Probability: OR

Objectives

1. Calculate probabilities using the Addition Rule
2. Calculate the complement of an event
3. Calculate "at least" probabilities
4. Calculate the odds of an event

AND vs. OR

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In this section, we will focus on the word *or*, which will mean adding probabilities.

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$$= \frac{1}{3}$$

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In the previous example, the events “rolling a 4” and “rolling a 5” were *mutually exclusive*.

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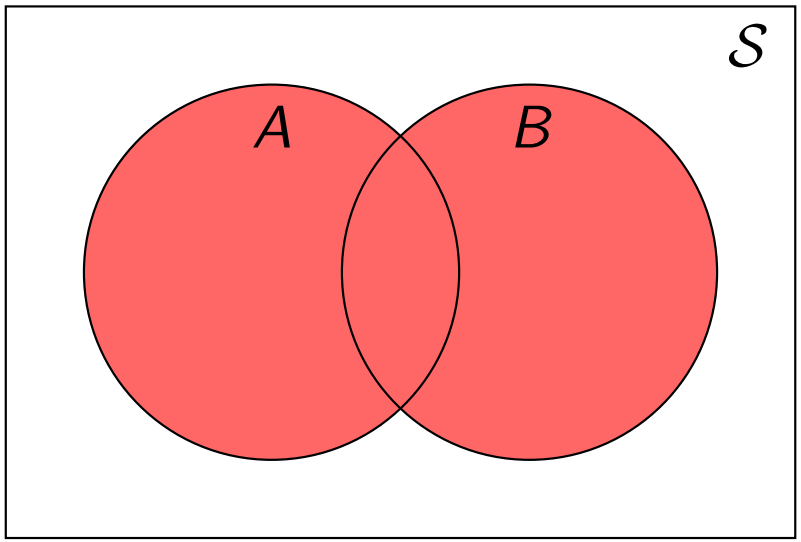
To find the `OR` probability of two mutually exclusive events, use the Addition Rule:

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

Venn Diagram – OR



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

Example 2

The table below lists the types and numbers of cars sold at Lemon Autos along with their ages. Find each probability.

	0–2	**3–5**	**6–10**	**Over 10**	**Total**
Foreign	37	21	12	30	100
Domestic	35	23	11	31	100
Total	72	44	23	61	200

(a) If a car is randomly selected, what is the probability that the car is 0–2 years old or over 10 years old?

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(b) If a car is randomly selected, what is the probability that the car is 3–5 years old or a domestic car?

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Example 2 $P(3-5$ or domestic$)$

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$$P(3-5 \text{ years old or domestic}) = \frac{121}{200}$$

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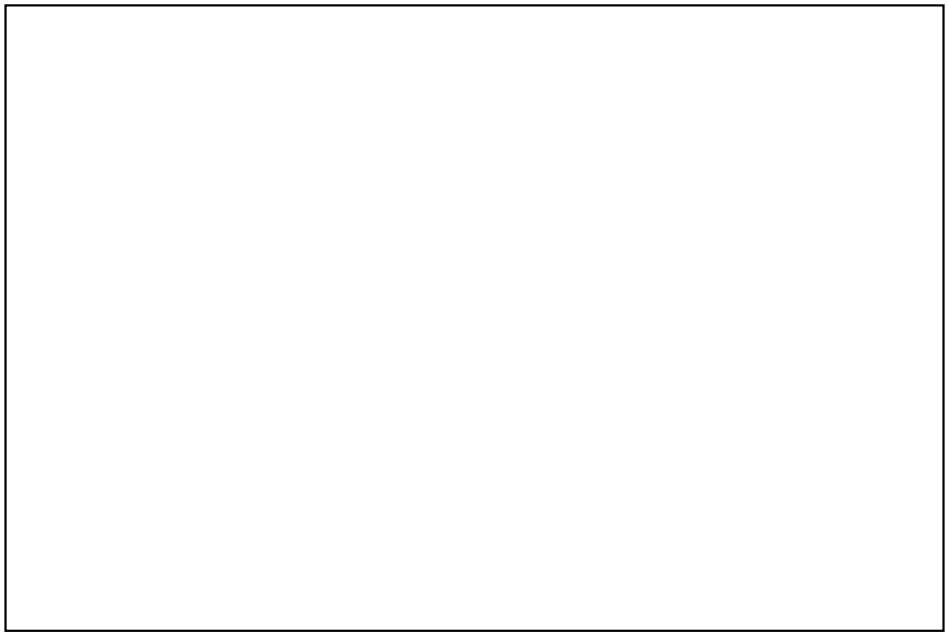

