Competitive Math Assessment - Probability Practice Quiz #1

Here are some suggestions for how to practice replicating testing conditions:

- Make sure you have a quiet place to practice on your own for an extended period of time. This will help model the actual experience of a competition. When you have finished the quiz, check your solutions using the online Brilliant quiz.
- Set a timer, or at least keep an eye on the clock to learn your own pace. If you want to set a specific time goal, math competitions provide an average of about 2 minutes per problem, so you should give yourself 30-40 minutes to complete these problems. Keep in mind that the general difficulty of problems increases as you move forward.
- Some competitions allow students to use calculators while others do not. We encourage you to use a calculator only for the most in-depth calculations on this practice quiz.

---

1. _____

The table below shows the number of students in each grade at the local middle school.

If the school paper chooses a student at random to interview, what is the probability that it will be a sixth grader?

Grade	Students
5th	19
6th	20
7th	23
8th	22

A. $\frac{1}{5}$

B. $\frac{5}{21}$

C. $\frac{1}{4}$

D. $\frac{11}{42}$

2. _____ Ezra is playing a game with the spinner shown below.

If it is equally likely to land on any of the sections, what is the probability that it lands on a multiple of 3?

A. $\frac{1}{5}$ **B.** $\frac{3}{10}$

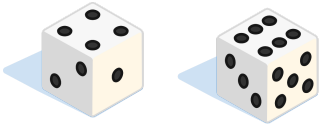
C. $\frac{1}{3}$ **D.** $\frac{7}{10}$

3. _____ Oscar is filling a jar with numbered marbles. He puts in a single marble with the number 1, two marbles with the number 2, and three marbles with the number 3. He continues this pattern until he puts in ten marbles with the number 10. He then reaches in and pulls out a single marble at random. If each of the marbles has the same probability of being drawn, what is the probability that he pulls out an even number?

A. $\frac{3}{7}$ **B.** $\frac{1}{2}$

C. $\frac{6}{11}$ **D.** $\frac{3}{5}$

4. _____ Hana rolls a pair of fair, six-sided dice. What is the probability that the sum of the numbers on the dice is less than 5?

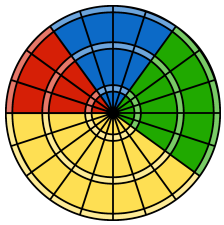


A. $\frac{1}{9}$ **B.** $\frac{1}{6}$

C. $\frac{7}{36}$ **D.** $\frac{2}{9}$

5. _____ A dartboard is divided into red, blue, green, and yellow regions.

15% of the board is red, 20% is blue, 25% is green, and 40% is yellow.



When Luis throws a dart, he has an equal opportunity of hitting every position on the board. What is the percent probability that he hits a section that is blue or green?

6. _____ Samir has 5 black shirts, 7 red shirts, and 8 blue shirts. He also has 4 pairs of black pants and 6 pairs of blue pants. Every morning he picks a shirt and pants at random, with an equal opportunity of picking each article of clothing. What is the probability that both his shirt and pants are black?

A. $\frac{1}{10}$

B. $\frac{2}{9}$

C. $\frac{1}{4}$

D. $\frac{13}{20}$

7. _____ A jar is filled with red, blue, and yellow marbles. If a single marble is selected, the probability of it being red is $\frac{1}{4}$. The probability that the marble is blue is $\frac{2}{5}$. What is the probability of selecting a yellow marble?

A. $\frac{1}{5}$

B. $\frac{2}{7}$

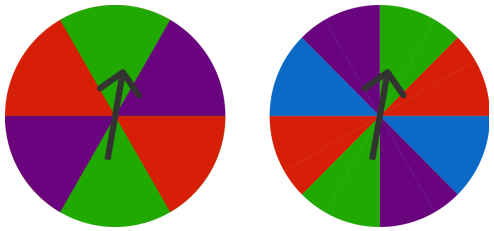
C. $\frac{1}{3}$

D. $\frac{7}{20}$

8. _____

Each of the spinners shown has the same probability of landing on each of the colored sections.

Masha spins both of the spinners once. What is the probability that at least one of the spinners lands on green?



A. $\frac{2}{5}$

B. $\frac{5}{12}$

C. $\frac{1}{2}$

D. $\frac{7}{12}$

9. _____

Three people all set down their identical notebooks on a table. On the way out, they each randomly pick up one of the notebooks. What is the probability that none of the three people pick up the notebook that they started with?

A. $\frac{1}{9}$

B. $\frac{1}{6}$

C. $\frac{2}{9}$

D. $\frac{1}{3}$

E. $\frac{1}{2}$

10. _____

Pia flips a fair coin four times in a row. Which of the statements is more likely?

A. The number of heads and tails she gets are different

B. The number of heads and tails she gets are the same

11. _____ Alex tells the truth 70% of the time while Blake tells the truth 80% of the time, independently of each other. They are shown an apple and asked, "Is it an apple or a banana?"

What is the percent probability that they will give different answers?

12. _____ Amber, Benji, Carmen, Dylan, and Eugene need to form a line to get their lunch. They all randomly choose their places in line.

If the probability that Amber and Benji are standing next to each other is written as a fraction $\frac{p}{q}$ in lowest terms, what is the value of $p+q$?

13. _____ A jar contains red and blue marbles that are otherwise identical. At first, the probability of choosing a red marble from the jar is $\frac{1}{3}$. When 10 red marbles are added to the jar, the probability of randomly selecting a red marble becomes $\frac{3}{4}$. How many red marbles were originally in the jar?

14. _____ Rahul has 4 red marbles and 2 blue marbles. If he randomly arranges the marbles into a line, what is the probability that the 2 blue marbles end up next to each other?

A. $\frac{1}{6}$ **B.** $\frac{1}{4}$ **C.** $\frac{1}{3}$

D. $\frac{2}{5}$ **E.** $\frac{1}{2}$

15. _____ A bag contains four coins. Three of the coins are fair, normal coins. One of the coins has two sides that are both heads. Liz selects a coin at random and flips it. If the result is heads, what is the probability that the other side of the coin is tails?

A. $\frac{2}{5}$ **B.** $\frac{1}{2}$ **C.** $\frac{3}{5}$

D. $\frac{2}{3}$ **E.** $\frac{3}{4}$