b) $P(\text{Dem.} \mid \text{favor death pen.}) = \dfrac{P(\text{Dem.} \cap \text{favor death pen.})}{P(\text{favor death penalty})} = \dfrac{0.12}{0.62} \approx 0.194$

Consider only the Favor column. The probability of being a Democrat is 0.12 out of a total of 0.62 for that column.

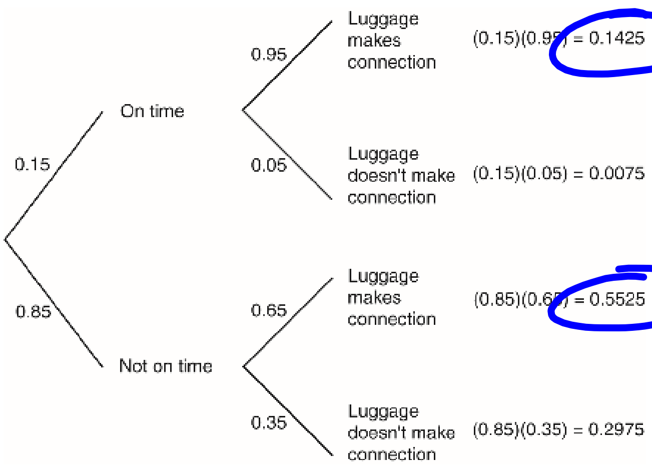
26. Luggage.

No, the flight leaving on time and the luggage making the connection are not independent events. The probability that the luggage makes the connection is dependent on whether or not the flight is on time. The probability is 0.95 if the flight is on time, and only 0.65 if it is not on time.

27. Graduation.

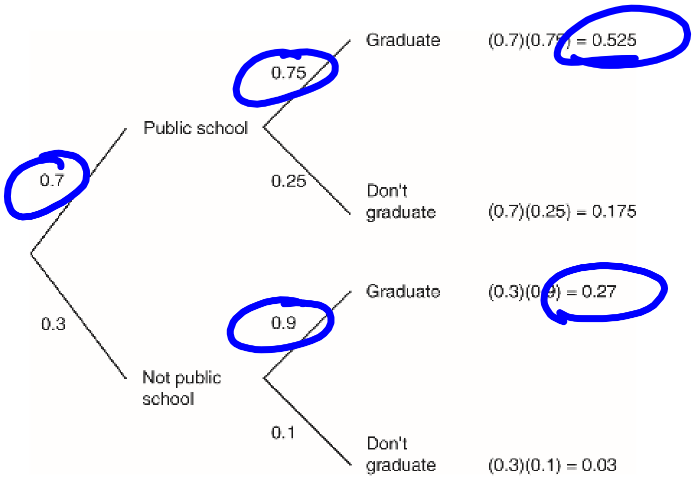
Yes, there is evidence to suggest that a freshman's chances to graduate depend upon what kind of high school the student attended. The graduation rate for public school students is 75%, while the graduation rate for others is 90%. If the high school attended was independent of college graduation, these percentages would be the same.

28. More luggage.



$$P(\text{Luggage}) = P(\text{On time} \cap \text{Luggage}) + P(\text{Not on time} \cap \text{Luggage})$$
$$= (0.15)(0.95) + (0.85)(0.65) = 0.695$$

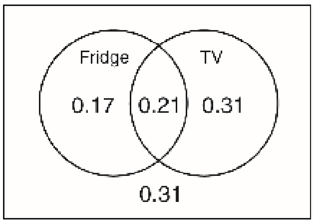
29. Graduation revisited.



$$P(\text{Graduate}) = P(\text{Public} \cap \text{Graduate}) + P(\text{Not public} \cap \text{Graduate})$$
$$= (0.7)(0.75) + (0.3)(0.9)$$
$$= 0.795$$

30. Amenities.

Construct a Venn diagram.



a) $P(\text{TV} \cap \text{no refrigerator})$
$= P(\text{TV}) - P(\text{TV} \cap \text{refrigerator})$
$= 0.52 - 0.21 = 0.31$

Or, from the Venn: 0.31
(the region inside the TV circle, yet outside the Fridge circle)

b) $P(\text{refrigerator or TV, but not both}) =$
$= [P(\text{refrigerator}) - P(\text{refrigerator} \cap \text{TV})] + [P(\text{TV}) - P(\text{refrigerator} \cap \text{TV})]$
$= [0.38 - 0.21] + [0.52 - 0.21] = 0.48$

This problem is much easier to visualize using the Venn diagram. Simply add the probabilities in the two regions for Fridge only and TV only.
$P(\text{refrigerator or TV, but not both}) = 0.17 + 0.31 = 0.48$

c) $P(\text{neither TV nor refrig.})$ $= 1 - P(\text{either TV or refrigerator})$
$= 1 - [P(\text{TV}) + P(\text{refrigerator}) - P(\text{TV} \cap \text{refrigerator})]$
$= 1 - [0.52 + 0.38 - 0.21]$
$= 0.31$

Or, from the Venn: 0.31 (the region outside the circles)

Name ______________________________ ***Statistics: Chapter 14 Tree Diagrams***

Pg. 19

1. In an elementary classroom, there are 11 girls and 9 boys. The teacher is going to randomly choose two students to go to the cafeteria to pick up the snacks ordered for today's party. Is it more likely that she sends two girls, two boys, or one of each?

   a. Complete the tree diagram below.

1st pick — 2nd pick

- $\frac{11}{20}$ girl
  - $\frac{10}{19}$ girl → $P(\text{girl and girl}) = \left(\frac{11}{20}\right)\left(\frac{10}{19}\right) = 0.289$
  - $\frac{9}{19}$ boy → $P(\text{Girl and Boy}) = \left(\frac{11}{20}\right)\left(\frac{9}{19}\right) = .2605$
- $\frac{9}{20}$ boy
  - $\frac{11}{19}$ girl → $P(\text{Boy and Girl}) = \left(\frac{9}{20}\right)\left(\frac{11}{19}\right) = .2605$
  - $\frac{8}{19}$ boy → $P(\text{Boy and Boy}) = \left(\frac{9}{20}\right)\left(\frac{8}{19}\right) = .1895$

   b. Use the tree diagram to find probability that the teacher picks…

   i. two girls, $P(G \cap G)$. .289

   ii. two boys, $P(B \cap B)$. .1895

   iii. one student of each sex. .2605 + .2605 = .521

   iv. a girl second, given she already picked a boy first, $P(G \mid B)$. 11/19

   v. a boy second, given she picked a girl first, $P(B \mid G)$. 9/19

2. Draw this tree diagram again for a class with 15 girls and 7 boys.

- 15/22 G
  - 14/21 G $P(G \cap G) = \left(\frac{15}{22}\right)\left(\frac{14}{21}\right) = .4545$
  - 7/21 B $P(G \cap B) = \left(\frac{15}{22}\right)\left(\frac{7}{21}\right) = .2273$
- 7/22 B
  - 15/21 G $P(B \cap G) = \left(\frac{7}{22}\right)\left(\frac{15}{21}\right) = .2273$
  - 6/21 B $P(B \cap B) = \left(\frac{7}{22}\right)\left(\frac{6}{21}\right) = .0909$