# **Geometry Unit Test Guide**

## Probability Unit Test

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| **Item** | **Lesson Coverage** | **Objective** | **Mathematical Practice Standard** | **Lesson Page** | **Assessment Item** |
| 1 | Lesson 2: Events, Outcomes, and Intersections | In this section, you will describe events as subsets of the set of all outcomes. | Reason abstractly and quantitatively. | Page 1-6 | Emilio rolls a typical 6-sided number cube. List the outcomes for him rolling an even number divisible by 3.Correct Answer: {6}[Probability Unit Test Item #1 - GeoGebra](https://www.geogebra.org/calculator/bgc95qmn) |
| 2 | Lesson 2: Events, Outcomes, and Intersections | In this section, you will describe events as unions, intersections, or complements of other events. | Reason abstractly and quantitatively. | Page 7-14 | In bowling, there are 10 pins that stand in a triangular shape. The idea is to knock down all the pins. A frame consists of two rolls (if you don’t knock all 10 pins down in the first roll). On your first roll, you knock down pins 9, 5, 7, and 1; in the second roll, you knock down pins 4 and 8. Which of the following options is a subset that is a complement of the event?Option #1: {3, 4, 6, 9}Option #2: {2, 3, 6, 10}Option #3: {1, 4, 5, 7, 8, 9}Option #\_\_\_\_ is a subset that is a complement of the event.Correct Answer: Option #2[Probability Unit Test Item #2 - GeoGebra](https://www.geogebra.org/calculator/qycegrrd) |
| 3 | Lesson 3: Simple Probability | In this section, you will differentiate between experimental probability and theoretical probability. | Make sense of problems and persevere in solving them. | Page 1-6 | What is the probability of drawing a black nine from a standard deck of playing cards?Correct Answer: $\frac{1}{26}$[Probability Unit Test Item #3 - GeoGebra](https://www.geogebra.org/calculator/s4zdnv4z) |
| 4 | Lesson 3: Simple Probability | In this section, you will determine the probability of an outcome. | Make sense of problems and persevere in solving them. | Page 7-12 | Consider a spinner with numbers 1–8 and a number cube with numbers 1–6. Let event ***A*** represent landing on a number greater than 3 on the spinner and event ***B*** represent rolling a number greater than 3 on the number cube. Find $P\left(A∩B\right)$. Enter your response as a fraction.Correct Answer: $\frac{5}{16}$[Probability Unit Test Item #4 - GeoGebra](https://www.geogebra.org/calculator/hrnzq3fa) |
| 5 | Lesson 4: Independent and Dependent Probabilities | In this section, you will mathematically determine if two events are independent of each other. | Attend to precision. | Page 1-6 | A standard deck of cards has 52 cards. The 52 cards are divided into four suits: diamonds, clubs, hearts, and spades. Diamonds and hearts are red cards, and clubs and spades are black cards. Suppose you choose a card from the deck. Let event ***A*** be you choose a red card and event ***B*** you choose an ace.Determine ***P(A and B), P(A), P(B)***, and state whether events ***A*** and ***B*** are independent. Enter the first three answers in fraction form. Reduce your answer.Correct Answer: P(A and B) = $\frac{1}{26}$P(A) = $\frac{1}{2}$P(B) = $\frac{1}{13}$2: Events A and B are independent.[Probability Unit Test Item #5 - GeoGebra](https://www.geogebra.org/calculator/auknu3gs) |
| 6 | Lesson 5: Two-Way Frequency Tables | In this section, you will interpret two-way frequency tables of data. | Model with mathematics. | Page 1-5 |

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|  | **Gender** |
| **Genre** | **Male** | **Female** |
| **Documentary** | 35 | 22 |
| **Drama** | 15 | 29 |

A survey asked men and women whether they preferred documentaries or dramas when watching television. The results are in the table. How many men were surveyed?Correct Answer: 50 men |
| 7 | Lesson 5: Two-Way Frequency Tables | In this section, you will construct two-way frequency tables of data. | Model with mathematics. | Page 6-11 | Students were surveyed about their current language class. * In the 9th grade class, 58 students take French and 47 take German.
* In the 10th grade class, 70 students take French and 64 take German.
* In the 11th grade class, 67 students take French and 57 take German.

