ICM Review of Lessons 7.4, 7.5 & 7.6 Name ____________________

Solve each of the following. Show work (when possible)!!! Attach separate paper if necessary.

Lesson 7.4

1. Two cards are selected at random without replacement from a well-shuffled standard 52-card deck.
   A. Find the probability that both cards are red.

   26 red cards
   52 total

   $$P(2\text{red}) = \frac{26 c 2}{52 c 2} = \frac{25}{102} \text{ or } .245$$

   B. Find the probability that at least one of the cards is black.

   $$1 - P(2\text{ red}) = 1 - .245 = .755$$

2. A jar contains six red, five yellow, and four green candies.
   a) If one candy is selected at random, what is the probability that it is yellow? $5/15 = 1/3$

   b) If two are selected without replacement, what is the probability that both are red?

   $$\frac{6}{15} \cdot \frac{5}{14} = \frac{1}{7} \quad \text{OR} \quad \frac{6 c 2}{15 c 2} = \frac{15}{105} = 1/7$$

   c) If three are selected without replacement, what is the probability that two are red? (+ 1 is not)

   $$\frac{6c2 \cdot 9c1}{15 c 3} = \frac{15 \cdot 9}{455} = \boxed{\frac{27}{91}} \text{ or } \boxed{.297}$$

   d) If three are selected without replacement, what is the probability that at least one is green?

   $$1 - P(\text{none green}) \quad 1 - \frac{11 c 3}{15 c 3} = \frac{58}{91}$$

3. In a group of 20 ballpoint pens on a shelf in a department store, 2 are known to be defective. If a customer selects 3 of these pens, what is the probability that
   a) At least 1 is defective?

   $$1 - P(\text{none def}) = 1 - \frac{18 c 3}{20 c 3} = 1 - \frac{68}{95} = \frac{27}{95}$$

   b) No more than 1 is defective?

   * $$P(0 \text{ or } 1 \text{ def}) = \frac{18c3 + 2c1 \cdot 18c2}{20 c 3} = \frac{816 + 2 \cdot 153}{1140}$$

   ↑ add

   $$= \frac{1122}{1140} = \frac{187}{190} \text{ or } .984$$

Lesson 7.5

4. Of 320 male and 280 female employees at a company, 160 of the men and 190 of the women are on flex-time (flexible working hours). An employee is selected at random.
   a) Find the probability that a female employee is on flex time.

   $$\frac{\text{females on flex}}{\text{females}} = \frac{190}{280} = \frac{19}{28} \text{ or } .679$$

   b) Find the probability that an employee is a male, given that they are not on flex time.

   males not on flex 320 − 160

   $$\frac{\text{males not on flex}}{\text{people not on flex}} = \frac{160}{250}$$

   $$= \frac{16}{25} \text{ or } .64$$

   160
   +90
   250

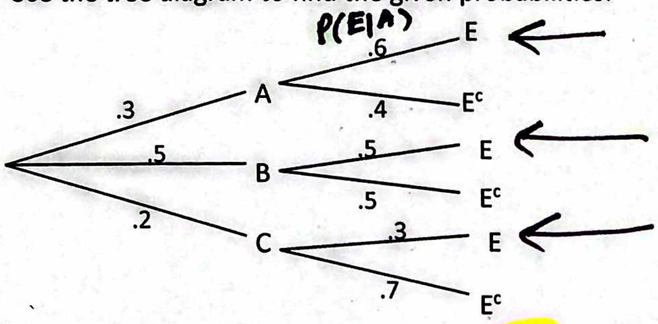
$$P(E)+P(F)-P(E\cap F)=P(E\cup F)$$
$$.35+.55-x=.7$$
$$x=.2$$

5. Let E and F be two events and suppose P(E) = .35, P(F) = .55, and P(E ∪ F) = .7.

a) Find P(E ∩ F). $= .2$

b) Find P (E| F). $\dfrac{P(E\cap F)}{P(F)} = \dfrac{.2}{.55} \approx .364$

6. Use the tree diagram to find the given probabilities.



a) P(A ∩ E) $.3 * .6 = .18$

b) P(E| A) $.6$

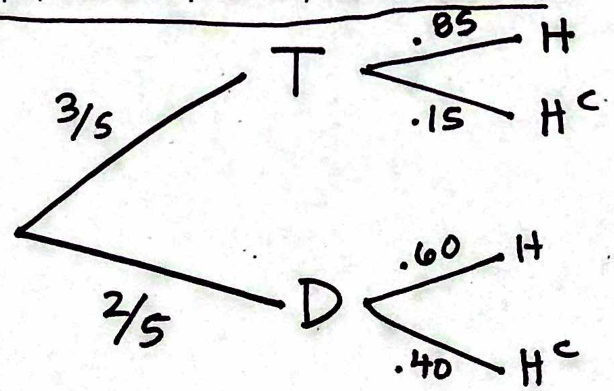
c) P(E) $.3*.6 + .5*.5 + .2*.3 = \boxed{.49}$

d) P(E^c) $1 - .49 = .51$

Lesson 7.6

7. For question 6 above, find P(B| E). $= \dfrac{P(B\cap E)}{P(E)} = \dfrac{.5*.5}{.49} = \dfrac{.25}{.49} = .510$

8. Bill commutes to work. He takes the train 3/5 of the time and drives 2/5 of the time. If he takes the train, he gets home by 6:30 pm 85% of the time. If he drives, then he gets home by 6:30 pm 60% of the time. If Bill gets home by 6:30 pm, what is the probability that he drove to work?



$$P(D|H)=\frac{P(D\cap H)}{P(H)}$$

$$=\frac{\frac{2}{5}(.60)}{\frac{3}{5}(.85)+\frac{2}{5}(.60)}$$

$$=\frac{.24}{.75}=.32$$