

For #1-4, determine whether the outcomes of each trial are dependent events or independent events.

1. A month is selected at random; a number from 1 to 30 is selected at random. *independent*
2. A month is selected at random; a day of that month is selected at random. *dependent*
3. A letter of the alphabet is selected at random; one of the remaining letters is selected at random. *dependent*
4. The color of a car is selected at random; the type of transmission is selected at random. *independent*
5. Suppose you have five books in your book bag. Three are novels, one is a biography, and one is a poetry book. Today you grab one book out of your bag without looking, and return it later. Tomorrow you do the same thing. What is the probability that you grab a novel both days?

$$\frac{3}{5} \cdot \frac{3}{5} = \boxed{\frac{9}{25}}$$

6. A jar contains four blue marbles and two red marbles. Suppose you choose a marble at random, and do not replace it. Then you choose a second marble. Find the probability of each event.

a) You select a blue marble and then a red marble. $\frac{4}{6} \cdot \frac{2}{5} = \boxed{\frac{4}{15}}$

b) You select a red marble and then a blue marble. $\frac{2}{6} \cdot \frac{4}{5} = \boxed{\frac{4}{15}}$

c) One of the marbles you select is blue and the other is red. $\boxed{\frac{4}{15}}$

d) Both of the marbles you select are red.

$$\frac{2}{6} \cdot \frac{1}{5} = \boxed{\frac{1}{15}}$$

7. A multiple-choice test has four choices for each answer. Suppose you make a random guess on three of the ten test questions. What is the probability that you will answer all three correctly?

a) Is each guess a dependent event or an independent event? $\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \boxed{\frac{1}{64}}$

b) What is the probability that a random guess on one question will yield the correct answer?

$$\frac{1}{4}$$

8. Q and R are independent events. Find $P(Q \text{ and } R)$.

a) $P(Q) = \frac{1}{4}$, $P(R) = \frac{2}{3}$ $\frac{1}{4} \cdot \frac{2}{3} = \boxed{\frac{1}{6}}$

b) $P(Q) = \frac{12}{17}$, $P(R) = \frac{3}{8}$ $\frac{12}{17} \cdot \frac{3}{8} = \boxed{\frac{9}{34}}$

c) $P(Q) = 0.6$, $P(R) = 0.9$ $(0.6)(0.9) = \boxed{0.54}$

d) $P(Q) = \frac{1}{3}$, $P(R) = \frac{6}{7}$ $\frac{1}{3} \cdot \frac{6}{7} = \boxed{\frac{2}{7}}$