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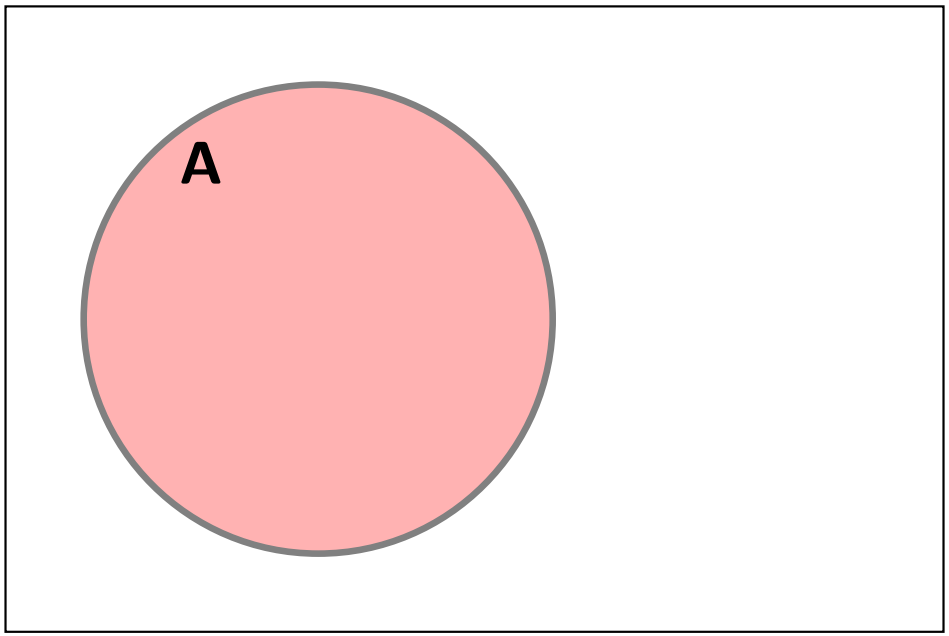

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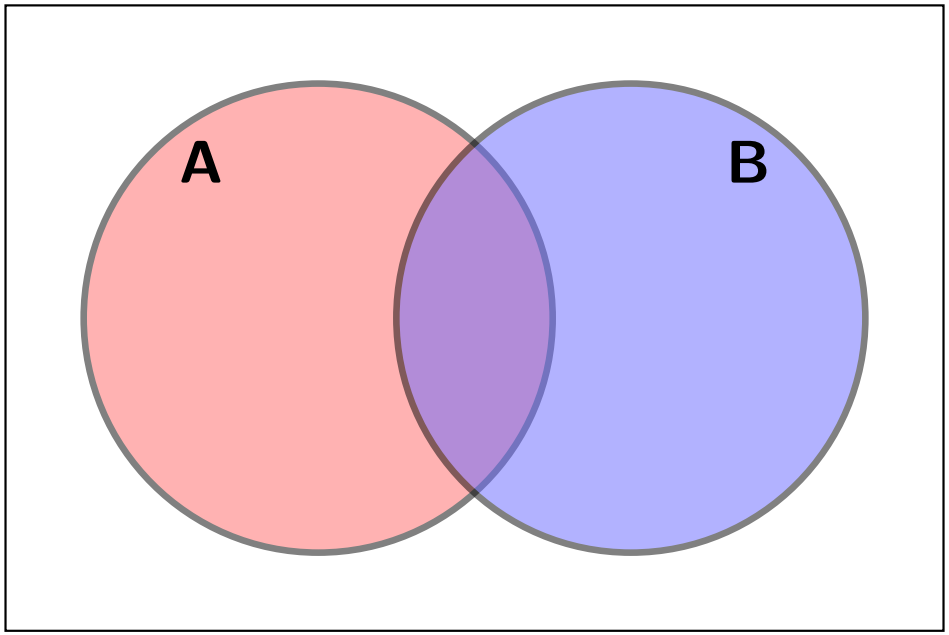

