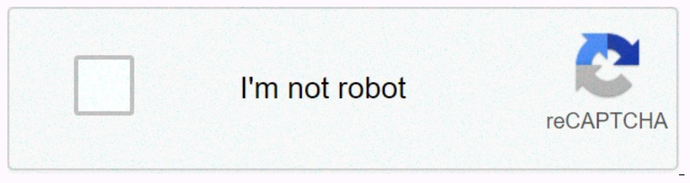

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Venn diagrams worksheet pdf

September 9, 2019 corbettmaths typical Venn diagram looks like the image below. Venn diagrams are a way of grouping different parts of data known as sets. Drawing a Venn diagram is relatively simple as shown below. Example: We have numbers \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}. Place the odd number in A and the prime number in B. Draw a Venn diagram for this information. Step 1: Identify the odd number: \{1, \, 3, \, 5, \, 7, \, 9, \, 11 \} and the prime number: \{2, \, 3, \, 5, \, 7, \, 11 \}. There are several crossovers here: \{3, \, 5, \, 7, \, 11\} contained in both, which means they go at the intersection. Step 2: Odd but not primed numbers: 1 and 9. This will go into part A which does not mention B. Prime but not odd numbers: 2. This will go into the part of circle B that does not mention A. Step 3: All numbers that are not odd or primed: 4, 6, 8, and 10, will go into the rectangle but outside both circles. The result is a Venn diagram displayed. We can use venn diagrams to solve probability problems. Example: In the Venn diagram below, A contains odd numbers and B contains prime numbers. Numbers are randomly selected. Use the Venn diagram to specify the following: a) The selected number is odd and primed. Looking at the Venn diagram, we see that 4 out of 11 numbers are in A and B, so the likelihood of numbers being odd and primed is, \dfrac{4}{11}. b) The selected number is odd instead of the prime number. We look for all the numbers that are in set A but not set B, 1 and 9, which gives probability, \dfrac{2}{11} venn diagram can also be used to solve conditional probability problems. Example: In the Venn diagram below, G represents students who chose Geography and H represents the student who selected History. Use the Venn diagram to specify \text{P}(G \text{ given } H) (Also written \text{P}(G| H)). We want to find the probability that someone took geography given that we already know they took History. If we know someone takes History, then they should be one of 2 + 12 = 14 people. Then, there are 12 of the 14 people who take Geography, or in other words \text{P}(G| H)=\dfrac{12}{14} a) The first thing we need to do is draw a rectangle labeled \xi to represent all year 9 students. Then we need to draw two overlapping circles, one labeled 'football' and the other labeled 'rugby'. There is some simple information that we can enter immediately. We were told that 14 students did not play rugby or football, so we could write '14' outside the circle, but still inside the rectangle. We were also told that 42

