

WARMUP

In your notes:

Of all the flashlights in a large shipment, 15% have a defective bulb, 10% have a defective battery and 5% have both defects. If you select one at random, find the probability that it has:

- 1) a defective bulb or defective battery 0.2
- 2) a good bulb or a good battery 0.95
- 3) a good bulb and a good battery. 0.8

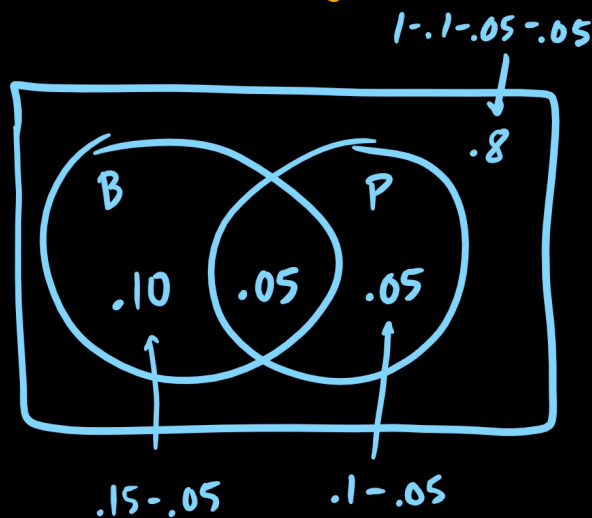
B = defective bulb

P = defective power (battery)

$$P(B) = .15$$

$$P(P) = .10$$

$$P(B \cap P) = .05$$



ex: A 6/46 lottery means you pick 6 numbers from 1-46. If all six are on your ticket you win 1st prize. If 5 out of 6 are on your ticket you win 2nd prize.

a) What is the probability of winning first prize?

6 good numbers

40 bad numbers

$$P(\text{1st prize}) = \frac{{}^6C_6}{{}^{46}C_6} = \frac{1}{9,366,819}$$

$$= 1.07 \times 10^{-7}$$

b) What is probability of winning 2nd prize?

$p(\text{2nd prize})$

5 out of 6 good numbers

1 out of 40 bad numbers

$$\frac{{}^6C_5 \cdot {}_{40}C_1}{{}^{46}C_6}$$

$$= \frac{6 \cdot 40}{9,366,819}$$

$$= \frac{6 \cdot 40}{9,366,819}$$

$$= 2.56 \times 10^{-5}$$

ex: You order 15 sandwiches from Ray's Breakfast Bistro. 5 have no cheese, 10 have cheese.

If you select 4 at random what is probability that:

that:

a) all four have cheese

b) exactly 2 have cheese

c) at least 1 has cheese

a) 4 out of 10 cheese

0 out of 5 no cheese

$$p(4 \text{ have cheese}) = \frac{{}^{10}C_4}{{}^{15}C_4}$$

$$= \frac{2}{13} \approx .154$$

b) 2 out of 10 cheese

2 out of 5 no cheese

$$\frac{{}^{10}C_2 \cdot {}^5C_2}{{}^{15}C_4} = \frac{30}{91}$$

$$\approx .330$$

c) $p(\text{at least 1 has cheese})$

$$= 1 - p(\text{none have cheese})$$

$$= 1 - \frac{{}^5C_4}{{}^{15}C_4} = \frac{272}{273}$$

$$\approx .996$$