FST
PS 7.3

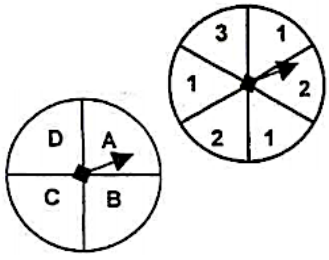
Name:
Date: Block:

Problem Set 7.3

Describe the events by writing **I** for *independent event* or **D** for *dependent event.*

D 1. Ann draws a colored toothpick from a jar. Without replacing. It, she draws a second toothpick.
I 2. John rolls a six on a number cube and then flips a coin that comes up heads.
I 3. Susie draws a card from a deck of cards and replaces it. She then draws a second card.
I 4. Seth draws a colored tile from a bag, replaces it; draws a second tile from the bag, replaces it; and then draws a tile a third time from the bag.
D 5. You draw a red marble from a bag, then another red marble (without replacing the first marble).

Using the two spinners, find each **compound** probability.



6. P(A and 2) = $\frac{1}{4} \cdot \frac{2}{6} = \frac{1}{12}$

7. P(D and 1) = $\frac{1}{4} \cdot \frac{3}{6} = \frac{3}{24}$

8. P(B and 3) = $\frac{1}{4} \cdot \frac{1}{6} = \frac{1}{24}$

9. P(A and not 2) = $\frac{1}{4} \cdot \frac{4}{6} = \frac{1}{6}$

A box contains 3 red marbles, 6 blue marbles, and 1 white marble. The marbles are selected at random, one at a time, and **are NOT replaced.** Find each **compound** probability.

10. P(blue and red) = $\frac{6}{10} \cdot \frac{3}{9} = \frac{1}{5}$

11. P(blue and blue) = $\frac{6}{10} \cdot \frac{5}{9} = \frac{1}{3}$

12. P(red and white and blue) = $\frac{3}{10} \cdot \frac{1}{9} \cdot \frac{6}{8} = \frac{1}{40}$

13. P(red and red and red) = $\frac{3}{10} \cdot \frac{2}{9} \cdot \frac{1}{8} = \frac{1}{120}$

14. P(white and red and white) = $\frac{1}{10} \cdot \frac{3}{9} \cdot$ ↑ 0
no whites left. not possible

15. P(not white) = $\frac{9}{10}$

Suppose that two tiles are drawn from the collection shown at the right. The first tile is **replaced** before the second is drawn. Find each compound probability.

A	R	R	R	C
A	R	R	R	C
E	E	E	E	C

16. P(A and A) = $\frac{2}{15} \cdot \frac{2}{15} = \frac{4}{225}$

17. P(A and not R) = $\frac{2}{15} \cdot \frac{9}{15} = \frac{2}{25}$

Suppose that two tiles are drawn from the same collection shown above. The first tile is **NOT Replaced** before the second is drawn. Find each compound probability.

18. P(A and A) = $\frac{2}{15} \cdot \frac{1}{14} = \frac{1}{105}$

19. P(A and not R) = $\frac{2}{15} \cdot \frac{8}{14} = \frac{8}{105}$

20. A basket contains five apples and seven peaches. You randomly select one piece of fruit and eat it. Then you randomly select another piece of fruit. Find the probability the first piece of fruit is an apple and the second piece of fruit is a peach.

$P(A \cap P) = \frac{5}{12} \cdot \frac{7}{11} = \frac{35}{132}$

21. There are eight shirts in your closet, four blue and four green. You randomly select one to wear on Monday and then toss it in the laundry basket to wash when you are done. You then pick a different one to wear on Tuesday. What is the probability you wear a blue shirt both days?

$P(B \cap B) = \frac{4}{8} \cdot \frac{3}{7} = \frac{3}{14}$

22. A penny and a nickel are tossed. Find the probability that the penny shows head, given that the nickel shows head.

$P(PH \mid NH) = \frac{1}{2} \cdot \frac{1}{2} = \boxed{1/4}$

23. Two hundred patients who had either hip surgery or knee surgery were asked whether they were satisfied or dissatisfied regarding the result of their surgery. The following table summarizes their response.
Complete the two-way frequency table.

