

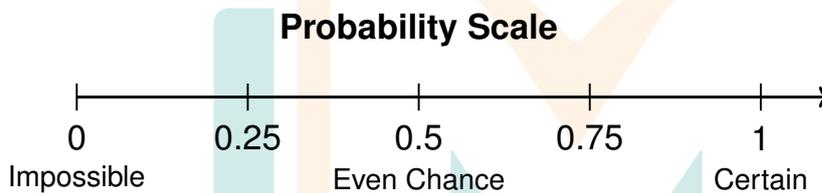


# Worksheet 51: The Probability Scale

Year 6 Mathematics — Data & Probability — Name: \_\_\_\_\_

## Section 1: Fluency — Describing Chance

**Question 1:** Look at the probability scale below. Mark the position of "Even Chance" on the number line with an arrow and label it.



**Answer:** Draw your arrow on the number line above.

**Question 2:** What is the probability of flipping a coin and getting **Heads**? Write your answer as a decimal.

**Answer:** \_\_\_\_\_

**Question 3:** What is the probability of rolling a **4** on a standard six-sided die? Write your answer as a fraction.

**Answer:** \_\_\_\_\_

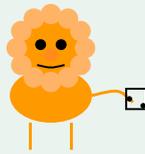
**Question 4:** On the probability scale, where would you mark an event that is **Impossible**? Write the number.



Answer: \_\_\_\_\_

**Question 5:** On the probability scale, where would you mark an event that is **Certain**? Write the number.

Answer: \_\_\_\_\_



### Probability Pioneer!

*Why did the probability scale go to school?  
To learn how to measure up to expectations!*

## Section 2: Reasoning — Fractions, Decimals & Percentages

**Question 6:** There is a **1 in 4** chance of winning a game. Write this probability as a **percentage**.

Answer: \_\_\_\_\_

**Question 7:** A bag contains **5 red marbles** and **5 blue marbles**. What is the probability of picking a red marble? Write your answer as:

- A fraction: \_\_\_\_\_
- A percentage: \_\_\_\_\_



**Question 8:** Convert the fraction

$$\frac{3}{4}$$

to a decimal and a percentage.

**Answer:** Decimal: \_\_\_\_\_ Percentage: \_\_\_\_\_

**Question 9:** The probability of rain tomorrow is

0.3

. Write this as a percentage.

**Answer:** \_\_\_\_\_

**Question 10:** A spinner has 8 equal sections: 2 are red, 3 are blue, and 3 are green. What is the probability of spinning **red**? Write your answer as a fraction in simplest form.

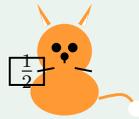
**Answer:** \_\_\_\_\_

**Question 11:** If the chance of something happening is

75%

, what is the chance of it **NOT** happening?

**Answer:** \_\_\_\_\_



## Fraction Master!

*Why was the fraction always happy?  
Because it knew how to find common ground with everyone!*

### Section 3: Challenge — Impossible to Certain

**Question 12:** Give an example of an event that has a probability of **0** (Impossible). Write a complete sentence.

**Answer:** \_\_\_\_\_  
\_\_\_\_\_

**Question 13:** Give an example of an event that has a probability of **1** (Certain). Write a complete sentence.

**Answer:** \_\_\_\_\_  
\_\_\_\_\_

**Question 14:** Place these events on the probability scale by writing their approximate position (0, 0.25, 0.5, 0.75, or 1):

- The sun will rise tomorrow: \_\_\_\_\_
- You will roll a 7 on a standard die: \_\_\_\_\_
- It will rain sometime this year: \_\_\_\_\_



**Question 15:** A bag has 1 red, 2 blue, and 1 green marble (4 total). Is it more likely to pick blue or red? Explain why using probability.

**Answer:** \_\_\_\_\_

**Question 16:** True or False: If something has a

50%

chance of happening, it will definitely happen exactly half the time in any experiment.

