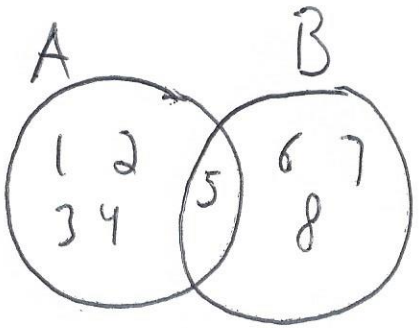
UNIVERSAL SET: $\{1, 2, 3, 4, 5, 6, 7, 8\}$

SET A: $\{1, 2, 3, 4, 5\}$

SET B: $\{5, 6, 7, 8\}$



$A \cap B = \{5\}$

$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$

$P(A) = \frac{5}{8}$

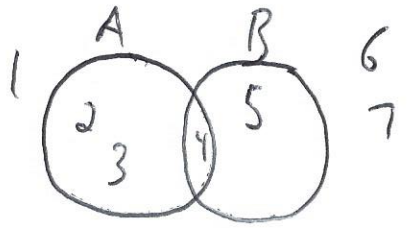
$P(B) = \frac{4}{8}$

$P(A \cap B) = \frac{1}{8}$

$P(A)$ Followed BY $P(B)$ → ONE AFTER THE OTHER IN SEQUENCE → $\left(\frac{5}{8}\right)\left(\frac{4}{8}\right) = \frac{20}{64} = \boxed{\frac{5}{16}}$

$\underbrace{P(A) \text{ OR } P(B)}_{\uparrow\ P(A \cup B)} = P(A) + P(B) - P(A \cap B)$

$\frac{5}{8} + \frac{4}{8} - \frac{1}{8} = \frac{8}{8} \rightarrow \boxed{1}$ ← 100% probability that number drawn from above will fall into either "A" or "B", which makes sense since M values exist outside the two circles.



UNIVERSAL SET: $\{1, 2, 3, 4, 5, 6, 7\}$

SET A: $\{2, 3, 4\}$

SET B: $\{4, 5\}$

SET $A \cap B$: $\{4\}$

SET $A \cup B$: $\{2, 3, 4, 5\}$

$P(A) = \frac{3}{7}$

$P(B) = \frac{2}{7}$

$P(A \cap B) = \frac{1}{7}$

$P(A)$ Followed by $P(B) = \left(\frac{3}{7}\right)\left(\frac{2}{7}\right) = \boxed{\frac{6}{49}}$

$P(A)$ or $P(B) = \frac{3}{7} + \frac{2}{7} - \frac{1}{7} = \boxed{\frac{4}{7}}$ ← NOT 100% BECAUSE SOME VALUES ARE OUTSIDE THE CIRCLES, SO ONLY $\frac{4}{7}$ probability A NUMBER DRAWN AT RANDOM WILL FALL WITHIN CIRCLES A OR B.

$P(A \cup B)$