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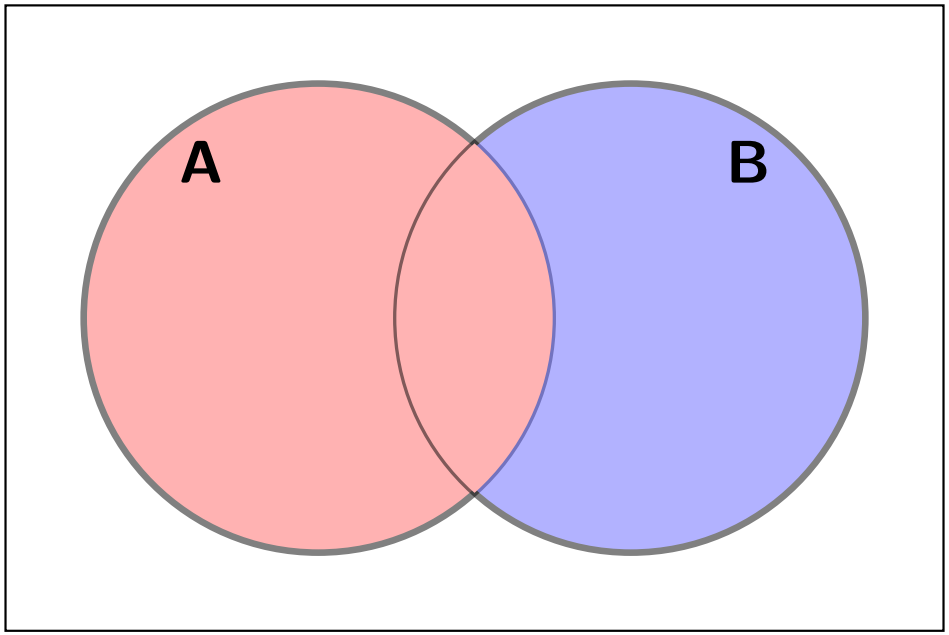

Venn Diagram of Example 2b

	0–2	3–5	6–10	Over 10	Total
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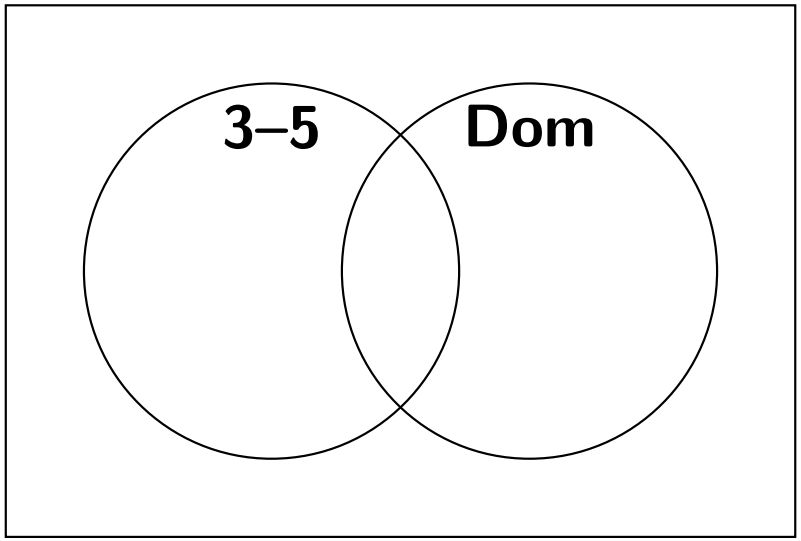

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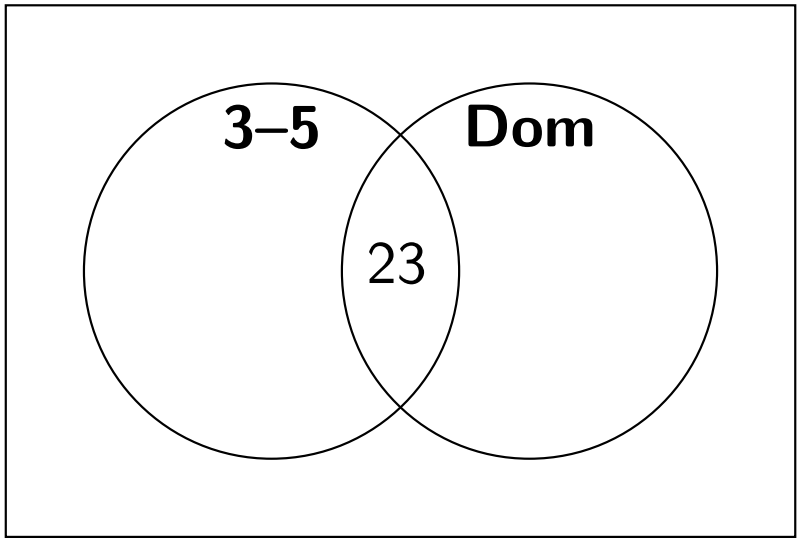

