

Probability Models and Chance Experiments

Grade 7 math · Worksheet · Standards: 7.SP.C.5, 7.SP.C.6, 7.SP.C.7

Name: _____ Date: _____ Class: _____

These 20 problems cover the probability scale from 0 to 1, theoretical and experimental probability, uniform and non-uniform models, and comparing predictions with observed results. Standards 7.SP.C.5, 7.SP.C.6 and 7.SP.C.7 are the focus.

Problems 1 to 7 build the basics. Problems 8 to 14 use tables, spinners and predictions. Problems 15 to 20 are multi-step word problems that ask for a judgment from data.

Standards: 7.SP.C.5, 7.SP.C.6, 7.SP.C.7 · **Level:** Grade 7

Problem 1 Certain event (easy)

A standard number cube has faces numbered 1 to 6. Describe the likelihood of rolling a number less than 7 and give its probability.

Problem 2 Describe the probability (easy)

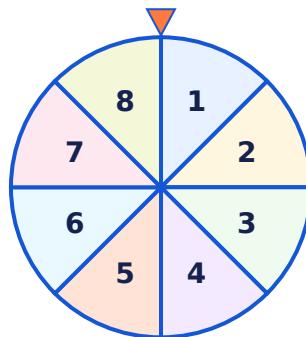
Match each probability to impossible, unlikely, equally likely as not, likely or certain: 0.92, 0, 1, 0.08, 0.5.

Problem 3 Marble bag (easy)

A bag holds 4 red, 6 yellow and 5 green marbles. One marble is drawn at random. Find $P(\text{yellow})$ as a fraction in simplest form and as a decimal.

Problem 4 Spinner with 8 sections (easy)

A spinner has 8 equal sections numbered 1 to 8. Find the probability of landing on a prime number.



Spinner numbered 1 to 8.

Problem 5 Experimental probability (easy)

A paper cup was tossed 40 times and landed on its side 14 times. Find the experimental probability that the cup lands on its side.

Problem 6 Complement (easy)

A weather app reports a 0.18 chance of snow for Tuesday. What is the probability that it does not snow on Tuesday?

Problem 7 Which is more likely (easy)

Event A has a probability of $\frac{3}{8}$. Event B has a probability of 0.4. Which event is more likely?

Problem 8 Predict a count (medium)

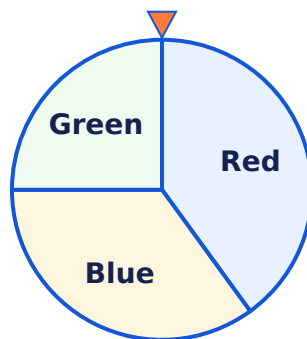
The probability of drawing a red tile from a bag is $\frac{3}{10}$. If a tile is drawn 250 times and replaced each time, how many red tiles are expected?

Problem 9 Coin flips (medium)

A fair coin is flipped 60 times and lands on heads 36 times. How many heads are expected? Is the result reasonable?

Problem 10 Missing probability (medium)

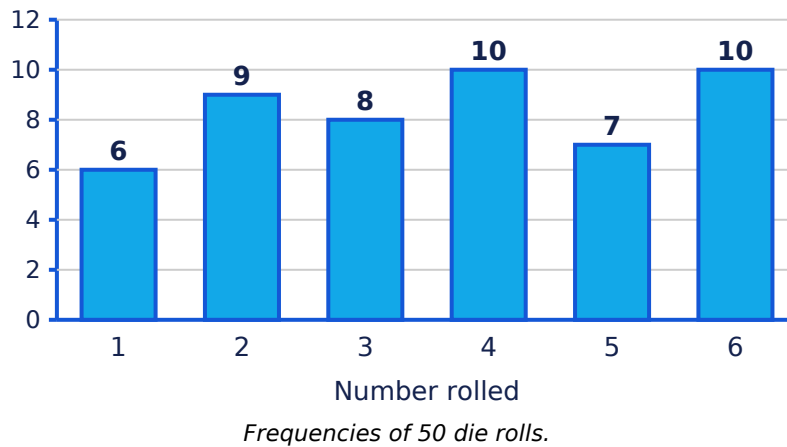
A spinner has red, blue and green sections. $P(\text{red}) = 0.40$ and $P(\text{blue}) = 0.35$. Find $P(\text{green})$ and $P(\text{not red})$.



