Packet Unit 6 Probability Honors CCM2

HW Day 9 & 10: Unit 6 Probability Review **Show work to receive credit!!**

Solve the problem.

1. Lisa has 4 skirts, 8 blouses, and 2 jackets. How many 3-piece outfits can she put together assuming any piece goes with any other?

A) 32 B) 64 C) 14 D) 128

$\frac{4}{S} \cdot \frac{8}{B} \cdot \frac{2}{J}$

2. A combination lock has 20 numbers on it. How many different 3-digit lock combinations are possible if no digit can be repeated?

A) 2280 B) 6840 C) 1140 D) 380

$20P_3$

order matters because a combination is like a password

3. A church has 10 bells in its bell tower. Before each church service 3 bells are rung in a sequence. No bell is rung more than once. How many sequences are there?

A) 720 B) 604,800 C) 120 D) 1,209,600

$10P_3$ a sequence is an order so use permutation

4. A hamburger shop sells hamburgers with cheese, relish, lettuce, tomato, onion, mustard or ketchup. How many different hamburgers can be concocted using any 5 of the extras?

A) 1260 B) 2520 C) 42 D) 21

$7C_5$

5. You randomly select one card from a standard 52-card deck. Then, the probability of not selecting a king, P(not king) =

A) 1 - P(king) B) 1 + P(king) C) P(king) D) - P(king)

6. The physics department of a college has 7 male professors, 11 female professors, 16 male teaching assistants, and 8 female teaching assistants. If a person is selected at random from the group, find the probability that the selected person is a teaching assistant or a female.

A) $\frac{4}{7}$ B) $\frac{9}{14}$ C) $\frac{5}{6}$ D) $\frac{19}{42}$

$P(TA) + P(F) - P(TA + F)$

$\frac{24}{42} + \frac{19}{42} - \frac{8}{42} = \frac{35}{42} = \frac{5}{6}$

7. In a class of 50 students, 32 are Democrats, 16 are business majors, and 6 of the business majors are Democrats. If one student is randomly selected form the class, find the probability of choosing a Democrat or a business major.

A) $\frac{1}{5}$ B) $\frac{24}{25}$ C) $\frac{21}{25}$ D) $\frac{27}{25}$

$P(\text{Dem or Bus}) = P(\text{Dem}) + P(\text{Bus}) - P(\text{Dem} + \text{Bus})$

$\frac{32}{50} + \frac{16}{50} - \frac{6}{50} = \frac{42}{50} = \frac{21}{25}$

8. Use the spinner shown, find the probability that the arrow will land on an odd number. Assume that it is equally probable to land on any of the numbered spaces. If the pointer lands on the border, spin again.

A) $\frac{2}{5}$ B) $\frac{3}{5}$ C) 1 D) 0

9. A die is rolled. The sample space of equally likely outcomes is (1, 2, 3, 4, 5, 6). Find the probability of getting a 6.

A) $\frac{1}{6}$ B) 1 C) 6 D) 0

10. You are dealt one card from a standard 52-card deck. Find the probability of being dealt a picture card. = face card = J, Q, K

A) $\frac{3}{52}$ B) $\frac{1}{13}$ C) $\frac{3}{26}$ D) $\frac{3}{13}$

$\frac{12}{52} =$

11. A fair coin is tossed two times in succession. The sample space of equally likely outcomes is (HH, HT, TH, TT). Find the probability of getting the same outcome on each toss.

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) 1

$\frac{2}{4} =$

12. You randomly select one card from a standard 52-card deck. Find the probability of selecting an ace or a 9. mutually exclusive

A) $\frac{2}{13}$ B) $\frac{13}{2}$ C) $\frac{5}{13}$ D) 10

$\frac{4}{52} + \frac{4}{52} = \frac{8}{52}$

13. A spinner is used for which it is equally probable that the pointer will land on any one of six regions. Three of the regions are colored red, two are green, and one is yellow. If the pointer is spun three times, find the probability it will land on green every time.

A) $\frac{2}{27}$ B) $\frac{1}{9}$ C) $\frac{1}{18}$ D) $\frac{1}{27}$

$\frac{2}{6} \cdot \frac{2}{6} \cdot \frac{2}{6}$

1st spin 2nd spin 3rd spin

14. You are dealt one card from a standard 52-card deck. Then the card is replaced in the deck, the deck is shuffled, and you draw again. Find the probability of getting a picture card the first time and a club the second time.

J, Q, K "face cards"

A) $\frac{3}{13}$ B) $\frac{1}{13}$ C) $\frac{3}{52}$ D) $\frac{1}{4}$

$\frac{12}{52} \cdot \frac{13}{52}$

picture card clubs

15. Two dice are rolled. The numbers are multiplied. What is the probability of getting a 12?

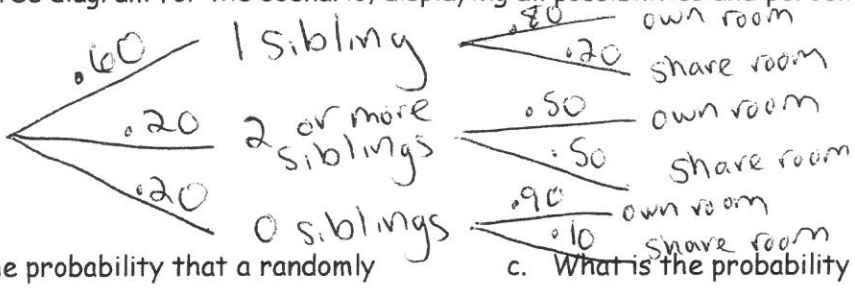
A) $\frac{1}{9}$ B) $\frac{1}{12}$ C) $\frac{1}{36}$ D) $\frac{1}{4}$

4/36

	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

12. A student conducted a survey at school and found the following:
    - Of the respondents, 60% have 1 sibling and 20% have 2 or more siblings
    - Of the respondents with 0 siblings, 90% have their own room
    - Of the respondents with 1 sibling, 20% do not have their own room
    - Of the respondents with 2 or more siblings, 50% have their own room

a. Create a tree diagram for the scenario, displaying all possibilities and percentages



b. What is the probability that a randomly selected student from this school has 1 sibling and has their own room?