**Answer:** \_\_\_\_\_

**Question 17:** What probability (as a fraction) is exactly halfway between Impossible and Certain?

**Answer:** \_\_\_\_\_



### Chance Champion!

*Why did the chameleon love probability?  
Because it could change its predictions to match any situation!*

**Fantastic work! Check your answers on the next page.**



## Worksheet 51: Answer Key

### Section 1: Fluency — Describing Chance

**Question 1:** Arrow should point to 0.5 on the number line

**Question 2:**

0.5

(or

0.50

)

**Question 3:**

$\frac{1}{6}$

**Question 4:**

0

**Question 5:**

1

### Section 2: Reasoning — Fractions, Decimals & Percentages

**Question 6:**

25%

(

$$\frac{1}{4} = 0.25 = 25\%$$

)

**Question 7:** Fraction:

$\frac{5}{10}$

or

$\frac{1}{2}$

; Percentage:

50%



**Question 8:** Decimal:

0.75

; Percentage:

75%

**Question 9:**

30%

**Question 10:**

$\frac{2}{8}$

or

$\frac{1}{4}$

(simplified)

**Question 11:**

25%

(

$$100\% - 75\% = 25\%$$

)

### Section 3: Challenge — Impossible to Certain

**Question 12:** Accept reasonable answers. Examples: "Rolling a 7 on a standard die", "Flipping a coin and getting both heads and tails at once", "The sun rising in the west", etc.

**Question 13:** Accept reasonable answers. Examples: "The sun will rise tomorrow", "A rolled die will show a number between 1 and 6", "Water will freeze at 0°C", etc.

**Question 14:**

- The sun will rise tomorrow:

1

(Certain)

- You will roll a 7 on a standard die:

0

7



(Impossible)

- It will rain sometime this year:

0.75

to

1

(Very likely or Certain - accept reasonable answers)

**Question 15:** More likely to pick blue. Blue has probability

$$\frac{2}{4} = \frac{1}{2} = 50\%$$

, while red has probability

$$\frac{1}{4} = 25\%$$

. (Accept explanations showing understanding)

**Question 16:** False (Results vary due to chance;

50%

is the expected probability, but actual results may differ in experiments)

**Question 17:**

$\frac{1}{2}$

(or

0.5

or

50%

)

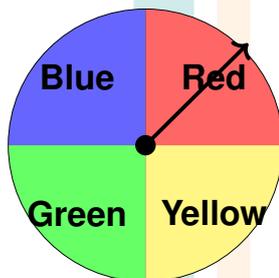


# Worksheet 52: Expected Frequency & Experiments

Year 6 Mathematics — Data & Probability — Name: \_\_\_\_\_

## Section 1: Fluency — Basic Predictions

**Question 1:** Look at the spinner below, which is divided into 4 equal sections. If you spin it **20 times**, how many times do you **expect** to land on Red?



Equal Spinner (4 sections)

**Answer:** \_\_\_\_\_

**Question 2:** If you roll a standard six-sided die **60 times**, how many times do you **expect** to roll a 6?

**Answer:** \_\_\_\_\_

**Question 3:** A coin is flipped **100 times**. How many times do you expect to get **Heads**?

**Answer:** \_\_\_\_\_



**Question 4:** A bag has 3 red marbles and 1 blue marble (4 total). If you pick a marble 40 times (replacing it each time), how many times do you expect to pick **red**?

**Answer:** \_\_\_\_\_

**Question 5:** Using the spinner from Question 1, if you spin it **80 times**, how many times do you expect to land on **Blue**?

**Answer:** \_\_\_\_\_



### Prediction Pro!

*Why did the dice go to the fortune teller?  
To find out what number would come up next!*

## Section 2: Reasoning — Expected vs Observed Results

**Question 6:** Sarah flipped a coin **10 times** and got **8 Heads** and **2 Tails**. She expected to get 5 of each. Did Sarah make a mistake, or is this just normal variation (chance)?

**Answer:** \_\_\_\_\_

\_\_\_\_\_

**Question 7:** Tom rolled a die 60 times. He expected to get ten 6s, but he only got 8. Is this a problem? Explain why or why not.



**Answer:** \_\_\_\_\_

\_\_\_\_\_

**Question 8:** Why does the "Expected" result not always happen in real-life experiments? Write one reason.

**Answer:** \_\_\_\_\_

\_\_\_\_\_

**Question 9:** A spinner has 2 red sections and 2 blue sections (4 equal parts). Mia spun it 20 times and got 12 reds and 8 blues. Is this close to the expected result? Explain.

**Answer:** \_\_\_\_\_

\_\_\_\_\_

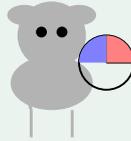
**Question 10:** True or False: If you flip a coin and get 3 Heads in a row, the next flip is more likely to be Tails.

**Answer:** \_\_\_\_\_

**Question 11:** A bag has 5 green and 5 yellow marbles. You pick 50 times (with replacement). You expect 25 green. Would getting exactly 23 green be surprising? Why or why not?