Spinner sections.

Problem 11 Die results (medium)

A six-sided die was rolled 50 times. Find the experimental probability of a 4, compare it with the theoretical probability, and find how many 4s are expected in 50 rolls.



Problem 12 Probability model (medium)

A fair spinner has 5 equal sections: 1, 1, 2, 3, 3. Write a probability model for the outcomes 1, 2 and 3, and find $P(2 \text{ or } 3)$.

Problem 13 Free throws (medium)

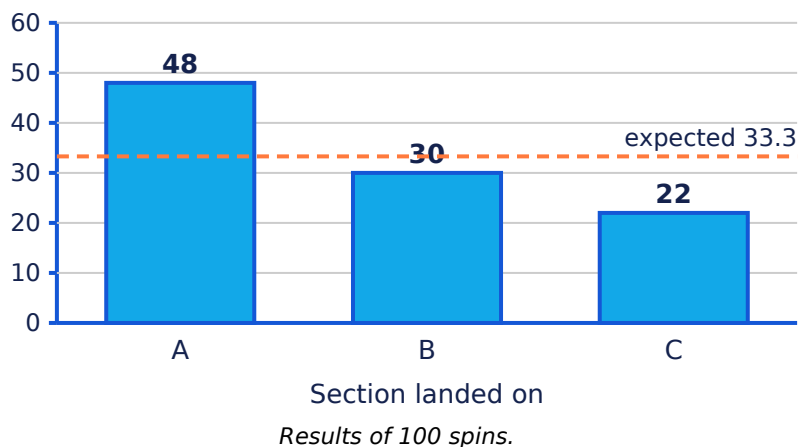
In 200 games a player made 140 of her free throws attempts. Estimate the probability that she makes a free throw, then predict how many she makes in her next 30 attempts.

Problem 14 Mystery bag (medium)

A bag of 40 chips holds only red and blue chips. In 80 draws with replacement, 22 were red. Estimate the number of red chips in the bag.

Problem 15 Is it uniform (hard)

A spinner with sections A, B and C was spun 100 times: A came up 48 times, B 30 times and C 22 times. A friend says the three outcomes are equally likely. Use the data to evaluate this claim.



Problem 16 Prize boxes (hard)

A cereal company says each of 4 prizes is equally likely in any box. Ria opened 40 boxes and

found the four prizes 14, 9, 8 and 9 times. Find the experimental probabilities and decide whether the company claim is reasonable.

Problem 17 Weather model (hard)

In a weather model for a 30-day month, $P(\text{sunny}) = 0.45$, $P(\text{cloudy}) = 0.30$ and the only other outcome is rain. Find $P(\text{rain})$ and the expected number of days of each kind.

Problem 18 Defective bulbs (hard)

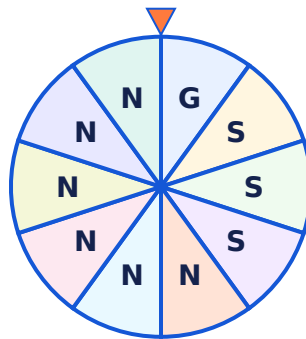
In a test of 250 bulbs, 5 were defective. A factory makes 12,000 bulbs. Estimate the probability that a bulb is not defective and the number of defective bulbs.

Problem 19 Weighted number cube (hard)

A number cube is weighted so that $P(6) = 0.25$ and each of the other five faces is equally likely. Find the probability of each of the other faces, $P(\text{even})$, and the expected number of 6s in 80 rolls.

Problem 20 Carnival game (hard)

A carnival spinner has 10 equal sections: 1 grand prize, 3 small prizes and 6 no prize. Find the probability of winning any prize. For 150 plays, predict how many prizes and how many grand prizes. In real play, 52 prizes were won: is that close to the prediction?



$G = \text{grand}$, $S = \text{small}$, $N = \text{no prize}$.