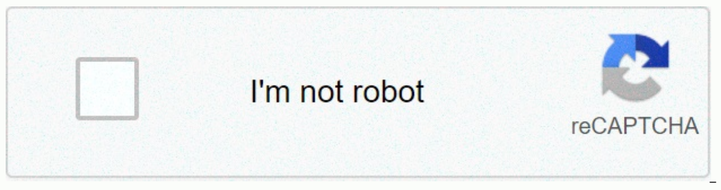

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Probability trees worksheet pdf

arrow_back Diagrams Back to The Tree – conditional/no replacement If you want a homework, some cover work, or a little extra practice, this is the place for you. And best of all they all (well, most!) come up with answers. Mathster Content is a great resource for creating online and paper-based reviews and tasks. They kindly allowed me to create 3 editable versions of each worksheet, complete with answers. Spreadsheet Name 1 2 3 Probability - Dependent Events 1 2 3 Corbett Maths keyboard_arrow_up Back to Top Corbett Maths offers excellent and original exam style questions on any topic as well as videos, past work and 5-a-day. It's really one of the best sites around. We need to understand independent and dependent events in order to be able to do the next sections. Two or more events are independent if one event does not affect the likelihood of others happening. Two or more events depend on whether one event affects the likelihood of others happening. Example: Getting a head twice in 2 coin postings are independent events. Choosing a red marble randomly from a bag, then harvesting a green marble without replacing the red marble are dependent events. Rule E states that: If two events, A and B, are independent, then \text{P}(A \text{ and } B) = \text{P}(A) \times \text{P}(B) This means that to find the probability of A and B occurring, you must multiply the probability of A occurring by the probability of B occurring. The OR rule states that: for two events, A and B, then \text{P}(A \text{ or } B) = \text{P}(A) + \text{P}(B) - \text{P}(A \text{ and } B) If A and B cannot happen together, we say that they are mutually exclusive, and then we have \text{P}(A \text{ and } B) = 0, so that the OR rule becomes \text{P}(A\'s text{or } B) = \text{P}(A) + \text{P}(B) Probability trees are similar to frequency trees, but instead we put the probabilities on the branches and events at the end of the branch. Example: A bag contains 4 red balls and 5 blue balls. Raheem picks up 2 balls randomly. Calculate the probability that it selects the same colored ball each time, since after each time a ball is selected, it is replaced. Step 1: Build the probability tree by showing two selections. We know there's a total of 9 balls in the bag, so there's {4}{9} to pick a red ball. So as the red ball is replaced, there are still 4 red balls left out of 9, so again there is a \dfrac{4}{9} chance to pick a red ball in the second selection. Go ahead and fill in the rest. Step 2: Use rule E From the tree diagram we can see that there are two ways to do this, blue and blue, or red and red We use rule E through the tree diagram, \text{P(blue and blue)}=\dfrac{5}{9}\times\dfrac{5}{9}= \text{blue}{\dfrac{25}{81}} \, \text{P(red and red red \textcolor{red}{\dfrac{16}{81}} Step 3: Use the RULE OR The final step, then, is to add the probabilities together, by rule OR for mutually exclusive events, to obtain, \text{P((same color)}= \dfrac{25}{81} +\dfrac{16}{81}=\dfrac{41}{81} The conditional probability of A given B, is the probability that event A happens given that the event happens You will not be informed that it is a conditional probability of probability , but seeing words like no replacement or given will mean it's one, or you may have to use your own intuition. If two events, A and B, are independent, then \textcolor{black}{\text{P}(A \text{ given } B) = \text{P}(A)} \,\, and \,\, \textcolor{black}{\text{P}(B \text{ given } A) = \text{P}(B)} If two events, A and B are dependent, then \textcolor{black}{\text{P}(A \text{ and } B) = \text{P}(A) \times \text{P}(B \text{ given } A)} The probability of him being in the starting team this Sunday is 0.7. If he starts the game, the probability of scoring a goal is 0.4. What is the probability of Benjamin starting the game but not scoring a goal? Step 1: We want to find \text{P(start and don't score)} Let starts be event A and not score to be event B Step 2: \text{P}(A) = 0.7 \text{P}(B \text{ given } A) = \text{P(does not score since it starts)} = 1 - 0.4 = 0.6 Step 3: So then \text{P}(A \text{ and } B) = \text{P}(A) \times \text{P}(B \text{ given } A) = 0.7 \times 0.6 = 0.42 Conditional probability trees are similar to probability trees , but the odds change depending on the previous events. Example: A bag contains 4 red balls and 5 blue balls. Raheem picks up 2 balls randomly. Calculate the probability that it selects the same colored ball each time, since each time a ball is selected, it is not replaced. Step 1: Build the probability tree showing two selections, there are 9 balls to start, reducing to 8 after the first selection, as shown below, The chance of selecting a red ball for the first selection is \dfrac{4}{9}, then with a red ball removed, the second selection is \dfrac{3}{8} and so on.... Step 2: Use the tree diagram to determine the probability of selecting the same color twice. We can see that there are two ways to do this, blue and blue, or red and red. We use rule E through the probability tree, then \text{P(blue and blue)}=\dfrac{5}{9}\times\dfrac{4}{8}= \textcolor{blue}{\dfrac{20}{72}} \text{ and } \text{P(red and red)}=\dfrac{4}{9}\times\dfrac{3}{8}= \textcolor{red}{\dfrac{12}{72}} Step 3: Add probabilities by rule OR for mutually exclusive events, to get \text{P(Same color)}= \dfrac{20}{72} +\dfrac{12}{72}=\dfrac{32}{72} (a) Let Anna pass up to A_p of events and Rob going B_p event time. To find out rob's probability we can write the probability of both passing as: P(A_p \text{ and } R_p) =0.35 Replacing anna's probability of passing her test, 0.7 \times P(R_p) =0.35 Rearranging the equation to make P(R_p) the subject: P(R_p) = 0.35 \div 0.7 = 0.5 (b) The probability of Anna and Robem