The Rule of Sum

Sept 20/2018

When counting outcomes of multiple events together, we must consider how they relate to each other.

- (1) Fundamental Counting Principle
 - used when one event AND another occur together
 - product rule for independent events:

$$n(A \cap B) = n(A \text{ and } B) = n(A) \times n(B)$$

- (2) Rule of Sum
 - used when one event OR another occurs.

$$n(A \cup B) = n(A \text{ or } B) = n(A) + n(B) - n(A \cap B)$$

Note: For mutually exclusive events $n(A \cap B) = 0$

Sep 19-5:30 PM

Ex. A yearbook cover can show 7 students from a single team or club. The Rugby 7's team has 10 members, and student's council has 7 members. How many ways can students be arranged on the cover?

Note: Assume there is no overlap between them.

$$n(cover) = n(rughy) + n(SC) - n(RNSC)$$

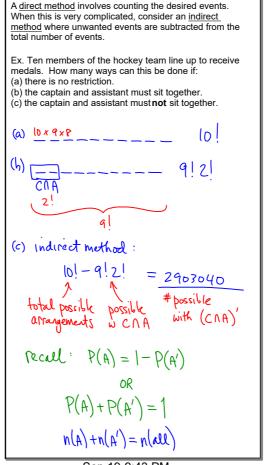
$$= 10 P_{7} + P_{7}$$

$$= \frac{10!}{(10-7)!} + 7!$$

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

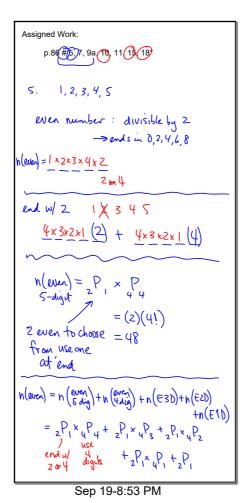
$$= 69840$$

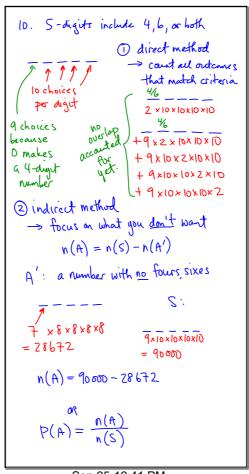
Sep 20-11:00 AM



Sep 19-8:40 PM

Sep 21-1:17 PM





Sep 25-12:41 PM

15. mutually exclusive
$$n(6-digit) + n(7d) + n(8d)$$
(a) no restriction (repeat chars)

$$= \frac{62 \times 62 \times ...}{62 \times 62 \times ...} = 62^{6} + 62^{7} + 62^{8}$$

(b) no repetition, order matters

$$62 \times 61 \times 60 \times 59 \times 58 \times 57$$
 $62 \stackrel{?}{}_{62} \stackrel{?}{}_{7}$
 $62 \stackrel{?}{}_{8}$

Sep 25-12:59 PM