Surgery	Satisfied	Dissatisfied	**Total**
Knee	70	25	95
Hip	90	15	105
Total	160	40	200

a) If one person from the 200 patients is selected at random, determine the probability that the parson was satisfied *given that* the person had knee surgery. $P(S \mid K) = 70/95 = \boxed{14/19}$

b) P(satisfied) = $\frac{160}{200} = \frac{4}{5}$

b) P(knee and dissatisfied) = $\frac{70}{200} = \frac{7}{20}$

c) P(hip or dissatisfied) = $\frac{105}{200} + \frac{40}{200} - \frac{15}{200} = \frac{130}{200} = \frac{13}{20}$

d) P(dissatisfied | hip surgery) = $\frac{15}{105} = \frac{1}{7}$

e) P(knee | satisfied) = $\frac{70}{160} = \frac{7}{16}$

24. A number selected, at random, from the set {1, 2, 3, 4, 5, 6, 7, 8}. Find…

a) P(odd) = $\frac{4}{8}$

b) P(prime | odd) = $\frac{4}{4} = 1$

25. The senior class is 55% female, and 32% are females who play a competitive sport. Find the probability that a student plays a competitive sport, given that the student is female.

$P(S \mid F) = \frac{P(S \cap F)}{P(F)} = \frac{0.32}{0.55} = \boxed{0.581818}$

26. A utility research company asked 50 of its customers whether they pay their bills online or by mail. What is the probability that a customer pays online *given that* the customer is male?

$P(O \mid M) = \frac{12}{20} = \frac{3}{5}$

Bill Payment

	Online	By Mail
Male	12	8
Female	24	6

20

27. Use the table below to find the probability for a randomly selected employee:

EDUCATION AND SALARY OF EMPLOYEES				
	Under $20,000	**$20,00 to $30,000**	**Over $30,000**	
Less than high school	69	36	2	107
High School	112	98	14	224
Some College	102	193	143	438
College	13	173	245	431
	296	500	404	1200

a) *P*(employee has less than a high school education)

$\frac{107}{1200}$

b) *P*(employee earns under $20,000)

$\frac{296}{1200} = \frac{37}{150}$

c) *P*(employee earns over $30,000 and has less than a high school education)

$\frac{2}{1200} = \frac{1}{600}$

d) *P*(employee earns under $20,000 and has a college degree)

$\frac{13}{1200}$

e) *P*(employee earns over $30,000 | has only high school education)

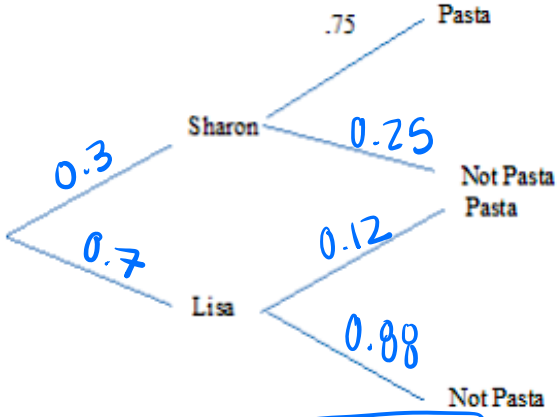
$\frac{14}{224} = \frac{1}{16}$

f) *P*(employee has less than high school education | earns over $30,000)

$\frac{2}{404} = \frac{1}{202}$

28) **a)** Complete the tree diagram below showing the appropriate probabilities.

Sharon and Lisa share an apartment. Sharon cooks dinner three nights out of ten. If Sharon does not cook dinner, then Lisa does. If Sharon cooks dinner the probability that they have pasta is 0.75. If Lisa cooks dinner the probability that they have pasta is 0.12.



b) Find the probability that Lisa cooks dinner and they do not have pasta.

$(0.7)(0.88) = 0.616$

c) Find the probability they do not have pasta.

$(0.3)(0.25) + (0.7)(0.88) = 0.075 + 0.616 = 0.691$

d) Given that they do not have pasta, find the probability that Lisa cooked dinner.

$P(L|\text{NO pasta}) = \frac{P(L \cap \text{no pasta})}{P(\text{no pasta})} = \frac{0.616}{0.691} = 0.891462$