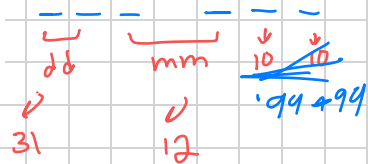


1) How many different combinations for 6 digits password where the first 4 digits are a date like ddmm?

$$31 \times 12 \times 10 \times 10 = 37,200$$

but this will include possibilities  
the days that don't exist so =



$$336 \times 99 + 99$$

2) How many different combinations of 8-digits pin code that contains exactly 3 similar digits.

3 Similar



$$(3 \text{ out of } 8) \times 10 + (9)^5 - (5 \text{ out of } 8)$$

or

$$9 \times 8 \times 7 \times 6 \times 5$$

we used one number for the similar but also exclude the similar.

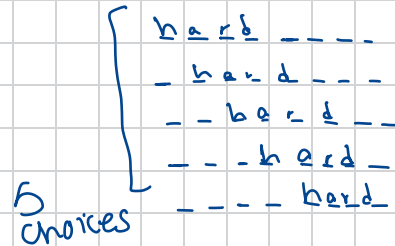
3) What is the entropy of an 8 character password which has the word "hard" in it?

Small, caps = 4 letters will be known.  
Symbol, number  
99

$$S = 5 \times \log_2 (99)^4$$

$$H = \log_2 (5 \times \log_2 (99)^4)$$

$$= 28.54$$



4) How many different combinations for 6 digits passwords where at least two categories should be used?

(right - wrong)

↳ Caps → 26  
↳ Small → 26  
↳ number → 10  
↳ special → 32

} 94

$(94)^6 =$  all possibilities

$$(94)^6 - \left( \underset{\substack{\downarrow \\ \text{all} \\ \text{small}}}{(26)^6} - \underset{\substack{\downarrow \\ \text{all} \\ \text{cap}}}{(26)^6} - \underset{\substack{\downarrow \\ \text{all} \\ \text{special}}}{(32)^6} - \underset{\substack{\downarrow \\ \text{all} \\ \text{num}}}{(10)^6} \right) = 690,944,522,880$$