12-6 Additional Practice

Probability and Decision Making

1. There are 3 red apples and 1 green apple in a bowl. Gemma and Raul both want the green apple. How can they use probability to fairly decide who will get the green apple?

2. In each hand of a card game, there is a 54% chance of winning 3 points and a 46% chance of losing 4 points. Is the game a fair game? Explain

3. A theater coach can send only 3 of 20 applicants to a workshop. To be fair he assigns each student a number from 1 to 20. He uses the numbers below to select students. Which students were selected? Would you expect the same results if you used the same method? Explain.

   randInt(1,20) 20 **randInt(1,20) 5** **randInt(1,20) 16**

4. In a game at a fundraiser, Choice A gives you a 12% chance of winning 8 prize tickets and Choice B gives you a 46% chance of winning 2 prize tickets. Would you play Choice A or Choice B? Explain.

5. The board members of a company think there is a 75% chance of high demand and a 25% chance of low demand for a new product. If the company sells online, research models suggest profits of $20 per unit if there is high demand and $15 per unit if there is low demand. If the company sells through stores, models suggest profits of $50 per unit if there is high demand and –$10 per unit if there is low demand. Is it better to sell online or through stores? Explain.

6. The director of a race needs 10 volunteers. Because 20% of the volunteers in the past have not shown up, the director assigns 12 volunteers. Find the probability that 10 volunteers show up, 12 volunteers show up, and at least 10 volunteers show up. Do you think the director is assigning enough volunteers? Explain.

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Probability and Decision Making

1. There are 3 red apples and 1 green apple in a bowl. Gemma and Raul both want the green apple. How can they use probability to fairly decide who will get the green apple?

   Answers may vary. Sample answer: Assign three different numbers to each person on a number cube. Then roll the number cube. Each person has a 50% chance of success.

2. In each hand of a card game, there is a 54% chance of winning 3 points and a 46% chance of losing 4 points. Is the game a fair game? Explain

   No, the expected value on each hand is –0.22 and not equal to zero, so the game is not fair.

3. A theater coach can send only 3 of 20 applicants to a workshop. To be fair he assigns each student a number from 1 to 20. He uses the numbers below to select students. Which students were selected? Would you expect the same results if you used the same method? Explain.

   randInt(1,20) 20 randInt(1,20) 5 randInt(1,20) 16

   The 20th, 5th, and 16th students were selected. If I used this method, I would expect different results since the numbers are randomly generated.

4. In a game at a fundraiser, Choice A gives you a 12% chance of winning 8 prize tickets and Choice B gives you a 46% chance of winning 2 prize tickets. Would you play Choice A or Choice B? Explain.

   Sample answer: I would play Choice A because it has an expected value 0.96 which is greater than the expected value of Choice B.

5. The board members of a company think there is a 75% chance of high demand and a 25% chance of low demand for a new product. If the company sells online, research models suggest profits of $20 per unit if there is high demand and $15 per unit if there is low demand. If the company sells through stores, models suggest profits of $50 per unit if there is high demand and –$10 per unit if there is low demand. Is it better to sell online or through stores? Explain.

   Through stores, because expected profit is higher. Expected profit online: $18.75; Expected profit in stores: $35

6. The director of a race needs 10 volunteers. Because 20% of the volunteers in the past have not shown up, the director assigns 12 volunteers. Find the probability that 10 volunteers show up, 12 volunteers show up, and at least 10 volunteers show up. Do you think the director is assigning enough volunteers? Explain.

   0.283; 0.069; 0.558; Sample answer: No, the probability of at least 10 volunteers showing up is less than 56%. So more than 44% of the time, not enough volunteers will come.