Year 7 probability worksheet

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Name: _____ Date: _____

Question 1

A standard six-sided die is rolled. Describe the chance of each event using one of: impossible, unlikely, even chance, likely, certain.

(a) rolling a 7 (b) rolling an even number (c) rolling a number less than 6 (d) rolling a number from 1 to 6

Answer: _____

Question 2

A standard six-sided die has faces numbered 1 to 6. List the sample space for one roll of the die, then find the probability of rolling a number greater than 4. Write your answer as a fraction, a decimal and a percentage.

Answer: _____

Question 3

Mia spins a fair four-sided spinner with equal sections labelled 1, 2, 3 and 4. She records her results over 40 spins and lands on 3 a total of 14 times. What is the theoretical probability of landing on 3? What is the experimental probability of landing on 3 based on Mia's results? By how many percentage points do these two probabilities differ? Round to one decimal place.

Answer: _____

Question 4

A bag holds 3 red, 5 blue and 2 green marbles. One marble is chosen without looking.

(a) List the colours from least likely to most likely.

(b) What is the probability of choosing blue, and how would you describe this chance in words?

Answer: _____

Question 5

A bag contains 3 red marbles, 5 blue marbles and 2 yellow marbles. One marble is drawn at random. Find the probability that the marble is NOT blue.

Answer: _____

Question 6

(a) A fair die is rolled 300 times. About how many times would you expect to roll a 5?

(b) A fair coin is tossed 80 times. About how many heads would you expect?

Answer: _____

Question 7

A spinner has 8 equal sectors: 4 yellow, 3 blue and 1 red.

(a) Which colour is most likely?

(b) Describe in words the chance of landing on yellow, and the chance of landing on red.

(c) Redesign the 8-sector spinner so that blue and red are equally likely and yellow is unlikely but still possible.

Answer: _____

Question 8

A spinner is divided into 8 equal sections numbered 1 to 8. What is the probability of spinning a number greater than 5? Give your answer as a fraction.

Answer: _____

Question 9

A bag has 2 red, 3 white and 5 black counters. A counter is drawn, its colour is recorded, and it is put back. This is done 200 times. Predict how many times each colour will be drawn.

Answer: _____

Question 10

The probability that a train is late is 0.3. What is the probability that it is not late?

Answer: _____

Year 7 probability: answers and worked solutions

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Question 1

Key idea: Compare the number of favourable outcomes with the 6 possible outcomes.

1. (a) No face shows 7: 0 out of 6, impossible 2. (b) 2, 4, 6: 3 out of 6, even chance 3. (c) 1, 2, 3, 4, 5: 5 out of 6, likely 4. (d) All 6 outcomes: certain

Answer: (a) impossible (b) even chance (c) likely (d) certain

Question 2

Key idea: The sample space is the list of all possible outcomes. Probability = (number of favourable outcomes)/(total number of outcomes)

1. List the sample space: {1, 2, 3, 4, 5, 6}. There are 6 equally likely outcomes. 2. Identify the favourable outcomes (greater than 4): {5, 6}. There are 2 favourable outcomes. 3. Write the probability as a fraction: P(greater than 4) = 2/6 = ⅓ 4. Convert to a decimal: ⅓ ≈ 0.333... 5. Convert to a percentage: ⅓ × 100 ≈ 33.3%

Answer: ⅓, approximately 0.333..., approximately 33.3%

Question 3

Key idea: Theoretical probability uses equally likely outcomes; experimental probability uses actual results. Experimental probability = (number of times the outcome occurred)/(total number of trials)

1. Find the theoretical probability. There are 4 equally likely outcomes and one favourable outcome: P(3) = ¼ = 0.25 = 25% 2. Find the experimental probability using Mia's results: P(3 from experiment) = 14/40 = 7/20 = 0.35 = 35% 3. Find the difference in percentage points: 35% - 25% = 10% 4. The experimental probability is 10 percentage points higher than the theoretical probability. This is expected because experiments with a small number of trials often differ from the theoretical value.

Answer: Theoretical probability: 25%. Experimental probability: 35%. Difference: 10 percentage points.

Question 4

Key idea: The colour with more marbles is more likely to be chosen.

1. (a) Green 2, red 3, blue 5, so green, red, blue 2. (b) Total marbles: 3 + 5 + 2 = 10. P(blue) = 5/10 = ½, which is an even chance

Answer: (a) green, red, blue (b) ½, even chance

Question 5

Key idea: Complementary events cover all outcomes that are not the chosen event. P(not A) = 1 - P(A)

1. Find the total number of marbles: 3 + 5 + 2 = 10. 2. Find P(blue) = 5/10 = ½. 3. Use the complement rule: P(not blue) = 1 - ½ = ½ 4. Check by listing non-blue marbles: 3 + 2 = 5 marbles, so P(not blue) = 5/10 = ½. ✓

Answer: ½

Question 6

Answer: (a) 50 (⅙ × 300) (b) 40

Question 7

Key idea: Probability = (favourable sectors)/(total sectors) when all sectors are equal.

1. (a) Yellow has the most sectors (4), so it is most likely 2. (b) P(yellow) = 4/8 = ½: even chance. P(red) = ⅛: unlikely 3. (c) Blue and red need the same number of sectors, and yellow needs at least 1 but fewer than half. For example 2 yellow, 3 blue, 3 red gives P(yellow) = 2/8 = ¼ (unlikely) and P(blue) = P(red) = ⅜. Other answers are possible.

Answer: (a) yellow (b) yellow: even chance; red: unlikely (c) For example 2 yellow, 3 blue, 3 red

Question 8

Key idea: Probability = (number of favourable outcomes) ÷ (total number of equally likely outcomes).

1. The sample space is {1, 2, 3, 4, 5, 6, 7, 8}, so there are **8** outcomes in total. 2. Outcomes greater than 5 are {6, 7, 8}, so there are **3** favourable outcomes. 3. Write the probability as a fraction: P(greater than 5) = ⅜ 4. Check: ⅜ is between 0 and 1, which makes sense for a probability.

Answer: ⅜

Question 9

Answer: Red 40, white 60, black 100

Question 10

Key idea: An event and its complement have probabilities that add to 1.

1. 1 - 0.3 = 0.7

Answer: 0.7