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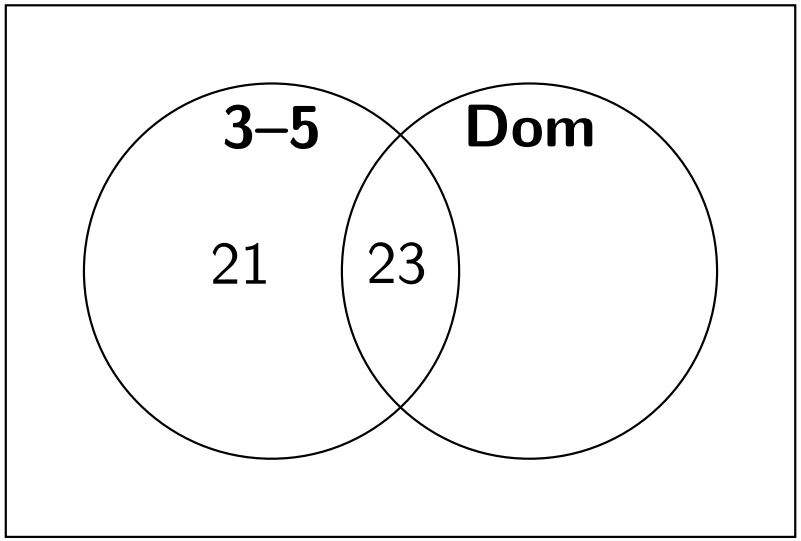

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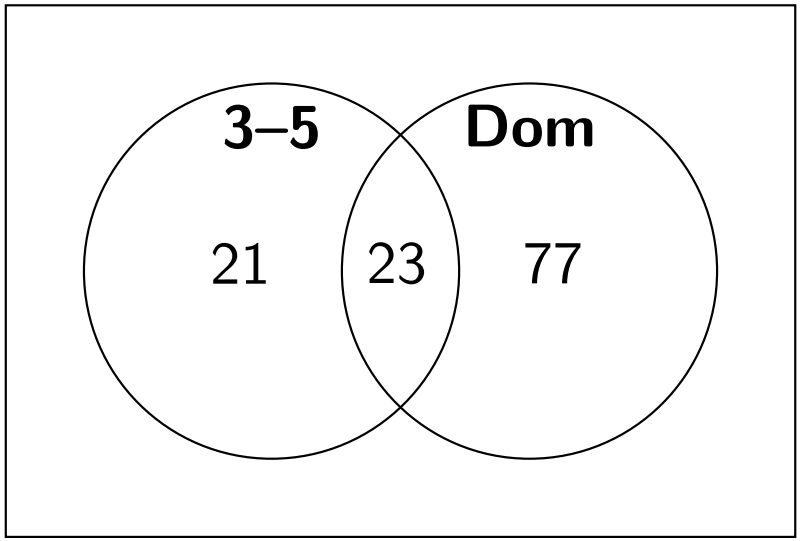

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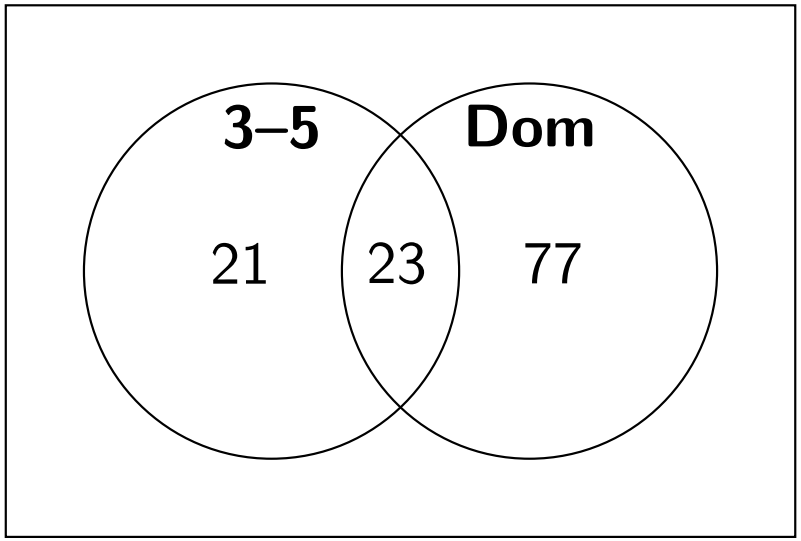

$$23 + 21 + 77 = 121$$

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

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$$= \frac{16}{52}$$

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$$= \frac{32}{52}$$

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$$= \frac{12}{52} + \frac{26}{52} - \frac{6}{52}$$

$$= \frac{32}{52}$$

$$= \frac{8}{13}$$

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