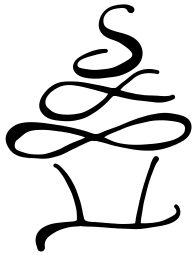
Practice Booklet

MYP 1 · Year 7 Mathematics

Unit 7.6 · Statistics

Name: _____

7.6.1 · 7.6.2	Types of data · Collecting data · Questions 1–13
7.6.3 · 7.6.4	Outliers · Mean, median and mode · Questions 14–26
7.6.5 · 7.6.6	Range · Frequency tables · Questions 27–38
7.6.7 · 7.6.8	Bar charts · Interpreting graphs · Questions 39–51
Homework	Homework page and checking record
Answers	For checking and correcting in green pen



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How to use this booklet and your homework

READ THIS FIRST

Choosing your level

Every part of the unit has four levels. Start where you feel comfortable and move between them freely. Most questions ask you to explain as well as answer, because being able to say *why* is what makes a method stick.

Learning
Small numbers, with counters or a diagram beside you.

Practising
The standard question, with your reasoning written out.

Challenging
Working backwards, and finding what is wrong with someone else's thinking.

Mastery
Explaining why a rule must be true, and testing it on new cases.

Working on your homework

Pens and setting out

- Answers in blue or black non-erasable pen, or in pencil.
- Colour and highlighters are for annotating your work and showing the steps of a method.
- Never erase a mistake. Rework it underneath so you can see what changed.

Green pen is for checking. When you finish, use the answers at the back to check your work.

- **Got it wrong?** Circle the question number, then make your correction and write your error analysis in green pen.
- **Still can't work out how to solve it?** Put a star ★ next to the question number, so we know to go over it in class.

Each sheet

- Your name goes on every sheet, because they are handed in one at a time.
- Each question is worth up to 3 marks. If a question has parts (a, b, c...), each part is marked out of 3. At the end of each level, write your score out of the total for that level.
- Questions are numbered 1, 2, 3... all the way through the booklet, so we can say exactly which ones to do.
- If you are stuck after trying, ask for help. Showing me what you tried is a good start.

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7.6.1 Types of data · 7.6.2 Collecting data

Name:

Key vocabulary

Word	Meaning	Example
categorical data	data that sorts things into groups, often in words	favourite colour
numerical data	data that are numbers	shoe size
discrete data	numerical data that is counted, so only certain values	number of pets
continuous data	numerical data that is measured, so any value in a range	height

A fair survey asks a sample that is chosen at random, so that it is not biased.

Learning

1 Say whether each is categorical or numerical: a) favourite colour b) shoe size c) number of pets

2 Say whether each is discrete or continuous: a) number of siblings b) height c) time to run 100 m

3 Make a tally chart for: red, blue, red, red, green, blue

4 Make a frequency table for: 2, 3, 3, 1, 2, 3, 3, 2, 1, 3

Learning score _____ **/ 24**

Practising

5 Say whether each is categorical, discrete or continuous: a) month of birth b) number of goals c) mass of a bag d) type of pet

6 A survey asks: Do you like maths? The answers are Yes or No. Describe one problem with this question and write a better one

7 You want to find the favourite sport at your school. Describe a fair way to choose who to ask

8 Why is it unfair to ask only the football team: What is your favourite sport?

Practising score _____ **/ 21**

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Name:

Challenging

9 Give one example each of categorical data, discrete data and continuous data about students in your class

10 Write a clear survey question, with answer choices, to find out how long students spend on homework each evening

11 **Find and describe the mistake.** Jon says time is discrete data because we measure it in whole seconds

Challenging score _____ **/ 9**

Mastery

12 Is age discrete or continuous? Give an argument for each side

13 Design a mini survey with three questions about screen time. Include at least one categorical and one numerical question

Mastery score _____ **/ 6**

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7.6.3 Outliers · 7.6.4 Mean, median and mode

LEARNING · PRACTISING

Name:

Key vocabulary

Word	Meaning	Example
mean	add all the values, then divide by how many values	mean of 4, 6, 8 is 18 ÷ 3 = 6
median	the middle value when the data is in order	median of 2, 4, 9 is 4
mode	the value that appears most often	mode of 3, 5, 5 is 5
outlier	a value that is far from the rest of the data	40 in 5, 6, 5, 7, 40

Always put the data in order before finding the median.