Construct a two-way frequency table to display the survey results.Correct Answer:

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| **Grade** | **French** | **German** | **Total** |
| **9th** | 58 | 47 | **105** |
| **10th** | 70 | 64 | **134** |
| **11th** | 67 | 57 | **124** |
| **Total** | **195** | **168** | **363** |

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| 8 | Lesson 9: Conditional Probability | In this section, you will mathematically determine whether the outcome of one event is dependent upon the outcome of a previous event. | Look for and make use of structure. | Page 1-6 |

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|  | **Grade Level** |
| **Apple Preference** | **Elementary School Students** | **Middle School Students** | **High School Students** | **Total** |
| **Likes apples** | 85 | 92 | 97 | 274 |
| **Dislikes Apples** | 15 | 8 | 3 | 26 |
| **Total** | 100 | 100 | 100 | 300 |

Let ***A*** be the event that a student likes apples. Let ***B*** be the event that a student is in middle school. Based on the data in the table, are events ***A*** and ***B*** independent?Correct Answer: No; the events are dependent because P(A) = 0.913 and P(A|B) = 0.92.[Probability Unit Test Item #8 - GeoGebra](https://www.geogebra.org/calculator/ecfrzz42) |
| 9 | Lesson 9: Conditional Probability | In this section, you will find the conditional probability of one event given the outcome of another event. | Reason abstractly and quantitatively. | Page 1-6 |

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|  | **Bowling** | **Dancing** | **Movies** | **TOTAL** |
| **20-25 Years Old** | 15 | 13 | 12 | 40 |
| **26-30 Years Old** | 12 | 10 | 8 | 30 |
| **31-35 Years Old** | 18 | 11 | 21 | 50 |
| **TOTAL** | 45 | 34 | 41 | 120 |

In a survey, 120 people are asked how they like to spend their free time. Their responses are recorded on the table based on their age. What is the probability that a person spends their time going to the movies, given that they are 31–35 years old? Express your answer as a percentage, rounded to the nearest whole number.Correct Answer: 42%[Probability Unit Test Item #9 - GeoGebra](https://www.geogebra.org/calculator/phdk4rjr) |
| 10 | Lesson 9: Conditional Probability | In this section, you will mathematically determine whether the outcome of one event is dependent upon the outcome of a previous event. | Attend to precision. | Page 7-13 | Consider a jar that has 20 marbles. There are 4 red, 4 blue, 4 green, 4 yellow, and 4 purple marbles. What is the probability of selecting a yellow marble without replacing it and then selecting a purple marble?Correct Answer: $\frac{4}{95}$[Probability Unit Test Item #10 - GeoGebra](https://www.geogebra.org/calculator/v8eugjft) |
| 11 | Lesson 10: Using Conditional Probabilities | In this section, you will interpret conditional probability in terms of a model. | Reason abstractly and quantitatively. | Page 6-11 | There are 50 books on a shelf. They include 15 mystery novels, 12 works of historical fiction, 8 romance novels, and 15 nonfiction books. If Federica randomly selects 2 books from the shelf, what is the probability of selecting a historical fiction book on the first selection and selecting romance on the second selection? Assume the books are taken without replacement.Correct Answer: $\frac{12}{50} ∙ \frac{8}{49}$[Probability Unit Test Item #11 - GeoGebra](https://www.geogebra.org/calculator/psek7hjd) |
| 12 | Lesson 11: Two-Way Tables and Conditional Probabilities | In this section, you will use two-way frequency tables to approximate conditional probabilities.  | Look for and make use of structure. | Page 1-7 |

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|  | **Number of Cube Rolls** |
| **Coin Flips** | **Cube Rolls = 1** | **Cube Rolls = 2** | **Cube Rolls = 3** | **Cube Rolls = 4** | **Cube Rolls = 5** | **Cube Rolls = 6** | **Total** |
| **Heads** | 9 | 15 | 12 | 8 | 9 | 6 | 59 |
| **Tails** | 8 | 6 | 11 | 12 | 14 | 10 | 61 |
| **Total** | 17 | 21 | 23 | 20 | 23 | 16 | 100 |

