Expected Number

Mana Maths

Te reo Māori terms

tūmanako
expected
Open in Te Aka

tūponotanga
probability
Open in Te Aka

tau
number
Open in Te Aka

tauira
trial/sample
Open in Te Aka

Foundation: Expected Number

1. The probability of rain tomorrow is 0.3. If you check the weather for 10 days, how many days are expected to have rain?

2. A coin is fair. If you flip it 20 times, how many heads are expected?

3. A dice is rolled 30 times. How many times is a 6 expected?

4. A bag has 3 red marbles and 7 blue marbles. If you draw one marble (and put it back) 50 times, how many red marbles are expected?

5. The probability of a bus being late is 0.1. If there are 40 buses, how many are expected to be late?

6. A spinner has 4 equal sections. If spun 24 times, how many times is section 1 expected?

7. A test has 5 multiple choice questions, each with 4 options. If guessing randomly, how many correct answers are expected?

8. A factory makes light bulbs. The probability of a bulb being faulty is 0.02. If they make 500 bulbs, how many faulty ones are expected?

9. A basketball player makes 60% of free throws. If they take 25 shots, how many are expected to go in?

10. A deck of cards has 52 cards. If you draw one card (and replace it) 26 times, how many hearts are expected?

11. The probability of winning a game is 0.15. If you play 20 times, how many wins are expected?

12. A bag has 8 green balls and 2 yellow balls. If you draw one ball (and replace it) 30 times, how many yellow balls are expected?

13. A dice is rolled 18 times. How many times is an even number expected?

14. The chance of snow is 0.25. If you check for 12 days, how many snowy days are expected?

15. A coin is biased: P(Heads) = 0.4. If flipped 15 times, how many tails are expected?

16. A spinner has 5 equal sections. If spun 35 times, how many times is section 3 expected?

Proficient: Expected Number

1. The probability of a train being delayed is 0.15. In a year, there are 365 trains. Calculate the expected number of delayed trains.

2. A bag contains 4 red balls and 6 blue balls. If a ball is drawn and replaced 100 times, what is the expected number of times a blue ball will be drawn?

3. A factory produces 2,000 light bulbs. If the probability of a bulb being faulty is $\frac{1}{200}$, how many faulty bulbs are expected?

4. A student guesses on a 40-question multiple choice test (4 options each). What is the expected number of correct answers?

5. A basketball player makes $\frac{3}{5}$ of their shots. If they take 75 shots in a tournament, how many are expected to go in?

6. The chance of a product being defective is 2.5%. In a batch of 800 products, how many defectives are expected?

7. A dice is rolled 150 times. How many times is a prime number (2, 3, or 5) expected?

8. A survey shows 30% of people prefer brand A. If you ask 250 people, how many are expected to prefer brand A?

9. A coin is biased with P(Heads) = 0.45. If flipped 80 times, how many tails are expected?

10. A spinner has sections: 40% red, 25% blue, 35% green. If spun 120 times, how many times is it expected to land on blue?

11. The probability of a computer crashing in a day is 0.08. Over 50 days, how many crashes are expected?

12. A deck of cards: If you draw one card (with replacement) 130 times, how many face cards (J, Q, K) are expected?

Excellence: Expected Number

1. A factory makes components with a 1.2% defect rate. In a shipment of 1250 components, what is the expected number of defective ones? Give your answer to the nearest whole number.

2. A basketball player's free throw percentage is 72.5%. If they take 48 free throws in a season, how many are expected to be successful? Round to the nearest whole number.

3. In a multiple-choice test with 60 questions (5 options each), a student guesses all answers. What is the expected score? Would you be surprised if they got 20 correct? Explain.

4. A biased coin has P(Heads) = 0.42. If flipped 175 times, how many tails are expected? Give your answer to one decimal place.

5. A spinner has unequal sections: Red (30%), Blue (25%), Green (20%), Yellow (25%). If spun 240 times, how many times is it expected to land on Red or Green?

6. The probability of a customer making a purchase is 0.18. If 350 customers visit a store, what is the expected number of purchases? How does this help the store manager?

7. A dice is rolled 210 times. How many times is a number greater than 2 expected? What assumption are you making?

8. A bag contains 7 white, 4 black, and 9 red marbles. If a marble is drawn (with replacement) 180 times, how many times is a non-white marble expected?

9. A weather forecast says there's a 35% chance of rain each day for the next 2 weeks (14 days). How many rainy days are expected? Would it be unusual to have only 2 rainy days? Explain.

10. A factory's quality control finds that 3 out of every 200 items are defective. In a production run of 8500 items, what is the expected number of defectives?

11. A student estimates they have a 65% chance of passing each test. If they have 8 tests this term, how many are they expected to pass? What does this tell you about their likely overall performance?

12. A deck of cards: If you draw one card (with replacement) 156 times, how many times are you expected to draw a card that is NOT a heart?

13. A game gives a prize with probability $\frac{1}{12}$. If 144 people play, how many prizes are expected to be given out? The organiser has 15 prizes. Is this enough?

14. A survey suggests 22.5% of teenagers own a tablet. In a school of 840 students, how many tablet owners are expected? Round appropriately.

15. A biased dice has P(6) = 0.25. If rolled 96 times, how many sixes are expected? If you actually got 30 sixes, would this be surprising?

16. A traffic light is green for 40 seconds, amber for 5, red for 25 in each cycle. If you approach it 90 times at random times, how many times are you expected to find it green?

17. A bag has marbles in ratio 3:5:2 (red:blue:green). If you draw (with replacement) 200 times, how many blue marbles are expected?

18. The chance of a flight being overbooked is 8%. An airline has 225 flights next month. How many are expected to be overbooked? Why might the actual number differ?

19. A spinner has areas: A=40%, B=30%, C=20%, D=10%. If spun 150 times, how many times is it expected to land on B or C?

20. A factory finds that 0.8% of its products fail within the first year. If it sells 12,500 products, how many failures are expected in the first year?