Learning

14 Find the mode of 3, 5, 5, 7, 8

15 Find the median of 2, 4, 6, 8, 10

16 Find the mean of 4, 6, 8

17 Which number looks out of place? 5, 6, 5, 7, 6, 40

Learning score _____ / 12

Practising

18 For the data 3, 7, 7, 4, 9 find the mean, the median and the mode

19 Find the median of 12, 5, 9, 20, 8, 15

20 Find the mean of 2.5, 3.5, 4 and 6

21 Look at 4, 6, 7, 8, 55. Which number is an outlier? Find the mean with it and without it

Practising score _____ / 12

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Name:

Challenging

22 The mean of five numbers is 8. Four of them are 6, 7, 9 and 10. Find the fifth number

23 Test scores are 7, 8, 8, 9, 9, 10, 1. Which average best shows a typical score? Explain

24 **Find and describe the mistake.** Ava finds the median of 9, 3, 7, 5, 1 and says it is 7, the middle number in the list

Challenging score _____ **/ 9**

Mastery

25 Five numbers have a mean of 6, a median of 5 and a mode of 4. Find a set that works

26 Explain how an outlier affects the mean, the median and the mode

Mastery score _____ **/ 6**

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7.6.5 Range · 7.6.6 Frequency tables

Name:

Key vocabulary

Word	Meaning	Example
range	largest value minus smallest value	12 − 3 = 9
frequency	how many times a value appears	3 appears 5 times, so frequency 5
frequency table	a table of each value and its frequency	Goals and Matches
consistent	values close together, with a small range	range 4 beats range 7

Learning

27 Find the range of 3, 8, 5, 12

28 Find the range of 15, 4, 9

29 A table shows goals scored in matches. How many matches were there?

Goals	0	1	2
Matches	3	5	2

30 Make a frequency table for 1, 2, 2, 3, 3, 3

Learning score _____ / 12

Practising

31 Find the range of 12.5, 8.2, 15.1 and 9.6

32 Number of pets owned by students. a) How many students? b) What is the mode? c) How many students have at least 2 pets?

Pets	0	1	2	3
Students	8	12	6	4

33 Class A scores 5, 6, 6, 7, 9 and class B scores 3, 6, 7, 8, 10. Find the mean and the range for each class. Which class is more consistent? Explain

Practising score _____ / 15

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Name:

Challenging

34 Shoe sizes of 20 students. Find the total, the mode and the median

Size	5	6	7	8	9
Students	2	5	8	3	2

35 The range of five numbers is 12 and the smallest is 7. What is the largest?

36 **Find and describe the mistake.** Raj finds the range of 4, 11, 6, 9 by working out 11 + 4 = 15

Challenging score _____ / 9

Mastery

37 Two sets of data both have a mean of 10. One has a range of 4 and the other a range of 20. What does this tell you?

38 Make a frequency table of 20 values that has a mode of 3 and a range of 5

Mastery score _____ / 6

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7.6.7 Bar charts · 7.6.8 Interpreting graphs

LEARNING · PRACTISING

Name:

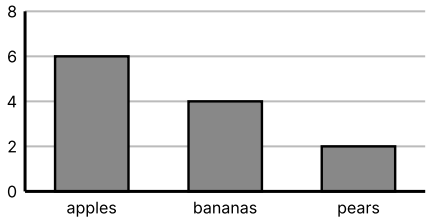
Key vocabulary

Word	Meaning	Example
bar chart	a graph that uses bars to show how many in each group	favourite fruit
axis	a number line or list of groups along the edge of a graph	the vertical axis shows frequency
scale	the equal steps along an axis	0, 2, 4, 6, 8
comparative bar chart	a bar chart that shows two groups side by side	7A and 7B pets

A graph must have a title, labelled axes and an even scale.

