

13.8

(a)

$$26 \cdot 26 \cdot 26 \cdot 26 \cdot 26 = 11881376$$

(b)

$$26 \cdot 25 \cdot 24 \cdot 23 \cdot 22 = 7893600$$

(c)

$$26 \cdot 26 = 676$$

(d)

$$26 \cdot 26 \cdot 2 = 1352$$

(e)

$$26 \cdot 26 \cdot 2 - 1 = 1351$$

13.44

(a)

$$\binom{10}{4} = 210$$

(b)

$$10 \cdot 9 \cdot 8 \cdot 7 = 5040$$

(c)

$$\binom{13}{4} = 715$$

(d)

$$10 \cdot 10 \cdot 10 \cdot 10 = 10000$$

13.50

(a)

$x_1, x_2, x_3, x_4 > 0$

$$\binom{9}{3} = 84$$

(b)

$x_1, x_2, x_3, x_4 \geq 0$

$$\binom{13}{3} = 286$$

(c)

$$\binom{15}{3} = 455$$

13.51

(a)

20 bit strings = 2^{20}

$Q(n)$ = # of n -bit strings not containing 00

Two cases:

- 1) $(n-1)$ -bit string not containing 00
- 2) $(n-2)$ -bit string not containing 00

$$Q(n) = Q(n-1) + Q(n-2)$$

$$Q(1) = \# \text{ 1-bit strings not containing 00} = 2$$

$$Q(2) = \# \text{ 2-bit strings not containing 00} = 3$$

Compute the sequence, $Q(20) = 17711$

$$T(n) = 2^{20} - 17711$$

13.61

$$(\sqrt{x} + 2x)^{10} = x^5 * (1 + 2\sqrt{x})^{10}$$

Coefficients of x^3 : 0

Coefficients of x^4 : 0

Coefficients of x^5 :

$$\binom{10}{0} * 2^0 = 1$$

Coefficients of x^6 :

$$\binom{10}{2} * 2^2 = 120 * 8 = 180$$

Coefficients of x^7 :

$$\binom{10}{4} * 2^4 = 3360$$

14.5

(a)

$$\binom{13}{3} = 286$$

(b)

$$\frac{15!}{5!5!5!} = 756756$$

(c)

$$\binom{10+10-1}{10-1} = \binom{19}{9} = 92378$$

(d)

$$\frac{9!}{3!3!3!} = 1680$$

14.14

(a)

Case1: 6 0's and 4 1's

$$\frac{10!}{6! 4!} = 210$$

Case2: 7 0's and 3 1's

$$\frac{10!}{7! 3!} = 120$$

Case3: 8 0's and 2 1's

$$\frac{10!}{8! 2!} = 45$$

Case4: 9 0's and 1 1's

$$\frac{10!}{9! 1!} = 10$$

Case5: all zero

1

$$\text{Total} = 210 + 120 + 45 + 10 + 1 = 386$$

(b)

$$2^5 + 5 * 2^4 = 112$$

(c)

$$2^5 + 5 * 2^4 = 112$$

(d)

$$112 * 2 - 2 = 222$$