

$$P(A \cap B) = P(A) \times P(B|A)$$

Key

### Section 3.5: Conditional Probability Worksheet

- Valerie draws a card from a well shuffled deck of 52 playing cards. Then she draws another card from the deck without replacing the first card.

(A) What is the probability both cards are spades?  $\frac{13}{52} \times \frac{12}{51} = \frac{1}{17}$

(B) What is the probability that one card is a Jack and the other card is a 5?  $\frac{4}{52} \times \frac{4}{51} = \frac{4}{663}$
- Andrea is a very good student. The probability that she studies and passes her mathematics test is  $\frac{17}{20}$ . If the probability that Andrea studies is  $\frac{15}{16}$ , find the probability that Andrea passes her mathematics test, given that she has studied.  $P(P|S) = \frac{P(S \cap P)}{P(S)} = \frac{\frac{17}{20}}{\frac{15}{16}} = \frac{68}{75}$
- The probability that Janice smokes is  $\frac{3}{10}$ . The probability that she smokes and develops lung cancer is  $\frac{4}{15}$ . Find the probability that Janice develops lung cancer, given that she smokes.  $P(C|S) = \frac{\frac{4}{15}}{\frac{3}{10}} = \frac{8}{9}$
- The probability that a plane will leave St. John's on time is 0.70. The probability that a plane will arrive in Ottawa on time given that it left St. John's on time is 0.80. Determine the probability that a plane will leave St. John's on time and arrive in Ottawa on time.  $P(S \cap O) = (0.80)(0.70) = 0.56$
- In Exton School, 60% of the boys play baseball and 40% percent of those that play baseball also play football. What percent of boys play baseball and football.  $P(B \cap F) = (0.6)(0.4) = 0.24 = 24\%$
- The probability that Sue will go to Mexico in the winter and to France in the summer is 0.40. The probability that she will go to Mexico in the winter is 0.60. Find the probability that she will go to France this summer, given that she just returned from her winter vacation in Mexico.  $P(F|M) = \frac{0.4}{0.6} = \frac{2}{3}$
- If the weather is nice, Mark is 85% likely to go for a run. If the weather is rainy, he is only 40% likely to run. The weather forecast tomorrow indicates a 30% chance of rain. Using a tree diagram, determine the probability Mark will run.