Learning

39 The bar chart shows favourite fruit. a) Which is the most popular? b) How many students answered?



40 What should every bar chart have?

41 On a bar chart one square is worth 2 units. A bar is 5 squares tall. What does it show?

42 What does a comparative bar chart help you to do?

Learning score _____ / 15

Practising

43 In 7A: dogs 8, cats 6, fish 3. In 7B: dogs 10, cats 5, fish 4. a) Which pets were more popular in 7B than in 7A? b) How many students are in each class?

44 The temperature at 9 am, 10 am, 11 am and 12 noon was 12 °C, 14 °C, 17 °C and 19 °C. How much did it rise between 9 am and noon?

45 In a pictogram each symbol stands for 4 books. How many books do 6 symbols show?

Practising score _____ / 12

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Name:

Challenging

46 Draw a comparative bar chart for favourite pets in 7A and 7B. Dog: 7A 8, 7B 10. Cat: 7A 6, 7B 5. Fish: 7A 3, 7B 4

47 Sales were 60 in May and 55 in June. A graph starts its vertical axis at 50. How will the bars look compared with the real values?

48 Choose the best graph for each: a) favourite subject b) temperature through a day c) comparing the pets of two classes

49 **Find and describe the mistake.** Ella draws a bar chart with the scale 0, 5, 10, 20, 25

Challenging score _____ **/ 18**

Mastery

50 Find a graph in a newspaper or on a website that could mislead. Describe how it misleads and how you would fix it

51 7A: dogs 8, cats 6. 7B: dogs 10, cats 5. Write two conclusions the data supports and one it does not

Mastery score _____ **/ 6**

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Homework and checking record

HAND THIS PAGE IN WITH YOUR SHEETS

Name:

Your teacher will tell you which sheet and questions to do. Choose your level, set out your work in pen or pencil, then check it with the answers at the back using a **green pen**: circle wrong question numbers, and star ★ any you still cannot solve.

Sheet	Questions	Which ones I did	Checked in green ✔	Teacher
7.6.1 Types of data · 7.6.2 Collecting data	Q1–13			
7.6.3 Outliers · 7.6.4 Mean, median and mode	Q14–26			
7.6.5 Range · 7.6.6 Frequency tables	Q27–38			
7.6.7 Bar charts · 7.6.8 Interpreting graphs	Q39–51			

Error analysis

Circle the number of any question you got wrong. Star ★ it if you still cannot solve it after correcting. Then write the questions you need to rework, and what you will do differently:

One thing I understand better now

Score: Parent / guardian signature:

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Answers

CHECK IN GREEN PEN

7.6.1 Types of data · 7.6.2 Collecting data

Learning	**1**	a) categorical b) numerical c) numerical
	2	a) discrete (counted) b) continuous (measured) c) continuous (measured)
	3	red 3, blue 2, green 1
	4	1 appears 2 times, 2 appears 3 times, 3 appears 5 times
Practising	**5**	a) categorical b) discrete c) continuous d) categorical
	6	Problem: there are only two answers, so we cannot tell how much someone likes maths. Better: How much do you like maths? Not at all, A little, Quite a lot, Very much
	7	Choose at random from the whole school, for example pick names from the school list using random numbers. Every student should have the same chance of being chosen
	8	The football team is not a fair sample of the school. They are likely to choose football, so the results would be biased
Challenging	**9**	Open answer, for example eye colour (categorical), number of brothers and sisters (discrete), height (continuous)
	10	For example: How long do you spend on homework each evening? Less than 30 minutes, 30 minutes to 1 hour, more than 1 hour to 2 hours, more than 2 hours. The choices must not overlap and must cover every case
	11	Time is continuous because it can take any value, such as 12.37 seconds. We only round it to whole seconds. Discrete data can only be counted values, such as the number of goals
Mastery	**12**	Discrete: we usually say we are 12 years old, a whole number. Continuous: age keeps growing all the time, so exactly we could be 12.4 years old. Our exact age is continuous and we round it down to a whole number
	13	Open answer. For example: Which device do you use most? (categorical). How many hours of screen time did you have yesterday? (numerical). Do you use screens before bed? Yes or No (categorical)

