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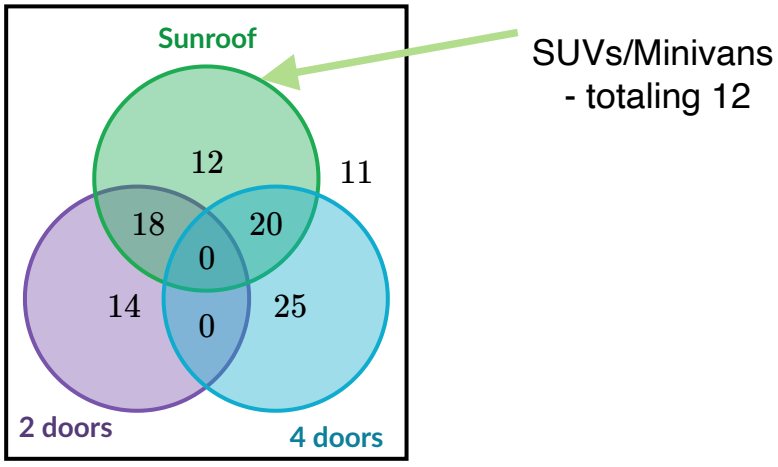
Math • AP®/College Statistics • Probability • Conditional proba

Calculate conditional probabili

AP.STATS: VAR-4 (EU), VAR-4.D (LO), VAR-4.D.1 (EK)
CCSS.Math: HSS.CP.B.6

A business owner noted the features of the 100 cars parked at the busines



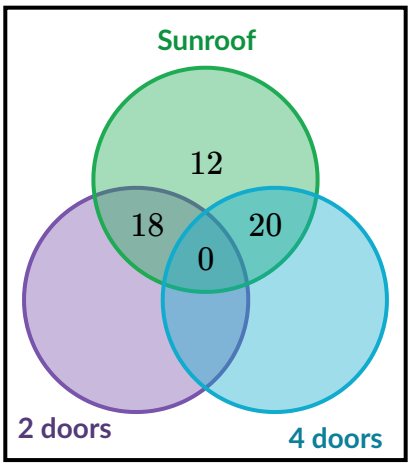
Given that a randomly selected car has a sunroof, find the probability the

$P\,(4 \text{ doors} \mid \text{sunroof}) =$ 0.80

1 / 3

Intuitive way

The condition is that the car has a sunroof, so we should only l
diagram:



So we have $12 + 18 + 0 + 20 = 50$ cars under the condition the probability that a car in that group had 4 doors:

$$P\left(4 \text{ doors} \mid \text{sunroof}\right) = \frac{20 + 0}{50} = \frac{2}{5}$$

2 / 3

Using conditional probability formula

$$P\left(4 \text{ doors} \mid \text{sunroof}\right) = \frac{P\left(4 \text{ doors and sunroof}\right)}{P\left(\text{sunroof}\right)}$$

$$= \frac{\frac{20}{100}}{\frac{12 + 18 + 20}{100}}$$

$$= \frac{20}{12 + 18 + 20} = \frac{20}{50} = \frac{2}{5}$$

3 / 3

The answer:

$$P\left(4 \text{ doors} \mid \text{sunroof}\right) = \frac{2}{5}$$

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