

5. Three channels, 6, 8, and 10, have quiz shows, comedies, and dramas.

Type of Show	Chan 6	Chan 8	Chan 10	Totals
Quiz Show	5	2	1	8
Comedy	3	2	7	12
Drama	4	4	2	10
Totals	12	8	10	30

Use the table above to answer the following questions:

- (a) What is the probability that the show is a Quiz Show or it is a show on Channel 8?
- (b) What is the probability that the show is a Drama or a Comedy?
- (c) What is the probability that the show is a Comedy given that it is on Channel 10?
- (d) If two shows are randomly selected, what is the probability that they are both Quiz Shows?

$P(A \text{ or } B) = P(A) + P(B)$ if events are mutually exclusive
 $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ if events are NOT mutually exclusive

$P(A \text{ and } B) = P(A) * P(B)$ if events are independent
 $P(A \text{ and } B) = P(A) * P(B|A)$ if events are dependent

$P(B|A) = P(A \text{ and } B) / P(A)$ conditional probability

(a) $P(\text{Quiz or Channel 8}) = P(\text{Quiz}) + P(\text{Channel 8}) - P(\text{Quiz and Channel 8})$
 $= 8/30 + 8/30 - 2/30 = 14/30 \sim 0.467$

(b) $P(\text{Drama or Comedy}) = P(\text{Drama}) + P(\text{Comedy})$
 $= 10/30 + 12/30 = 22/30 \sim 0.733$

(c) $P(\text{Comedy} | \text{Channel 10}) = 7/10$ (isolating on Channel 10 column)
 $= 7/30 / 10/30 = 7/10 = 0.700$

(d) $P(\text{Quiz and Quiz}) = 8/30 * 7/29 = 28/435 \sim 0.064$