7.6.3 Outliers · 7.6.4 Mean, median and mode

Learning	**14**	5 (it appears most often)
	15	6 (the middle number)
	16	4 + 6 + 8 = 18 and 18 ÷ 3 = 6
	17	40 (it is far from the others)
Practising	**18**	Mean: 30 ÷ 5 = 6. Median: put in order 3, 4, 7, 7, 9, so the median is 7. Mode: 7
	19	Put in order: 5, 8, 9, 12, 15, 20. There are two middle numbers, 9 and 12. The median is (9 + 12) ÷ 2 = 10.5
	20	Total 16, and 16 ÷ 4 = 4
	21	The outlier is 55. With it: 80 ÷ 5 = 16. Without it: 25 ÷ 4 = 6.25
Challenging	**22**	The total must be 5 × 8 = 40. 6 + 7 + 9 + 10 = 32, so the fifth number is 40 − 32 = 8
	23	The median, 8 (in order: 1, 7, 8, 8, 9, 9, 10). The mean is 52 ÷ 7 = 7.4, which is pulled down by the outlier 1. The median is not affected much
	24	The numbers must be put in order first: 1, 3, 5, 7, 9. The middle number is 5, so the median is 5
Mastery	**25**	The total is 30. The middle number is 5 and the 4 appears twice, so 4, 4, 5, ?, ? with the last two adding to 17, for example 4, 4, 5, 8, 9
	26	The mean is pulled towards the outlier, so it changes a lot. The median changes only a little. The mode usually does not change at all

7.6.5 Range · 7.6.6 Frequency tables

Learning	**27**	12 − 3 = 9
	28	15 − 4 = 11
	29	3 + 5 + 2 = 10 matches
	30	1 appears 1 time, 2 appears 2 times, 3 appears 3 times
Practising	**31**	15.1 − 8.2 = 6.9
	32	a) 8 + 12 + 6 + 4 = 30 students b) The mode is 1 pet (12 students) c) 6 + 4 = 10 students
	33	Class A: mean 33 ÷ 5 = 6.6, range 9 − 5 = 4. Class B: mean 34 ÷ 5 = 6.8, range 10 − 3 = 7. Class A is more consistent because its range is smaller, so its scores are closer together
Challenging	**34**	Total: 2 + 5 + 8 + 3 + 2 = 20. Mode: size 7. Median: with 20 values the middle two are the 10th and 11th, and both are size 7, so the median is size 7
	35	Range = largest − smallest, so largest = 7 + 12 = 19
	36	The range is the largest minus the smallest, not the sum. 11 − 4 = 7
Mastery	**37**	The averages are the same, but the second set is much more spread out. The first set is more consistent
	38	Open answer. For example: value 1 appears 2 times, 2 appears 4, 3 appears 7, 4 appears 4, 5 appears 2, 6 appears 1. The total is 20, the mode is 3 and the range is 6 − 1 = 5

7.6.7 Bar charts · 7.6.8 Interpreting graphs

Learning	**39**	a) apples b) 6 + 4 + 2 = 12 students
	40	A title, labels on both axes, bars of equal width and an even scale
	41	5 × 2 = 10
	42	Compare two groups side by side
Practising	**43**	a) dogs and fish b) 7A: 17 students, 7B: 19 students
	44	19 − 12 = 7 °C
	45	6 × 4 = 24 books
Challenging	**46**	Two bars for each pet, one for 7A and one for 7B, in different colours with a key. Both axes labelled, an even scale from 0 to 10 and a title
	47	The May bar is 10 tall and the June bar is 5 tall, so June looks half as tall as May. In fact June is only a little lower. The graph is misleading
	48	a) bar chart b) line graph c) comparative bar chart
	49	The gaps are not equal. 10 to 20 is a gap of 10 but the others are 5. It should be 0, 5, 10, 15, 20, 25
Mastery	**50**	Open answer. For example a vertical axis that does not start at 0, uneven scales or missing labels. Fix: start at 0, use an even scale and label the axes
	51	Supported: dogs are more popular than cats in both classes. 7B chose more dogs than 7A. Not supported: 7B likes dogs more than 7A (the classes may be different sizes), or dogs are the favourite pet of all of Year 7