MATHCOUNTS® Problem of the Week Archive

March Math Madness! – March 31, 2025

Problems & Solutions

The NCAA Basketball Tournament is a 64-team tournament featuring the top 64 college basketball teams in the United States. It is a single-elimination tournament. Each March, passionate college students, alumni and college basketball fans across the country cheer for their school teams in what has been nicknamed "March Madness." In addition to cheering for one's favorite team, a tradition is to correctly predict the outcomes of all the games in the tournament bracket.

Alison knows very little about basketball so she fills out her bracket randomly. What is the probability that Alison will correctly pick exactly one of the four teams that reaches the conference semifinals, also known as the Final Four? Express your answer as a common fraction. (Note: The tournament is divided into four regions, each consisting of 16 teams. The winner of each region advances to the Final Four.)

The probability that Alison correctly picks the team that reaches the Final Four in each region is 1/16. So the probability that she incorrectly picks a team that reaches the Final Four is 1 – 1/16 = 15/16. Since the one team Alison picks correctly can be in one of four regions, the probability that she correctly picks exactly one of the teams that reaches the Final Four is 4(1/16)(15/16)(15/16)(15/16) = 13,500/65,536 = ***3375/16,384****.*

In Alison's office bracket contest, each of the six rounds is worth a total of 32 possible points. Each correct selection of the winner of a First Round game is worth 1 point. Each correct selection of the winner of a Second Round game is worth 2 points. Each correct selection of the winner of a Third Round, also known as Sweet Sixteen game is worth 4 points. Each correct selection of the winner of a quarterfinal, also known as Elite Eight game is worth 8 points. Each correct selection of the winner of a semifinal, or Final Four game is worth 16 points. Correctly selecting the winner of the National Championship game is worth 32 points. Alison predicted that McNeese would win the tournament, but McNeese was eliminated in the Second Round. How many points did Alison lose, compared to her predicted outcome of McNeese winning the tournament?

If McNeese were to win the tournament, Alison would get 2 points for McNeese's Second Round win, 4 points for McNeese's Sweet Sixteen win, 8 points for McNeese's Elite Eight win, 16 points for McNeese's Final Four win and 32 points for McNeese's win in the National Championship game for a total of 2 + 4 + 8 + 16 + 32 = 62 points. Since McNeese lost in the Second Round, she got no points for any of those games, so Alison lost a total of ***62*** *possible points.*

Say in a game between Colorado State and Maryland, Colorado State is leading by one point. However, with a half a second left on the game clock, a Maryland player is fouled and gets to shoot two free throws, each worth one point. If the Maryland player makes 70% of his free throws, what is the probability that he will make exactly one out of two free throws, sending the game to overtime? Express your answer as a decimal to the nearest hundredth. (Assume that neither team will have time to score after the two free throws.)

The probability that the Maryland player makes a shot is 0.7, so the probability that he misses a shot is 1 – 0.7 = 0.3. The Maryland player could make exactly one free throw by (1) making the first shot and missing the second shot or by (2) missing the first shot and making the second shot. The probability of (1) is (0.7)(0.3) = 0.21 and the probability of (2) is (0.3)(0.7) = 0.21. Thus, the probability that the player makes exactly one free throw is 0.21 + 0.21 = ***0.42****.*

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