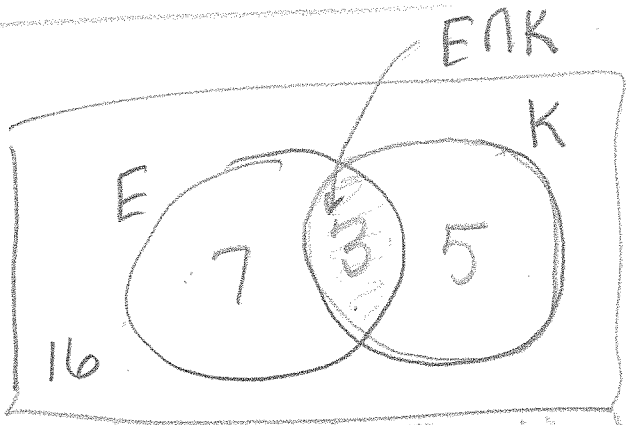
§4.2 Addition and Mult. Rules

The Addition Rule

$n(E) = 10$

$n(K) = 8$

$n = 31$ = Total class size



$n(K \cap E) = 3$ → In Kinesiology and English

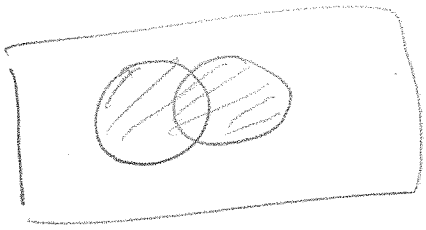
↑ Intersection

How many are taking an English or a Kinesiology class?

$P(E \text{ or } K) = P(E \cup K) = P(E) + P(K) - P(E \cap K)$

$= \frac{10}{31} + \frac{8}{31} - \frac{3}{31}$

$= \frac{15}{31} = .4839$



Contingency Table

		Not in Kin	
	K	$\bar{K}$	Total
E	3	7	10
Not in English $\bar{E}$	(5)	16	21
Total	8	23	31

a) $P(E) = \frac{8}{31}$

b) $P(\bar{E} \text{ or } K) = \frac{21}{31} + \frac{8}{31} - \frac{5}{31} = \frac{24}{31}$

$P(\bar{E} \text{ and } K) = P(\bar{E} \cap K) = \frac{5}{31}$

$P(E \text{ or } \bar{K}) =$

$P(E \text{ and } \bar{K}) =$

§4.3 The Addition Rule

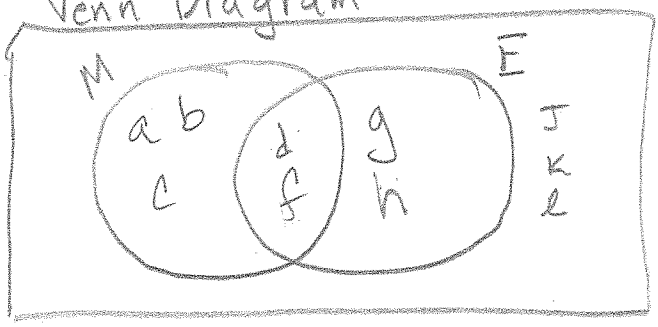
Addition rule.

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

A or $B = A \cup B$

A and $B = A \cap B$

Venn Diagram



If 10 people are asked

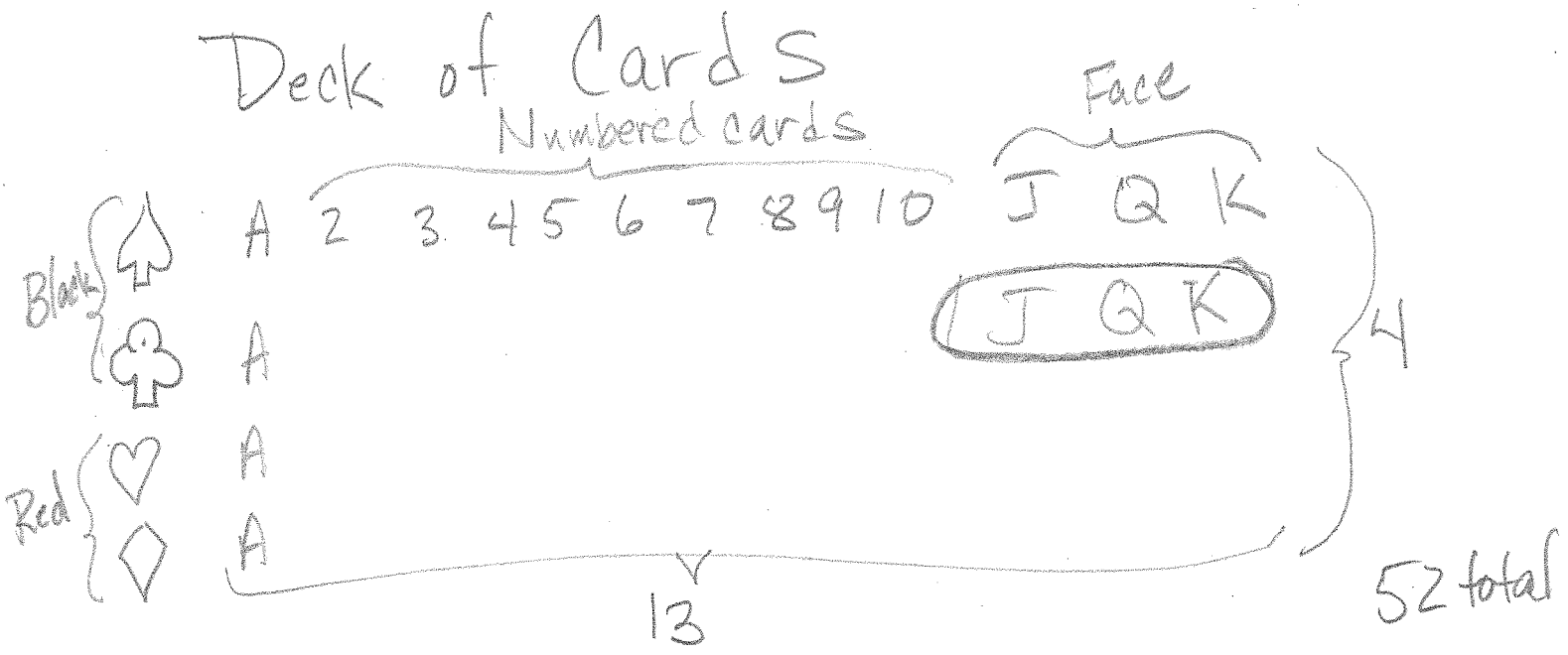
$P(M) = \frac{5}{10}$ = Prob. of randomly selecting someone who is taking Math

$P(E) = \frac{4}{10}$

$P(M \cap E) = \frac{2}{10}$

$P(M \cup E) = \frac{7}{10} = \frac{5}{10} + \frac{4}{10} - \frac{2}{10}$

Deck of Cards



$$P(\text{Face}) = \frac{12}{52} = \frac{3}{13}$$

$$P(\clubsuit) = \frac{13}{52} = \frac{1}{4}$$

And

$$P(\text{Face or } \clubsuit) = P(F) + P(\clubsuit) - P(F \cap \clubsuit)$$

$$= \frac{3}{13} + \frac{1}{4} - \frac{3}{52}$$

$$= \frac{12}{52} + \frac{13}{52} - \frac{3}{52} = \frac{12+13-3}{52} = \frac{22}{52}$$