Given that a coin is flipped and lands on heads, what is the probability that the number cube was rolled 6 times?Correct Answer: $\frac{6}{59}$ |
| 13 | Lesson 12: The Addition Rule | In this section, you will determine the probability that at least one of two given events will occur. | Reason abstractly and quantitatively. | Page 1-6 | Recall from the lesson that this Venn diagram represents 100 people’s responses to three different statements about their favorite ways to eat ice cream. Based on the diagram, what is the probability that a person prefers sprinkles or prefers chocolate on their ice cream? Express your answer as a fraction. You do not need to reduce.The probability that a person prefers sprinkles or chocolate is \_\_\_\_.Correct Answer: $\frac{85}{100}$[Probability Unit Test Item #13 - GeoGebra](https://www.geogebra.org/calculator/cgdqdxr9) |
| 14 | Lesson 12: The Addition Rule | In this section, you will interpret the answer of an “Or” probability in the context of a given situation. | Reason abstractly and quantitatively. | Page 7-12 |

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|  | **Finish** |
| **Color** | **Matte Finish** | **Glossy Finish** | **TOTAL** |
| **Red** | 8 | 9 | 17 |
| **Blue** | 2 | 4 | 6 |
| **Yellow** | 0 | 7 | 7 |
| **TOTAL** | 10 | 20 | 30 |

What is ***P(yellow or glossy)***? Provide the answer in fraction form. You do not need to reduce your answer.Correct Answer: $\frac{20}{30}$[Probability Unit Test Item #14 - GeoGebra](https://www.geogebra.org/calculator/cgrfdqcz) |
| 15 | Lesson 3: Simple Probability | In this section, you will differentiate between experimental probability and theoretical probability. | Make sense of problems and persevere in solving them. | Page 1-6 | If probability is $\frac{desired outcome}{total actual outcomes}$, then how does theoretical probability relate to experimental probability if there is a fifty-fifty chance of a coin flip landing on heads? Please answer in 1–2 sentences.Correct Answer:Student answers should explain that fifty-fifty chance usually refers to theoretical probability, or the mathematical probability of one out of two. However, experimental probably refers to an actual outcome of an experiment. It is possible that a series of actual coin tosses will not end up on heads one out of every two times. |
| 16 | Lesson 4: Independent and Dependent Probabilities | In this section, you will recognize and explain the concept of independence in everyday language and everyday situations. | Communicate clearly. | Page 7-12 | Your parents allow you to have an outing with your friends every Saturday of the month. You select the movies, bowling, skating, and the arcade as your activities for this month and put them on slips of paper in a jar to randomly select. In 3–5 sentences, describe the independent and dependent probabilities, then determine how many possible events you could have for the month if the movie outing is selected first and not replaced.Correct Answer:Student answers should include independent probability, dependent probability, and the total number of events based on the sample space of the 4 outings. * The independent probability would be based on putting the outing back in the jar and keeping it as a possibility for the next Saturday outing.
* The dependent probability would be based on selecting an outing and not replacing it in the jar.
* If the movie outing is selected first and not replaced, there would be a total of 6 possible events based on the sample space for the month.

Students may list the possible events, but it is not required. The list for the possible events is as follows: 1: movies, bowling, arcade, skating 2: movies, bowling, skating, arcade 3: movies, arcade, bowling, skating 4: movies, arcade, skating, bowling 5: movies, skating, arcade, bowling 6: movies, skating, bowling, arcade |
| 17 | Lesson 10: Using Conditional Probabilities | In this section, you will recognize and explain the concept of conditional probability in everyday language and everyday situations. | Communicate clearly. | Page 1-5 | Consider 6 different-color marbles that are randomly selected. Create a scenario for event ***A*** and a scenario for event ***B***, such that ***P(A and B) =*** $\frac{1}{30}$. State the result of event ***A***, the result of event ***B***, and explain if the two events are independent or dependent.Correct Answer:Let event ***A*** represent selecting a red marble and keeping it and event ***B*** represent selecting a green marble. Event ***A =*** $\frac{1}{6}$ and event ***B =*** $\frac{1}{5}$. The two events are dependent because the sample size changes from 6 marbles to 5 marbles. |
| 18 | Lesson 10: Using Conditional Probabilities | In this section, you will interpret conditional probability in terms of a model. | Reason abstractly and quantitatively. | Page 6-11 | In 3–5 sentences, explain the difference between independent and dependent events when calculating conditional probability, and provide an example of dependent events.Correct Answer:Student answers should note that if events are dependent, then the denominator of the second event will need to change according to the new conditions. Furthermore, there are now two different probabilities that must be multiplied together. If the events are independent, then ***P(A and B***) will cancel out the denominator according to the Multiplication Rule, and only the probability of one event is left over. There are many examples of dependent events that students can devise, but one example might be drawing a card from a standard deck and then drawing another card without replacing the first. |