Homework

8.1 + 8.2

1.) a.) ~~[struck out]~~ Each could be 35 different digits. $35 \cdot 7 = 245$

b.) $9 + (35 \cdot 6) = 219$

c.) $78 + 140 = 218$

d.) $78 + 36 = 114$

2.) a.) Could be 40 different characters.
~~[struck out]~~ 40^6

b.) Length 7 = ~~[struck out]~~ 40^7
Length 8 = ~~[struck out]~~ 40^8
Length 9 = ~~[struck out]~~ 40^9
* Add all = ~~[struck out]~~ $40^6 + 40^7 + 40^8 + 40^9$

3.) a.) 10 options · 5 days = 50

b.) $40 + 3 = 43$

c.) $30 + 3 + 3 = 36$

d.) 50 food · 2 drink = 100

8.2

2.) a.) $B^3 = (000)(001)(010)(011)(100)(101)(110)(111)$
$P^6 = (000000) / (010010) / (001100) | (011110) |$
(100001) (110011) (101101) (111111)

b.) $|P^6| = 8$

Homework

8.2+8.3

c.) $P^7 = (0000000), (1000001), (1100001), (1110111), (0110110), (0010100), (0001000), (1001001), (1010111), (1111111), (0111110), (0011100)$

$|P^7| = 12$

3.) a.) $B^9 =$
(000000000)
(000000001)
(000000010)
(000000011)
(000000100)
...
(111111111)

$E^{10} =$
(0000000000)
(0000000011)
(0000000110)
(0000001100)
(0000011000)
...
(1100000000)

* Bijection because their cardinality is the same.

b.) $|E^{10}| = 512$

8.3
1.) a.) $40 \cdot 39 \cdot 38 \cdot 37 \cdot 36 \cdot 35$

b.) $36 \cdot 39 \cdot 38 \cdot 37 \cdot 36 \cdot 35$

2.) $3 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 1536$

4.) $10 \cdot 2 \cdot 6 = 120$

Homework

8.4 + 8.5

1.) a.) $(2^7)^{25} = 2^{7 \cdot 25}$

b.) $= P(2^7, 2^5)$

3.) a.) $10! = 3628800$

b.) Decide left or right $= 2 \cdot 9!$

8.5

1.) a.) $(f) = (10100000100100100000)$

b.) yes. The parenthesis means order matters.

c.) $P(26, 5)$

2.) a.) (b, d, e, f)

b.) $\{a, e, d, b\}$

c.) There are $\binom{7}{4} = \frac{7!}{4! \cdot 3!} = 35$

3.) a.) No restrictions $= \binom{10}{1}$ or $10!$

b.) Starts with 001 so this leaves 7 locations which gives $\binom{7}{1}$

c.) $\binom{7}{1} + \binom{8}{1}$

d.) $\binom{10}{4}$

e.) $\binom{10}{6}$

Homework

8.5 + 8.6 + 8.7

8.) a.) $\binom{52}{5}$

b.) Since there are 4 categories and we need 2 of only one, that gives $2\binom{4}{1}$

c.) 5 cards and can be 2 categories. $\binom{4}{2}$ which gives $\binom{4}{2}$

d.) 13 possible ranks. This gives $\binom{13}{5}$. However, we want 4 of the same which is $4\binom{13}{5}$

e.) $\binom{13}{2} + \binom{13}{3}$

8.6

1.) a.) 37 choose 4

b.) P(37,4)

2.) a.) 120 choose 30

b.) P(30,5)

6.) a.) Since you choose from both Parties it is out of 100. = 100 choose 10.

8.7

2.) a.) $(4) - \binom{3}{1}$

b.) $\binom{13}{2} - \binom{11}{2}$

Homework

8.8+8.9

1.) a.) $6!$ since there are no repititions

b.) $8!/2!$ since there are 2 E's.

3.) a.) $\binom{52}{13}\binom{39}{13}\binom{26}{13}\binom{13}{1}$

b.) $\binom{52}{7}\binom{45}{7}\binom{38}{7}\binom{31}{7}$

4.) a.) $\binom{20}{5}$

b.) $\binom{20}{5}\binom{15}{4}\binom{11}{3}\binom{8}{2}\binom{6}{1}$

8.9

2.) a.) $\frac{15+6-1}{6-1} = \binom{20}{5}$

b.) $\frac{12+6-1}{6-1} = \binom{17}{5}$

4.) a.) $\frac{25+4-1}{4-1} = \binom{28}{3}$

b.) $\frac{20+4-1}{4-1} = \binom{23}{3}$

5.) a.) $\frac{50+8-1}{8-1} = \binom{57}{7}$

b.) $\frac{47+8-1}{8-1} = \binom{54}{7}$

c.) $\binom{57}{7} - \binom{54}{7}$

Homework

8.10 + 8.12

1.) a.) $\binom{62}{2}$

b.) 3^{60}

c.) $P(25,1) + P(20,1) + P(15,1)$

5.) a.) $\binom{25}{10}$

b.) $P(25,10)$

8.12

1.) a.) The first character is $A = \binom{3}{1}$
The last character is $A = \binom{3}{1}$
Both $= \binom{3}{2}$
$= 7\binom{3}{1} + \binom{3}{1} - \binom{3}{2}$

b.) $(2 \times 1^8) + (1^8 \times 2) + 1 = 5$

c.) $3 \cdot [(2 \cdot 1^8) + (1^8 \cdot 2) + 1] = 3 \cdot (2 + 2 + 1) = 15$

e.) $3 \cdot [(2 \cdot 1^7) + (1^7 \cdot 2) + 1] = 15$

f.) $3 \cdot [(2 \cdot 1^7) + 1] = 9$

2.) a.) Since it needs at least one 1, it can also have more. $= 10!$

b.) $10! + 10! - 5!$ (since it needs to subtract when it doesn't have both.)

c.) $2^5 + 1^1 - 2^4$
five 1's begins ⊙ both

Homework

8.12 + 8.13

4.) a.) Div by $2 = 60$
Div by $3 = 40$
Div by $5 = 24$
Div by $2 \cdot 3 = 20$
Div by $2 \cdot 5 = 12$
Div by $3 \cdot 5 = 8$
Div by $2 \cdot 3 \cdot 5 = 4$
$60 + 40 + 24 - 20 - 12 - 8 + 4 = 88$

8.13
1.) a.) $\binom{7}{3}(-3)^3(4)^4 \Rightarrow \binom{7}{3} \cdot (-27) \cdot (256)$

b.) $\binom{9}{2}(5)^2(-1)^7 \Rightarrow \binom{9}{2} \cdot (25) \cdot (-1)$

2.) a.) $(3+(-1))^n \Rightarrow 2^n$

b.) $(2+0)^n \Rightarrow 2^n$