Probability Notation

$f(x)$

E = event we roll even

roll 2, 4, 6

If E is an event, $P(E)$ is the probability that E occurs.

$$\frac{f}{N} = \frac{3}{6} = 0.5$$

$$P(E) = 0.5$$

The Special Addition Rule

If events A and B are mutually exclusive

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

A, B, C, ...

$$P(A \text{ or } B \text{ or } C \text{ or } \ldots) = P(A) + P(B) + P(C) + \ldots$$

Let A = event roll a 6 B = event roll a 5

$$P(A) = \frac{1}{6} \qquad P(B) = \frac{1}{6}$$

$$P(A \text{ or } B) = P(A) + P(B) = \frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

Size (acres)	Rel. frequency	Event
<10	0.106	A
10-49	0.281	B
50-179	0.300	C
180-499	0.167	D
500-999	0.068	E
1000-1999	0.042	F
≥2000	0.036	G
	Total: 1	

What is probability b/w 180 and 1999 acres?

$P(D \text{ or } E \text{ or } F) = P(D) + P(E) + P(F)$

$= 0.167 + 0.068 + 0.042$

$= 0.277$

27.7%

The Complementation Rule

The Complement of E is (NOT E)

$P(E)$??? $P(\text{NOT } E)$

For any E,

$$P(E) = 1 - P(\text{not } E)$$

a) < 2000 acres

$P(A) + P(B) + \ldots P(F)$

$1 - P(G) = 1 - 0.036$

$= 0.964$

b) ≥ 50 acres

$P(C) + P(D) + \ldots + P(G)$

$1 - P(\text{less than } 50 \text{ acres})$

$1 - P(A \text{ or } B)$

$1 - [P(A) + P(B)]$

$1 - (0.106 + 0.281)$

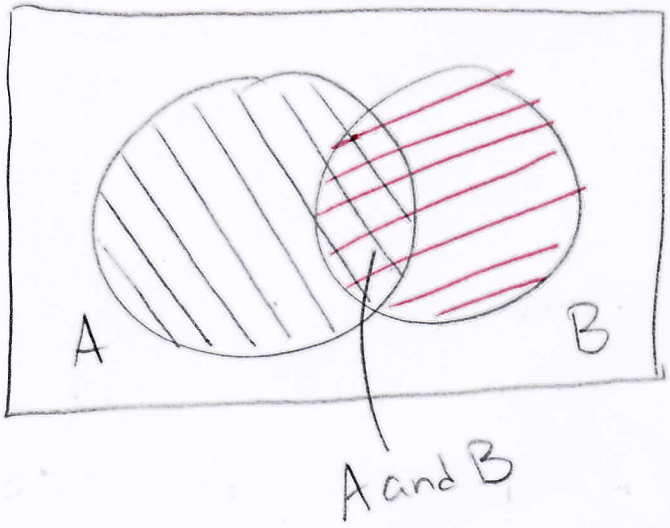
$1 - 0.387$

0.613

The General Addition Rule

If A and B are any two events, then

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



Note: For mutually exclusive events A, B

$P(A \text{ and } B) = 0$

Consider A: roll is greater than 4

B: roll is even

$P(A \text{ or } B) = \frac{4}{6} = \frac{2}{3}$

1 (2) 3 (4) (5) (6)

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

$= \frac{2}{6} + \frac{3}{6} - \frac{1}{6}$

$= \frac{4}{6} = \frac{2}{3}$