

PROBLEM SET 12-2
(Conditional Probability)

1. A student says that if $P(A) = P(A | B)$, then A and B must be independent events. Is the student correct? Explain.

For 2-5, use the table below to find each 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
High School	112	98	14
Some College	102	193	143
College	13	173	245

2. $P(\text{has less than high school education})$
3. $P(\text{earns over } \$30,000 \text{ and has less than high school education})$
4. $P(\text{earns over } \$30,000 \mid \text{has only high school education})$
5. $P(\text{has less than high school education} \mid \text{earns over } \$30,000)$

For 6-8, use the table below to find each probability for a randomly chosen student.

GENDER AND COLLEGE MAJORS			
	Biology	Physics	Chemistry
Male	40	16	35
Female	15	24	20

6. $P(\text{male})$
7. $P(\text{male or majors in Chemistry})$
8. $P(\text{majors in Physics} \mid \text{male})$

For 9-12, use the sample space {5, 6, 7, 8, 9, 10, 11, 12, 13, 14} to find the probability for a randomly selected number

- 9. $P(\text{integer})$
- 10. $P(\text{less than } 10 \mid \text{less than } 13)$
- 11. $P(\text{greater than } 8 \mid \text{less than } 11)$
- 12. $P(\text{greater than } 7 \mid \text{greater than } 12)$

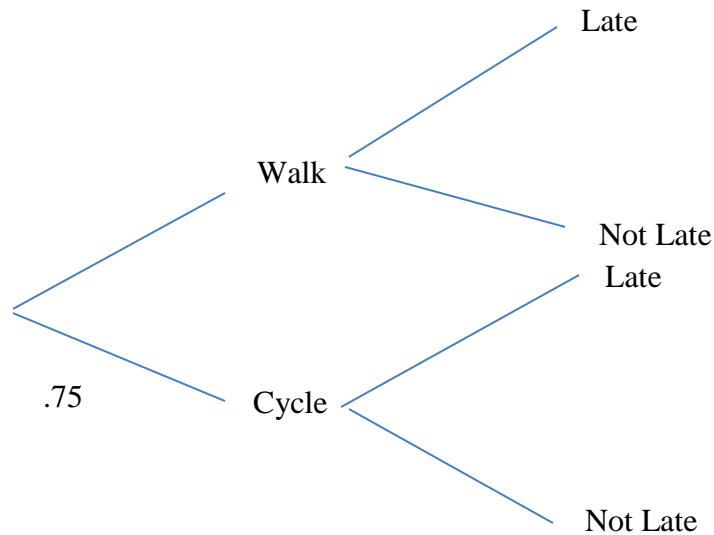
The letters in the word AARDVARK are printed on square pieces of cardboard with one letter per card. The eight letters are placed in a hat and one letter is chosen at random. Find the following probabilities.

- 13. $P(\text{the letter chosen is a vowel} \mid \text{the letter falls in the first half of the alphabet})$
- 14. $P(\text{the letter falls in the first half of the alphabet} \mid \text{letter chosen is a vowel})$

Maria travels to school either by walking or by bicycle. The probability she cycles to school is .75.

If she walks, the probability that she is late for school is .1.
If she cycles, the probability that she is late for school is .05.

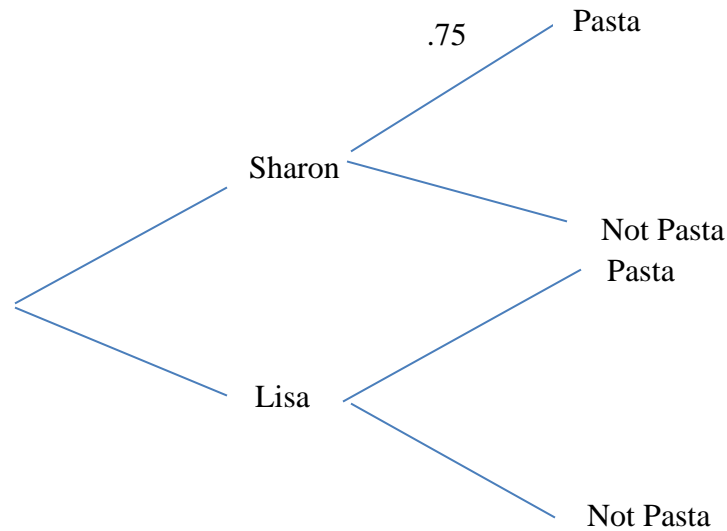
- 15. Complete the tree diagram below showing the appropriate probabilities.



- 16. Find the probability that Maria is late for school.

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 .75. If Lisa cooks dinner the probability that they have pasta is .12.

17. Complete the tree diagram below showing the appropriate probabilities.



18. Find the probability that Lisa cooks dinner and they do not have pasta.
19. Find the probability they do not have pasta.
20. Given that they do not have pasta, find the probability that Lisa cooked dinner.