

2022 MCAS Sample Student Work and Scoring Guide

Grade 7 Mathematics

Question 8: Constructed-Response

Reporting Category: Statistics and Probability

Standard: [7.SP.C.8](#) - Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

Item Description: Find probabilities of compound events involving a spinner and a number cube.

Calculator: Not allowed

[View item in MCAS Digital Item Library](#)

Scoring Guide

Select a score point in the table below to view the sample student response.

Score*	Description
4A	The student response demonstrates an exemplary understanding of the Statistics and Probability concepts involved in finding probabilities of compound events. The student finds probabilities of both simple and compound events and uses them to solve problems.
4B	
3	The student response demonstrates a good understanding of the Statistics and Probability concepts involved in finding probabilities of compound events. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
2	The student response demonstrates a fair understanding of the Statistics and Probability concepts involved in finding probabilities of compound events. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Statistics and Probability concepts involved in finding probabilities of compound events.
0	The student response contains insufficient evidence of an understanding of the Statistics and Probability concepts involved in finding probabilities of compound events. As a result, the response does not merit any points.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

Score Point 4A**This question has four parts.**

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The answer is $\frac{1}{6}$. I know this because there are 6 faces of a dice/cube and the number 5 is on one of those face. So their is a $\frac{1}{6}$ chance that the student will role a 5.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The answer is $\frac{1}{2}$. I know this because there are 6 faces on a cube. $\frac{3}{6}$ of these faces have odd numbers on them. These odd numbers include 1, 3, and 5. So the chances that a student will role an odd number is $\frac{3}{6}$. This simplifies to $\frac{1}{2}$.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The answer is $\frac{1}{18}$. I know this because there are 18 possibilities. These possibilities are (b,1), (b,2), (b,3), (b,4), (b,5), (b,6), (r,1), (r,2), (r,3), (r,4), (r,5), (r,6), (g,1), (g,2), (g,3), (g,4), (g,5), and (g,6). (b stands for blue, r stands for red, and g stands for green.) The probability of the student selecting (g,2) is $\frac{1}{18}$ because that is one of the 18 outcomes.

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The answer is $\frac{1}{3}$. I know this because out of the 18 outcomes I listed in Part C, 6 of them are even number and not blue. So the probability of the student getting an even number and not spinning blue is $\frac{6}{18}$. This simplifies to $\frac{1}{3}$.

Score Point 4B**This question has four parts.**

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

it is a $\frac{1}{6}$ probability because the number cube has #'s 1 to 6 and 5 only shows up once out of the 6.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

There is a $\frac{1}{2}$ probability because out of the 6 #'s 3 are odd and $\frac{3}{6}$ can be simplified to $\frac{1}{2}$.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$\frac{1}{6} \text{ times } \frac{1}{3} = \frac{1}{18}$$

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$$\frac{1}{2} \text{ times } \frac{2}{3} = \frac{1}{3}$$

Score Point 3**This question has four parts.**

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability of rolling a 5 on the number cube is a $\frac{1}{6}$ because there is only one 5 on the cube and 6 numbers in total.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability of rolling an odd would be $\frac{1}{2}$ because there is 3 odd numbers and a total of 6 numbers on the cube. Then you would simplify $\frac{3}{6}$ to $\frac{1}{2}$.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability is $\frac{1}{18}$ because there is a $\frac{1}{6}$ chance of rolling a 2 and a $\frac{1}{3}$ chance of spinning green, and when you multiply that together you get $\frac{1}{18}$.

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability would be $\frac{1}{3}$ because there is a $\frac{1}{2}$ chance of rolling a even and there is a $\frac{2}{3}$ chance of spinning a non-blue color. Then, when you multiply it you would get $\frac{2}{6}$, which is equal to $\frac{1}{3}$.

Score Point 2**This question has four parts.**

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability is $\frac{1}{6}$, because there are 6 possible numbers the cube could land on, and there is one 5 on the cube.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability that the number cube will land on an odd number is $\frac{3}{6}$, or 50%. This is because there are 6 total numbers on the cube, and there are 3 odd numbers: 1, 3 and 5.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability that this event will occur is $\frac{1}{6}$. This is because the probability of the cube landing on a 2 is $\frac{1}{6}$, and the probability of the spinner landing on green is $\frac{1}{3}$, or $\frac{2}{6}$. If you subtract $\frac{2}{6} - \frac{1}{6}$, you get $\frac{1}{6}$.

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

The probability is $\frac{1}{6}$. This is because there is a $\frac{3}{6}$ chance the number cube will land on an even number, and there is a $\frac{2}{6}$ chance that the spinner will land on a color that is not blue. if you subtract them, you get $\frac{1}{6}$.

Score Point 1**This question has four parts.**

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

6 sides

$$\frac{1}{6}$$

because there are 6 possibilities and 5 is one.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

$\frac{3}{3}$ because there are 3 odd numbers and even.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

For it to land on a 2 the chance is $\frac{1}{5}$ because there is one 2 and 5 other numbers.

For it land on a green section is $\frac{2}{4}$ because there are 2 blue sections and 4 other sections.

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

For it to land on an even number it is $\frac{3}{3}$ because there are 3 even numbers and 3 odd.

For it to land on a not blue section is $\frac{4}{2}$ because there are 4 not blue sections and 2 blue sections.

Score Point 0

This question has four parts.

Students are playing a game. They roll a number cube once and then spin the arrow on a spinner once.

- The number cube has faces numbered 1 through 6.
- The spinner has 3 equal-sized sections. One section is colored blue, one red, and one green.

Part A

What is the probability that, on a student's turn, the number cube will land with a 5 on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

I think it might be a 1 out of 5 chance because there are 5 chances to land on a different number and there's only 1 number 5 and it's probably a $\frac{50}{50}$ chance.

Part B

What is the probability that, on a student's turn, the number cube will land with an odd number on the top face? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

the probability would probably be $\frac{3}{3}$ because there only 3 odd numbers and there are only 3 even numbers.

Part C

What is the probability that, on a student's turn, the number cube will land with a 2 on the top face **and** the arrow on the spinner will land on the section that is green? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

I think it's a $\frac{2}{4}$ chance because there's only one 2 and the rest different numbers and there is a $\frac{1}{3}$ chance that the spinner will land on green because there is only one green.

Part D

What is the probability that, on a student's turn, the number cube will land with an even number on the top face **and** the arrow on the spinner will land on a section that is **not** blue? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

I think it is a $\frac{3}{3}$ chance because there is only 3 even numbers and there is a $\frac{2}{1}$ chance that the spinner will not land on blue.