failing the steering test can be found using a tree diagram shown as below : Therefore, the probability of both failing is \dfrac{3}{20} = 0.15. For this question when drawing the diagram of the tree we have to be careful with the probability changes between the two events. This is the result of not replacing the first counter, therefore leaving only 11 counters in the bag to choose from. Adding the probabilities of the result being blue and green, then green: \dfrac{7}{22}+\dfrac{5}{33}=\dfrac{31}{66} To find out the probability of the bus being delayed on both days we can use a tree diagram where E represents the bus in time or early and L represents the delayed bus. Going along the bottom line we find that the probability of being late for the two days is: \dfrac{1}{16} Here we have to figure out the probability that the coach takes out two balls that are of a different color. For conditional probability issues, when drawing the tree diagram we have to be careful as the probability changes between the two events. This is the result of not replacing the first ball, therefore leaving only 13 balls in the bag to catch. Adding the odds of the result being two different colors: \dfrac{45}{182}+\dfrac{45}{182}=\dfrac{90}{182}=\dfrac{45}{91} So as this is slightly below half it is more likely that the coach will choose two balls of the same color. a The diagram of the resulting tree must look something like: (b) To find the probability of it winning at least one game, we can simplify adding the probabilities of the top 3 branches together or subtract the lower branch probability from 1: \dfrac{9}{25}+\dfrac{6}{25}+\dfrac{6}{25}=\dfrac{21}{25} or, 1-\dfrac{4}{25}=\dfrac{21}{25} This worksheet explains how to draw a tree diagram to represent results based on this exercise : A shopkeeper has a bowl with 2 types of filter. Draw a tree diagram to represent the possible results. See how you do with this exercise: In the garden Dave saw that there are 2 species available in 3 different heights and 2 quality levels. Draw a tree diagram to represent the possible results. You'll work on problems based on stories like: The librarian told Dave that he can select one of two different history books and two different geography books. Draw a tree diagram to represent the possible results. The concept of how to draw a tree diagram to represent a result set is A sampling problem is solved. You will break six word problems based on practice stories. Students will demonstrate their proficiency with the skills and concepts that we explored here. You will reflect on problems like this: 2 different cold drinks and one of 3 different ice creams. Draw a tree diagram to illustrate the possible results. Let's explain all the steps needed to solve this exercise: a family has two children. How many results are there in the 2-generation sample space? A sampling problem is resolved, and two practice problems are provided. Students will model the predictable results of a situation using the techniques we discussed. Ten problems are provided. Let's solve exercises like: Choose a table and choose a chair behind the carnival game table. There are 2 tables and 2 chairs behind them. How many options are possible? Ten problems are provided. Solve problems like: A bag contains 3 red toys and 5 white ones. Choose two toys one after the other. Draw a tree diagram that shows all the possible combinations of toys that Rose can choose from? Students will demonstrate their ability with these types of problems. Ten problems are provided. This is a good way to introduce or review the skills we explore here. This worksheet explains how to model a scenario to represent a result set. A sampling problem is resolved, and two practice problems are provided. You will solve exercises like: A box contains green balls numbered from 1 to 4, violet balls numbered from 1 to 3, and red balls numbered from 1 to 2. Determine a method to represent total results for selecting two marbles. You will model situations like: Choosing a red shirt outfit, a green jeans, a blue skirt? If the shoes come in your choice of 4 sizes and colors. This is a cool spreadsheet where you work on history problems like: 2 different roads from city A to city B and 3 different roads from city B to city C. Draw a tree diagram to represent the total path from city A to city C via city B? Students will demonstrate their skill with all the concepts we explore with this theme. Ten problems are provided. Students will use a well-known method to model possible outcomes. Three problems are provided, and space is included for students to copy the correct answer when given. You will put these skills to use for you to determine the solution to problems like this: You roll a die from 6 sides and take a marble out of a bag containing an orange, a red and a colored yellow marble. How many results are possible? You will model data for situations like this: You choose a card and strip marble from a bag containing a red, a yellow and a green colored marble. How many results are possible? This is a great visual series of problems for you to extend your skills with this series. with stranger problems that add an extra level of difficulty to everything. Such as: Two cards are removed from one card pack, one after the other. We get a little more advanced with our skills solving tasks like: A child has a bag of colorful candies consisting of 14 red reds 12 orange and if the child eats 2 of the candies one after the other. What is the probability that the first sweet ate was orange and the second red? Check out the kind of problems you can find here: Two cards are removed from a pack of cards that are ace or not ace, one after the other. What is the probability that no seas will be obtained? Obtained?

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