

To the Student

In *FOCUS on Determining Probability and Averages, Book F*, you will read problems and answer questions. You will practise using a maths strategy. It is called Determining Probability and Averages. You will learn about the strategy on the Learn About pages. You will see a sample passage, sample questions and sample answer choices on the Lesson Preview pages. Then you will practise using the strategy.

Each lesson has a passage and five questions. After you finish reading the passage, answer the five questions. For the first four questions, fill in the correct answers on the Answer Form on page 53. Or, you may fill in the correct answers on the page. For the fifth question, show your work. Then write and explain your answer. Fill in the circle on the Answer Form to show that you have completed the fifth question.

Use the Tracking Chart on page 47. Show when you have finished each lesson and the number of questions that you answered correctly. After each group of five lessons, complete a self-assessment. This will let you see how you are doing.

So . . . FOCUS and enjoy!

Acknowledgments

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Learn About

Determining Probability and Averages: Probability

Probability is the chance that a certain event will occur. The probability of an event occurring is found by comparing the number of favourable outcomes to the total number of outcomes. Probability can be represented as a fraction or as a percentage.

The chart shows the number of each colour of pieces of confetti in a bag. To find the probability of picking a yellow piece of confetti, first find the total number of pieces of confetti. Then divide the number of yellow pieces of confetti by the total number of pieces of confetti. You can write the probability as a fraction or as a percentage.

Confetti

Colour	Number
Red	150
Blue	180
Yellow	120
Green	50
White	80

Fraction:

Total number of pieces of confetti: 580

Number of yellow pieces of confetti: 120

Probability: $\frac{120}{580} = \frac{6}{29}$

Percentage:

$$\frac{6}{29} = 6 \div 29 \approx 0.207$$

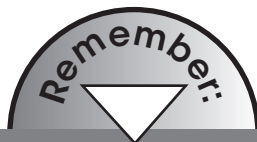
$$0.207 \times 100 = 20.7\%$$

Tamsin writes each letter of WOOLLOOMOOLOO on a card and places the cards face down on the table. What is the probability of Tamsin selecting a card with an L on it? Write the probability as a fraction and a percentage, rounded to the nearest per cent.

There are 3 cards with an L written on them and 13 cards in all.

$$\frac{3}{13} = 3 \div 13 \approx 0.23 \text{ and } 0.23 = 23\%$$

The probability of picking a card with an l on it is $\frac{3}{13}$ or **23%**.



Probability is the chance that a certain event will occur. The probability of an event occurring is found by comparing the total number of favourable outcomes to the total number of outcomes.

Learn About

Determining Probability and Averages: Averages and Combinations

The **average** is the sum of the items in a group divided by the total number of items in that group. Find the average of 25, 31, 26 and 38.

First, find the sum of the numbers: $25 + 31 + 26 + 38 = 120$.

Then divide the sum by the number of items in that group (4):

$$120 \div 4 = 30.$$

The average of 25, 31, 26 and 38 is **30**.

Combinations are the number of ways that items from different categories can be grouped together. To find the total number of possible combinations, multiply the number of items in one category by the number of items in the other category. Find the total number of possible combinations for 5 shirts and 4 pairs of shorts.

$$5 \times 4 = 20$$

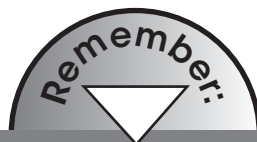
There are **20 possible combinations** for 5 shirts and 4 pairs of shorts.

Jake will pick one activity from group A and one activity from group B. How many possible combinations of activities are there?

Summer Camp Activities

Group A		Group B	
Activity	Length (min)	Activity	Length (min)
Crafts	45	Swimming	60
Reading	60	Basketball	60
Woodwork	30	Hiking	45
Story Telling	50	Totem Tennis	50
Scavenger Hunt	55	Volleyball	40

There are 5 activities in group A and 5 activities in group B. To find the total number of possible combinations, multiply the number of activities in each group: $5 \times 5 = 25$. There are 25 possible combinations.



The **average** is the sum of the items in a group divided by the total number of items in that group. **Combinations** are the number of ways that items from different categories can be grouped together.

Lesson Preview

Read these sample problems.

