#34 Conditional Probability

**You randomly draw a card from a standard deck of playing cards. Let $A$ be the event that the card is an ace, let $B$ be the event that the card is black, and let $C$ be the event that the card is a club. Find the specified probability as a fraction.**

**8.** $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{\frac{1}{26}}{\frac{1}{2}} = \frac{1}{26} \cdot \frac{2}{1} = \frac{1}{13}$

$P(A) = \frac{4}{52} = \frac{1}{13}$

$P(B) = \frac{1}{2}$ $P(A \cap B) = \frac{2}{52} = \frac{1}{26}$

**9.** $P(B|A)$

**10.** $P(A|C)$

**11.** $P(C|A)$

**12.** $P(B|C)$

**13.** $P(C|B) = \frac{n(C \cap B)}{n(B)} = \frac{13}{26} = \frac{1}{2}$

**14.** A botanist studied the effect of a new fertilizer by choosing 100 orchids and giving 70% of these plants the fertilizer. Of the plants that got the fertilizer, 40% produced flowers within a month. Of the plants that did not get the fertilizer, 10% produced flowers within a month.

**a.** Use the given information to complete the two-way frequency table.

| | Received fertilizer | Did not receive fertilizer | Total |
|---|---|---|---|
| Did not flower in one month | | 10 | |
| Flowered in one month | 40 | | |
| Total | 70 | | 100 |

**b.** To the nearest percent, what is the probability that an orchid that produced flowers got fertilizer?

**c.** To the nearest percent, what is the probability that an orchid that got fertilizer produced flowers?

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**15.** At a school fair, a box contains 24 yellow balls and 76 red balls. One-fourth of the balls of each color are labeled "Win a prize." Match each description of a probability with its value as a percent.

Y = yellow
R = Red
W = "Win Prize"

P(Y

A. The probability that a randomly selected ball labeled "Win a prize" is yellow ____ 76%

B. The probability that a randomly selected ball labeled "Win a prize" is red ____ 25%

C. The probability that a randomly selected ball is labeled "Win a prize" and is red A 24%

D. The probability that a randomly selected yellow ball is labeled "Win a prize" ____ 19%

A.) $P(Y|W) = \frac{n(Y \cap W)}{n(W)} = \frac{6}{25} \approx 24\%$

$\frac{1}{4}(24) = 6$

$\frac{1}{4}(76) = 19$

**16.** A teacher gave her students two tests. If 45% of the students passed both tests and 60% passed the first test, what is the probability that a student who passed the first test also passed the second?

$T_1$ = Test 1 Passed  $T_2$ = Test Passed

$P(T_2|T_1) = \frac{P(T_1 \cap T_2)}{P(T_1)}$

$P(T_1) = 0.6$

$P(T_1 \cap T_2) = 0.45$

$\frac{0.45}{0.6} = 0.75$

**17.** You randomly select two marbles, one at a time, from a pouch containing blue and green marbles. The probability of selecting a blue marble on the first draw and a green marble on the second draw is 25%, and the probability of selecting a blue marble on the first draw is 56%. To the nearest percent, what is the probability of selecting a green marble on the second draw, given that the first marble was blue?

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