11-3 Probability of Multiple Events

Vocabulary

Review

1. Cross out all numbers that are NOT *multiples* of 8.

48 74 405 136

2. Write three numbers that are *multiples* of both 2 and 9.

Vocabulary Builder

event (noun) **ee VENT**

Math Usage: An **event** is one or more outcomes from the set of all possible outcomes of an experiment.

Example: Roll a number cube. The set of all possible outcomes is {1, 2, 3, 4, 5, 6}. The set of outcomes resulting in the **event** that an even number is rolled is the set {2, 4, 6}.

Use Your Vocabulary

Write a possible *event* for each experiment.

3. A basket has 5 red balls and 3 blue balls. You pick one ball without looking.

4. You roll a number cube one time.

Problem 1 Classifying Events

Got It? **You select a coin at random from your pocket. You replace the coin and select again. Are your selections independent events? Explain.**

5. Circle the true statement.

Selecting the first coin affects the possible outcomes of picking the second coin, because you replace the coin.	Selecting the first coin does not affect the possible outcomes of picking the second coin, because you replace the coin.

6. The two selections are independent / dependent.

take note

Key Concept Probability of Compound Events

Probability of *A* and *B* If A and B are independent events, then $P(A \text{ and } B) = P(A) \cdot P(B)$.

Probability of *A* or *B* If A and B are *not* mutually exclusive, then $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$.

If A and B are mutually exclusive, then $P(A \text{ or } B) = P(A) + P(B)$.

Events *A* and *B* are independent and mutually exclusive. $P(A) = \frac{3}{5}$ and $P(B) = \frac{4}{9}$. Write T for *true* or F for *false*.

____ **7.** $P(A \text{ and } B) = \frac{4}{15}$

____ **8.** $P(A \text{ or } B) = \frac{3}{5} + \frac{4}{9} - \frac{4}{15}$

Problem 2 Finding the Probability of Independent Events

Got It? **At a picnic there are 10 diet drinks and 5 regular drinks. There are also 8 bags of fat-free chips and 12 bags of regular chips. If you grab a drink and a bag of chips without looking, what is the probability that you get a regular drink and regular chips?**

9. Define each event.

Event A = You pick a regular drink. Event B = _____

10. Complete each equation.

$$P(A) = \frac{\text{_____}}{\text{total number of drinks}} = \frac{\text{_____}}{15}$$

$$P(B) = \frac{\text{_____}}{\text{total number of bags of chips}} = \text{_____}$$

11. Use the justifications at the right to find the probability.

$P(A \text{ and } B) = P(A) \cdot P(B)$	Multiply to find the probability of independent events.
$= \text{_____} \cdot \text{_____}$	Substitute.
$= \text{_____}$, or _____	Simplify.

Problem 3 Mutually Exclusive Events

Got It? **You roll a standard number cube. Are the events rolling an even number and rolling a prime number mutually exclusive? Explain.**

12. The numbers on the number cube are listed below. Circle the even numbers. Underline the prime numbers.

1 2 3 4 5 6

13. Are the events mutually exclusive? Explain.

_____

_____

Problem 4 Finding Probability for Mutually Exclusive Events

Got It? **Languages** **At your high school, a student can take one foreign language each term. About 37% of the students take Spanish. About 15% of the students take French. About 9% of the students take Mandarin Chinese. What is the probability that a student chosen at random is taking Spanish, French, or Mandarin Chinese?**

14. Are the events of a student taking Spanish, taking French, or taking Mandarin Chinese mutually exclusive? Explain.

_____

_____

15. Circle the formula you would use to find the probability.

$P(A \text{ or } B \text{ or } C) = P(A) \cdot P(B) \cdot P(C)$ $P(A \text{ or } B \text{ or } C) = P(A) + P(B) + P(C)$

16. Find the probability that a student is taking Spanish, French, or Mandarin Chinese.

Problem 5 Finding Probability

Got It? **Suppose you reach into the dish at the right and select a token at random. What is the probability that the token is square or red (R)?**

17. Complete.

number of tokens in the dish	number of square tokens	number of red (R) tokens	number of tokens that are square and red (R)
	3		

18. Use your answers to Exercise 17 to find each probability.

P(square token)	*P*(red (R) token)	*P*(square and red (R) token)
$\frac{3}{\square}$	$\frac{\square}{\square}$	$\frac{\square}{\square}$

19. Find the probability that the token you select is square or red (R).

Lesson Check • Do you UNDERSTAND?

Error Analysis **The weather forecast for the weekend is a 30% chance of rain on Saturday and a 70% chance of rain on Sunday. Your friend says that means there is a 100% chance of rain this weekend. What error did your friend make?**

20. Which formula should you use to find the chance of rain for this weekend? Circle your answer.

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $\qquad$ $P(A \text{ and } B) = P(A) \cdot P(B)$

21. Explain your friend's error.

Math Success

Check off the vocabulary words that you understand.

☐ event ☐ independent events ☐ mutually exclusive events

Rate how well you can *find probabilities of multiple events.*

Need to review 0 2 4 6 8 10 Now I get it!