Determining Probability and Averages

Bailey is getting ready for school. He refuses to turn on the light in the morning because it hurts his eyes. Bailey knows that all of his socks are in the top drawer of his chest of drawers. His shirts are in the second drawer, and his pants are in the third drawer.

Bailey's Clothing Options

Socks		Shirts		Pants	
Colour	Number	Colour	Number	Colour	Number
Black	10	Black	2	Black	3
White	10	Blue	4	Blue	5
Brown	3	Green	2	Brown	2
		Yellow	3		

1. How many combinations of sock colour, shirt colour and pants colour does Bailey have to choose from?

- (A) 44 combinations
- (B) 36 combinations
- (C) 10 combinations
- (D) 3 combinations

2. If Bailey takes a pair of socks without looking, what is the probability that he will choose a pair of black socks?

- (A) $\frac{10}{23}$
- (B) $\frac{1}{3}$
- (C) $\frac{3}{10}$
- (D) $\frac{2}{11}$

Look at the answer choices for each question.
Read why each answer choice is correct or
not correct.

1. How many combinations of sock colour, shirt colour and pants colour does Bailey have to choose from?

Ⓐ 44 combinations

This is not correct. There are 3 different colours of socks, 4 different colours of shirts and 3 different colours of pants. $3 \times 4 \times 3 = 36$, not 44.

● 36 combinations

This is correct. There are 3 different colours of socks, 4 different colours of shirts and 3 different colours of pants. $3 \times 4 \times 3 = 36$.

Ⓒ 10 combinations

This is not correct. There are 3 different colours of socks, 4 different colours of shirts and 3 different colours of pants. Multiply $3 \times 4 \times 3 = 36$. Do not add $3 + 4 + 3 = 10$.

Ⓓ 3 combinations

This is not correct. There are 3 different colours of socks, 4 different colours of shirts and 3 different colours of pants. Multiply $3 \times 4 \times 3 = 36$.

2. If Bailey takes a pair of socks without looking, what is the probability that he will choose a pair of black socks?

● $\frac{10}{23}$

This is correct. There are 23 pairs of socks in all, 10 of which are black. The probability is $\frac{10}{23}$.

Ⓑ $\frac{1}{3}$

This is not correct. There are 23 pairs of socks in all, 10 of which are black. The probability is $\frac{10}{23}$, not $\frac{1}{3}$.

Ⓒ $\frac{3}{10}$

This is not correct. There are 23 pairs of socks in all, 10 of which are black. The probability is $\frac{10}{23}$, not $\frac{3}{10}$.

Ⓓ $\frac{2}{11}$

This is not correct. There are 23 pairs of socks in all, 10 of which are black. The probability is $\frac{10}{23}$, not $\frac{2}{11}$.

Lesson

1

Read the passage.
Then do Numbers 1–5.

Warm Weather

The Bureau of Meteorology keeps data for all cities in Australia. The data are useful in predicting weather. The average maximum temperatures for each month for four cities are shown in the table.

Average Maximum Temperature (°C)

	J	F	M	A	M	J	J	A	S	O	N	D
Brisbane	29	29	28	26	24	21	21	22	24	26	27	28
Sydney	26	26	25	22	19	17	16	18	20	22	24	25
Melbourne	26	26	25	20	17	14	13	15	17	20	22	24
Perth	30	30	29	25	21	18	17	18	20	21	25	27

1. What is the average maximum temperature in Brisbane from January to June? Round to the nearest whole number.

- Ⓐ 29°C
- Ⓑ 28°C
- Ⓒ 27°C
- Ⓓ 26°C

2. For these four cities, what is the average maximum temperature for February? Round to the nearest whole number.

- Ⓐ 26°C
- Ⓑ 28°C
- Ⓒ 29°C
- Ⓓ 30°C

3. What is the average maximum temperature in Sydney for the three coldest months?

- Ⓐ 17°C
- Ⓑ 18°C
- Ⓒ 19°C
- Ⓓ 20°C

4. What is the average maximum temperature in Melbourne for the three hottest months?

- Ⓐ 24°C
- Ⓑ 25°C
- Ⓒ 26°C
- Ⓓ 27°C

5. Suppose that you select a month at random to compare average maximum temperatures. What is the probability that the average maximum temperature in Brisbane is greater than that in Perth? Show your work in the space below. Remember to check your solution.

Write your solution.

Explain how you found your solution.
