

Geometric Probability and Conditional Probability: math practice, Grade 10 – download the PDF

21 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Spinner events

★ ★ ★

A spinner has 8 equal sectors numbered 1 to 8. Let A be “the number is prime” and B be “the number is greater than 5.” Find $P(A)$, $P(B)$, $P(A \cap B)$, $P(A \cup B)$ and $P(A^c)$.

2 Two coins

★ ★ ★

You flip two coins. (a) List the sample space. (b) Find the probability of exactly one head. (c) Find the probability of at least one head.

3 A rope cut at random

★ ★ ★

A rope 30 ft long is cut at a random point. What is the probability that the cut is within 5 ft of one of the two ends?

4 Rainy weekend



The chance of rain on Saturday is 0.35. What is the probability that it does not rain on Saturday? What is the probability that it rains or does not rain?

5 Lunch menu



A cafeteria offers 4 sandwiches, 3 drinks and 2 desserts. A meal is one of each. (a) How many different meals are possible? (b) A meal is chosen at random. What is the probability that it contains the chicken sandwich (one of the 4)?

6 True or false: adding probabilities



True or false: “For any two events, $P(A \cup B) = P(A) + P(B)$.” Justify with a card drawn from a standard 52-card deck, where A is “heart” and B is “king.”

7 Books on a shelf



Five different books are placed in a row on a shelf. (a) How many arrangements are there? (b) How many have two particular books side by side?

8 Dartboard with a circle



A square board 16 in wide has a centered circle of radius 6 in. A dart lands at a random point of the board. Find the probability that it lands in the circle. Give an exact value and a decimal rounded to three places.

9 Soccer and basketball



Of 40 students, 22 play soccer, 15 play basketball, and 7 play both. Find the probability that a student chosen at random (a) plays at least one of the two sports, (b) plays neither, (c) plays soccer only.

10 Independent events



Events A and B are independent with $P(A) = 0.4$ and $P(B) = 0.5$. Find $P(A \cap B)$, $P(A \cup B)$ and the probability that neither event occurs.

11 Pet owners



A survey of 50 families gave this table.

	Owns a cat	No cat
Owns a dog	8	17
No dog	12	13

Find (a) $P(\text{cat} \mid \text{dog})$, (b) $P(\text{dog} \mid \text{cat})$, (c) whether owning a cat and owning a dog are independent.

12 Team or roles

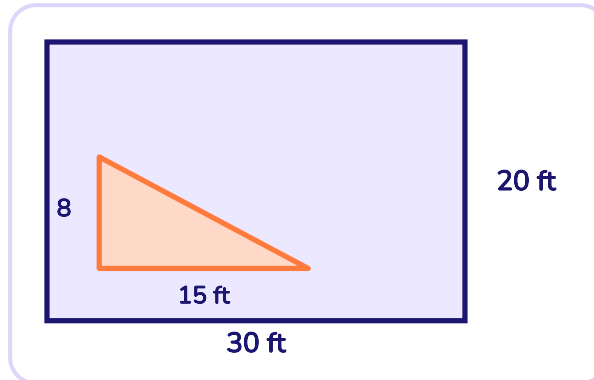


A club has 10 members. (a) In how many ways can a team of 4 be chosen? (b) In how many ways can a president, vice president, treasurer and secretary be chosen?

13 Flower bed in a garden



A rectangular garden is 30 ft by 20 ft. A right triangular flower bed with legs 15 ft and 8 ft lies inside it. A seed lands at a random point of the garden. Find the probability that it lands in the flower bed, and the probability that it does not.



14 Two dice



Two fair dice are rolled. Find the probability that the sum is (a) 9, (b) at most 4.

15 Given the sum is 8



Two fair dice are rolled. Given that the sum is 8, what is the probability that at least one die shows a 6?

16 Marbles without replacement



A bag holds 5 red and 3 blue marbles. Two marbles are drawn one after the other without replacement. Find (a) $P(\text{both red})$, (b) $P(\text{second red} \mid \text{first red})$, (c) $P(\text{different colors})$.

17 Subscribers and age

★★★

A channel surveyed 200 viewers.

	Subscribed	Not subscribed	Total
Under 30	45	75	120
30 or older	30	50	80

Are “subscribed” and “under 30” independent? Justify in two ways.

18 Photo lineup

★★★

Six friends line up for a photo. Two of them, Mia and Leo, must stand next to each other. (a) How many lineups are possible? (b) If the lineup were random, what is the probability that Mia and Leo are adjacent?

19 Committee probabilities

★★★

A committee of 4 is chosen at random from 5 juniors and 4 seniors. Find the probability that it has (a) exactly 2 juniors and 2 seniors, (b) only juniors.

20 Meeting problem

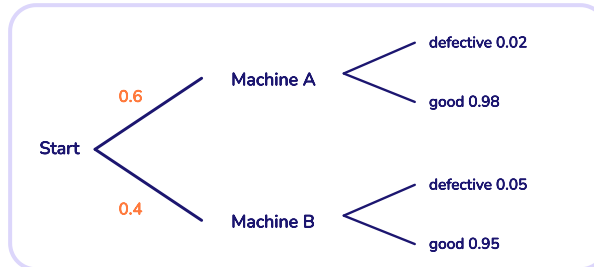
★★★

Two friends each arrive at a random moment between 1:00 and 2:00 p.m. Each waits 15 minutes for the other, then leaves. Use a square of side 60 (minutes) to find the probability that they meet.

21

Two machines

Machine A makes 60% of a factory's parts and 2% of them are defective. Machine B makes 40% and 5% of them are defective. A part is chosen at random. Find (a) the probability that it is defective, (b) the probability that it came from machine B given that it is defective.

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