

PROBABILITY TABLES & PROBLEM SOLVING

Best Guess Mastery Worksheet (Target Grade 4/5)

I Do

A bag contains only blue counters, yellow counters, black counters, and orange counters. The table gives each of the probabilities that, when a counter is taken at random from the bag, the counter will be black or the counter will be orange.

Counter	Blue	Yellow	Black	Orange
Probability			0.15	0.45

The ratio of the number of blue counters to the number of yellow counters is 3 : 5.
There are 54 orange counters in the bag.
Work out the number of blue counters in the bag.

We Do

Katie has a box containing only red, green, purple, and white buttons. The table gives each of the probabilities that, when a button is taken at random from the box, the button will be purple or the button will be white.

Button	Red	Green	Purple	White
Probability			0.20	0.35

The ratio of the number of red buttons to the number of green buttons is 4 : 5.
There are 42 white buttons in the box.
Work out the number of green buttons in the box.

PROBABILITY TABLES & PROBLEM SOLVING**Best Guess Mastery Worksheet (Target Grade 4/5)****You Do 1**

John has a bag containing only pink, silver, gold, and bronze marbles.

The table gives each of the probabilities that, when a marble is taken at random from the bag, the marble will be gold or the marble will be bronze.

Marble	Pink	Silver	Gold	Bronze
Probability			0.12	0.28

The ratio of the number of pink marbles to the number of silver marbles is 2 : 1.

There are 56 bronze marbles in the bag.

Work out the number of pink marbles in the bag.

You Do 2

Emily has a jar containing only cherry, lemon, mint, and toffee sweets.

The table gives each of the probabilities that, when a sweet is taken at random from the jar, the sweet will be mint or the sweet will be toffee.

Sweet	Cherry	Lemon	Mint	Toffee
Probability			0.30	0.10

The ratio of the number of cherry sweets to the number of lemon sweets is 3 : 7.

There are 45 mint sweets in the jar.

Work out the number of lemon sweets in the jar.

PROBABILITY & EXPECTATION

Best Guess Mastery Worksheet (Target Grade 4/5)

Challenge 1

Paige has a biased spinner with four sections coloured red, blue, green, and yellow.
The table shows the probabilities of the spinner landing on red, blue, green, and yellow.

Colour	Red	Blue	Green	Yellow
Probability	x	$2x$	$x + 0.1$	0.3

Paige spins the spinner 120 times.
Work out an estimate for the number of times the spinner lands on blue.

Challenge 2

Anna plays a game 80 times.
The probability that she wins a game is 0.3
The probability that she draws a game is 0.45
A win earns 3 points, a draw earns 1 point, and a loss earns 0 points.

Work out an estimate for the total number of points Anna will score in her 80 games.

Answers & Worked Solutions

I Do:

$$P(\text{Blue or Yellow}) = 1 - (0.15 + 0.45) = 0.40.$$

$$\text{Ratio } 3 : 5 \text{ means 8 parts total. } P(\text{Blue}) = (3/8) \times 0.40 = 0.15.$$

$$\text{Total counters} = 54 \div 0.45 = 120.$$

$$\text{Blue counters} = 120 \times 0.15 = \mathbf{18}$$

We Do:

$$P(\text{Red or Green}) = 1 - (0.20 + 0.35) = 0.45.$$

$$\text{Ratio } 4 : 5 \text{ means 9 parts total. } P(\text{Green}) = (5/9) \times 0.45 = 0.25.$$

$$\text{Total buttons} = 42 \div 0.35 = 120.$$

$$\text{Green buttons} = 120 \times 0.25 = \mathbf{30}$$

You Do 1:

$$P(\text{Pink or Silver}) = 1 - (0.12 + 0.28) = 0.60.$$

$$\text{Ratio } 2 : 1 \text{ means 3 parts total. } P(\text{Pink}) = (2/3) \times 0.60 = 0.40.$$

$$\text{Total marbles} = 56 \div 0.28 = 200.$$

$$\text{Pink marbles} = 200 \times 0.40 = \mathbf{80}$$

You Do 2:

$$P(\text{Cherry or Lemon}) = 1 - (0.30 + 0.10) = 0.60.$$

$$\text{Ratio } 3 : 7 \text{ means 10 parts total. } P(\text{Lemon}) = (7/10) \times 0.60 = 0.42.$$

$$\text{Total sweets} = 45 \div 0.30 = 150.$$

$$\text{Lemon sweets} = 150 \times 0.42 = \mathbf{63}$$

Challenge 1:

$$\text{Sum of all probabilities} = 1.$$

$$x + 2x + x + 0.1 + 0.3 = 1$$

$$4x + 0.4 = 1$$

$$4x = 0.6 \rightarrow x = 0.15$$

$$P(\text{Blue}) = 2x = 2(0.15) = 0.30$$

$$\text{Expected times landing on blue} = 0.30 \times 120 = \mathbf{36}$$

Challenge 2:

$$\text{Expected number of wins} = 0.3 \times 80 = 24 \text{ games.}$$

$$\text{Points from wins} = 24 \times 3 = 72 \text{ points.}$$

$$\text{Expected number of draws} = 0.45 \times 80 = 36 \text{ games.}$$

$$\text{Points from draws} = 36 \times 1 = 36 \text{ points.}$$

$$\text{Total estimated points} = 72 + 36 = \mathbf{108}$$