**Answer:** \_\_\_\_\_

\_\_\_\_\_



### Experiment Expert!

*What did the elephant say about probability experiments?  
I never forget that results can vary, but the odds stay the same!*

### Section 3: Challenge — Large Numbers & Real-World Probability

**Question 12:** The weather forecast says there is a **20% chance of rain** each day. In **100 days**, how many rainy days do you expect?

**Answer:** \_\_\_\_\_

**Question 13:** A factory makes **1000 toys**. Quality control shows that **1%** of toys are broken. How many broken toys do you expect?

**Answer:** \_\_\_\_\_

**Question 14:** A basketball player has a **75% free throw success rate**. If she takes **40 shots**, how many do you expect her to make?

**Answer:** \_\_\_\_\_

**Question 15:** A spinner has 5 equal sections: 1 red, 2 blue, 2 green. If you spin it **200 times**, how many times do you expect to land on **blue**?



**Answer:** \_\_\_\_\_

**Question 16:** The probability of winning a raffle is

$$\frac{1}{50}$$

. If **500 tickets** are sold in separate raffles, how many times would you expect to win?

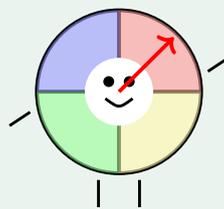
**Answer:** \_\_\_\_\_

**Question 17:** A coin is flipped **1000 times**. Would you be surprised if you got exactly 500 Heads and 500 Tails? Explain your thinking.

**Answer:** \_\_\_\_\_  
\_\_\_\_\_

**Question 18:** Calculate the expected frequency: A die is rolled **300 times**. How many times do you expect to roll an **even number** (2, 4, or 6)?

**Answer:** \_\_\_\_\_



### Probability Master!

*Why did the spinner get a promotion?  
Because it always knew which way things were going to turn out!*



**Brilliant work! You've completed the Year 6 Maths journey!**  
**Check your answers on the next page.**





## Worksheet 52: Answer Key

### Section 1: Fluency — Basic Predictions

**Question 1:** 5 times (Probability

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

, so

$$\frac{1}{4} \times 20 = 5$$

)

**Question 2:** 10 times (Probability

$$= \frac{1}{6}$$

, so

$$\frac{1}{6} \times 60 = 10$$

)

**Question 3:** 50 times (Probability

$$= \frac{1}{2}$$

, so

$$\frac{1}{2} \times 100 = 50$$

)

**Question 4:** 30 times (Probability

$$= \frac{3}{4}$$

, so

$$\frac{3}{4} \times 40 = 30$$

)



**Question 5:** 20 times (Probability

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

, so

$$\frac{1}{4} \times 80 = 20$$

)

## Section 2: Reasoning — Expected vs Observed Results

**Question 6:** This is just normal variation (chance). With only 10 flips, results can vary quite a bit from the expected 5-5 split. No mistake was made. (Accept explanations showing understanding of chance variation)

**Question 7:** No, this is not a problem. 8 is very close to the expected 10, and with probability, small variations are normal. (Accept reasonable explanations)

**Question 8:** Accept answers such as: "Chance/randomness means results vary", "Sample size affects results", "Probability shows what's expected on average, not guaranteed", etc.

**Question 9:** Expected: 10 red and 10 blue. Observed: 12 red and 8 blue. This is reasonably close; the difference of 2 from expected is normal variation. (Accept explanations showing understanding)

**Question 10:** False (Each flip is independent with

50%

chance; previous results don't affect future flips - this is called the "gambler's fallacy")

**Question 11:** No, 23 is very close to 25 and would not be surprising. This is normal variation in a probability experiment. (Accept reasonable explanations)

## Section 3: Challenge — Large Numbers & Real-World Probability

**Question 12:** 20 rainy days (

$$20\% \times 100 = 0.2 \times 100 = 20$$



)

**Question 13:** 10 broken toys (

$$1\% \times 1000 = 0.01 \times 1000 = 10$$

)

**Question 14:** 30 successful shots (

$$75\% \times 40 = 0.75 \times 40 = 30$$

)

**Question 15:** 80 times (Probability of blue

, so

)

**Question 16:** 10 wins (

)

**Question 17:** No, getting exactly 500-500 would actually be somewhat surprising because exact expected values are rare in large experiments. Results close to 500-500 (like 490-510 or 485-515) would be expected, but exactly 500 is unlikely due to natural variation. (Accept explanations showing understanding that exact matches are rare but close results are expected)

**Question 18:** 150 times (Probability of even

$$= \frac{3}{6} = \frac{1}{2}$$

, so

$$\frac{1}{2} \times 300 = 150$$

)