \{3, 5, 1\}, \{3, 5, 2\}, \{3, 5, 4\}, \{4, 1, 2\}, \{4, 1, 3\}, \{4, 1, 5\}, \{4, 2, 1\}, \{4, 2, 3\}, \{4, 2, 5\}, \{4, 3, 1\}, \{4, 3, 2\}, \{4, 3, 5\}, \{4, 5, 1\}, \{4, 5, 2\}, \{4, 5, 3\}, \{5, 1, 2\}, \{5, 1, 3\}, \{5, 1, 4\}, \{5, 2, 1\}, \{5, 2, 3\}, \{5, 2, 4\}, \{5, 3, 1\}, \{5, 3, 2\}, \{5, 3, 4\}, \{5, 4, 1\}, \{5, 4, 2\}, \{5, 4, 3\}$

(b) $\{1, 2, 3\}, \{1, 2, 4\}, \{1, 2, 5\}, \{1, 3, 4\}, \{1, 3, 5\}, \{1, 4, 5\}, \{2, 3, 4\}, \{2, 3, 5\}, \{2, 4, 5\}, \{3, 4, 5\}$

8. $5! = 120$

9. $12 \cdot 11 \cdot 10 = 1,320$

12. (a) $C(12, 3) = 220$

(b) $\sum_{0 \leq k \leq 3} C(12, k) = 299$

(c) $2^{12} - \sum_{0 \leq k \leq 2} C(12, k) = 4,017$

(d) $C(12, 6) = 924$

13. $2 \cdot (n!)^2$

15. $C(26, 5) = 65,780$

19. (a) $2^{10} = 1,024$

(b) $C(10, 2) = 45$

(c) $\sum_{0 \leq k \leq 3} C(10, k) = 176$

(d) $C(10, 5) = 252$

23. $8! \cdot P(9, 5) = 609,638,400$