students played both so we can write '42' at the intersection of two circles. The only information we need to solve is the number of students who play football only and the number of who play rugby only. Since there are a total of 126 students, of which 14 do not play sports and where 42 play both sports, we can find out how many students play football or rugby alone: 126-42-14 = 70\text{ students} Now we know that a total of 70 students only play football or just rugby, we are now in a better position to work out exactly how many students are included in each category. We are told that the ratio of the number of students who play football only to the number of students who play rugby is only 7 : 3. This means that {7}{10} 70 students only play football and the frac{3}{10} of 70 students only play rugby. (We are facing off in the tenth here because the ratio is 10.). The number of students playing football can only be calculated as follows: \dfrac{7}{10}\times70 = 49\text{ students} The number of students who play rugby can only be calculated as follows: \dfrac{3}{10}{7}{10} <2> <2>\times70 = 21\text{ students} Therefore we need to enter '49' inside the football circle (but not at the intersection) and '21' inside the rugby circle (but not at the intersection). Our completed Venn diagram should be similar to the one below: b) We know that 21 students play rugby out of a total of 126 students. We can write this as the following fraction: \dfrac{21}{126} This fraction can be simplified to: \dfrac{1}{6} a) The number of students in year 10 is total: All students who study geography only (40) All students who study history only (52) All students studying geography and history (14) All students studying both history and geography (36) 40+52+14+36=142\text{ students} b) We know that there are 142 students in total and , of these, 14 studied history and geography. We can express this as the following fraction: \dfrac{14}{142} This fraction can be simplified to: \dfrac{7}{71} (you can give probability as decimal or as percentage (the question does not state how the answer should be given), but because both are decimal (0.0985....) and percentage (9.85...\%) have some decimal places, leaving the probability as fractions will probably be the most sensible option here, but decimal and percentage answers are not wrong.) c) The phrase 'remembering that the chosen student is not studying geography' tells us that we need to find out how many students are not studying geography. Students who did not study geography were those who only studied history (52 students) or those who did not study the subjects (36 students). Therefore, the total number who do not study geography is 52+36 = 88 students. Of these 88 students, we need to find out how many did not study history. 36 who studied no subject study history, so 36 out of 88 who don't study geography don't study history. We can write this as the following fraction: \dfrac{36}{88} this fraction can be simplified to: \dfrac{18}{44} This fraction can be simplified again to: \dfrac{9}{22} (Decimal answer 0.409..... or 40,909....\% percentage answer is both acceptable ways to express probabilities as well.) a) What the data needs to include. Some of the data we will enter will be easy, other parts may be more confusing. Let's start with one fact at a time: All students \bf{80} like at least \bf{1} from animals. There's not much we can do with this information. However, this is key information because it tells us that once we fill in the Venn diagram, the numbers should add up to 80. \bf{15} students like all \bf{3} animals. If 15 students like all 3 animals, then we can enter '15' at the intersection of all 3 circles. \bf{14} like sharks and crocodiles but don't like hippos. With this information we can enter '14' in the section where sharks and crocodiles are tangent (which should be outside the hippo circle). \bf{23} students like crocodiles and hippos. This is part of the information that can cause confusion. Although the statement said that 23 students liked crocodiles and hippos, this does not mean that 23 students like crocodiles and hippos alone. The number 23 also includes students who love sharks as well as crocodiles and hippos. This is a slightly confusing part of the question! 15 students like sharks, crocodiles and hippos, so that means that these 15 students must love crocodiles and hippos. So, if in total there are 23 students who like crocodiles and hippos, that means there are 8 students who like crocodiles and hippos only. Therefore we can now enter '8' at the intersection of crocodiles and hippos (but not at the intersection of sharks, crocodiles and hippos). You may need to read this paragraph several times: it will sink in and make sense in the end! \bf{21} students like sharks and hippos. This is very similar information to the above information about crocodiles and hippos. 15 students such as sharks, crocodiles and hippos, therefore meaning there are at least 15 students who love sharks and hippos. Since we have been told that the total number of students who like sharks and hippos is 21, then this means that 6 students like sharks and hippos, but not crocodiles. Therefore we can enter '6' at the intersection of sharks and hippos. \bf{44} students like crocodiles. We know that 14 students like crocodiles and sharks, that 15 students like sharks, crocodiles and hippos, and that a further 8 are like crocodiles and hippos, so if we add these numbers until we know that 37 students like crocodiles. Since we were told that 44 students liked crocodiles in total, this meant there were 7 students who only liked crocodiles. Therefore we can insert '7' in the part of the crocodile circle that does not overlap with the Part. \bf{12} students just love sharks. All we need to do is put '12' in the shark section only. All we need to do is figure out how many students just like hippos. We know that there are a total of 80 students, and we have filled in every part of the Venn diagram except this last hippos section alone. If we subtract all the numbers from our total of 80, we will be able to find out how many students just like hippos: 80-12-14-7-6-15-8 = 18 Therefore our finished Venn diagram will look similar to below: b) There are 80 students in total, of which 18 are just like hippos. This means that 18 out of 80 is just like a hippo that can be written as the following fraction: \dfrac{18}{80} This fraction can be simplified to: \dfrac{9}{40} So, the probability of someone being randomly selected and only liking hippos is \frac{9}{40} (or 9\div40=0.225 if you prefer to give your answer as decimal. A 22.5\% answer is also acceptable.) c) In total there are 44 students who love crocodiles. There are 14 students who love crocodiles and sharks and 8 students who love crocodiles and hippos, so there are 22 students who like crocodiles and one other animal. This means that 22 out of 80 are just like crocodiles and one other type of animal, which can be written as the following fraction: \dfrac{22}{80} This fraction can be simplified to: \dfrac{11}{40} So, the probability of someone being randomly selected and only liking hippos is \frac{11}{40} or 11\div40=0.275 if you prefer to give your answer as decimal. A 27.5\% answer is also acceptable. Try a revision card on this topic. Topic.