$(.60)(.80)$
$.4800$ → 48%

c. What is the probability that a randomly selected student has their own room?

$P(\text{1 sib} + \text{own room}) + P(\text{1 sib} + \text{own}) + P(\geq 2 \text{ sib} + \text{own})$
$(.20)(.90) + (.60)(.80) + (.20)(.50)$
$.18 + .48 + .10 = .76$ → 76%

d. Find P(own room | 2 or more siblings)

$= \frac{P(\text{own room} + 2 \text{ or more})}{P(2 \text{ or more})} = \frac{(.20)(.50)}{.20}$

OR zoom in to "2 or more" branch then "own" branch $= .50 = 50\%$

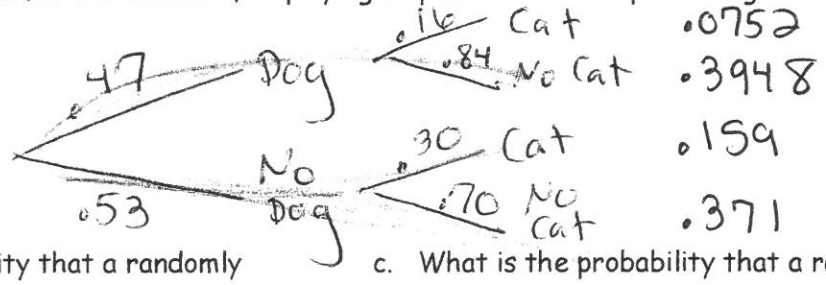
e. Find P(share room | 1 sibling)

$\frac{P(\text{share room} + 1 \text{ sibling})}{P(\text{sibling})} = \frac{(.60)(.20)}{(.60)}$

OR zoom in to "1 sibling" branch & "share" branch → $.20 = 20\%$

13. In a certain school the students in Common Core Math 2 completed a survey about cats and dogs. They found that 47% of the children in a school have a dog. Of those with no dog, 30% have a cat. 16% of those with a dog also have a cat.

a. Create a tree diagram for the scenario, displaying all possibilities and percentages



b. What is the probability that a randomly selected student from this school has a dog and a cat?

$(.47)(.16) = .0752$

c. What is the probability that a randomly selected student has either no dog or no cat?

(1st way) $(.47)(.84) + (.53)(.30) + (.53)(.70) =$
(2nd way) OR $1 - (.47)(.16) =$ → .9248

d. Find P(dog | cat)

$= \frac{P(\text{dog} + \text{cat})}{P(\text{cat})} = \frac{(.47)(.16)}{((.47)(.16) + (.53)(.30))}$
$= .3211$

since cat is

e. Find P(no cat | no dog)

$\frac{P(\text{no cat} + \text{no dog})}{P(\text{no dog})} = \frac{(.53)(.70)}{.53} = .70$ ← from branch (at bottom start)

OR zoom in after

14. In the game "Marble snap", three red and one blue marble are placed in one bag ; and two red and two blue in the other bag. To play the game, pull a marble from each bag. If the marbles are the same (snap) player A wins a point; otherwise player B wins a point. Replace the marbles after each trial.

a. Make a conjecture about who is most likely to win.

seems unfair because more red in one bag ... seems more likely B will win because don't need a match

b. Create a sample space for the game.

one bag →	R	R	B	B ← other bag
R	RR	RR	RB	RB
R	RR	RR	RB	RB
R	RR	RR	RB	RB
B	BR	BR	BB	BB

= player A wins = "snap"

c. What is the probability that player A will win?

$8/16 = \boxed{1/2}$

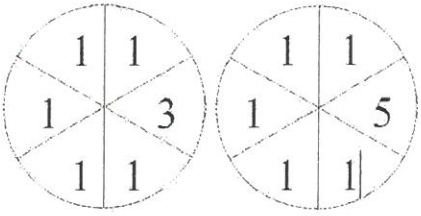
d. What is the probability that player B will win?

$8/16 = \boxed{1/2}$

e. Is the game fair? Explain.

yes the probability that each wins is equal.

15. The OR game is a game for two players, A and B. The game requires two spinners, each having 6 equal sectors. The first spinner has 1,1,1,1,1,3 on its sectors; the second spinner has 1,1,1,1,1,5. In one round, the spinners are both spun. If the product is 1 OR 15, then player A wins. If the product is 3 OR 5, then player B wins.



a. Make a conjecture about who is most likely to win.

seems equal because $1 \cdot 1 = 1$, $3 \cdot 5 = 15$ for A and $1 \cdot 3 = 3$, $1 \cdot 5 = 5$ for B

b. Create a sample space for the game.

1st spinner ↓ \ 2nd spinner →	1	1	1	1	1	5
1	1	1	1	1	1	5
1	1	1	1	1	1	5
1	1	1	1	1	1	5
1	1	1	1	1	1	5
1	1	1	1	1	1	5
3	3	3	3	3	3	15

c. What is the probability that player A will win?

$26/36 = \boxed{13/18}$

d. What is the probability that player B will win?

$\frac{10}{36} = \boxed{\frac{5}{18}}$

e. Is the game fair? Explain.

No. P(A wins) > P(B wins). The probabilities of winning should be equal for the game to be