

Name _____

Date _____

16.5 Comparing data sets and drawing conclusions — worksheet

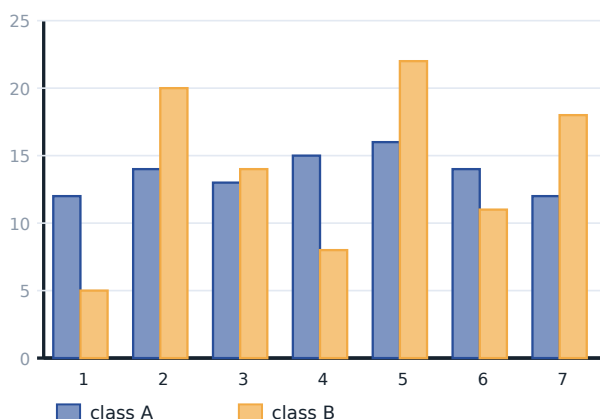
Compare two data sets using an average and a range, identify patterns and trends, and discuss conclusions and the sources of variation. · 46 questions · Show your working.

Remember

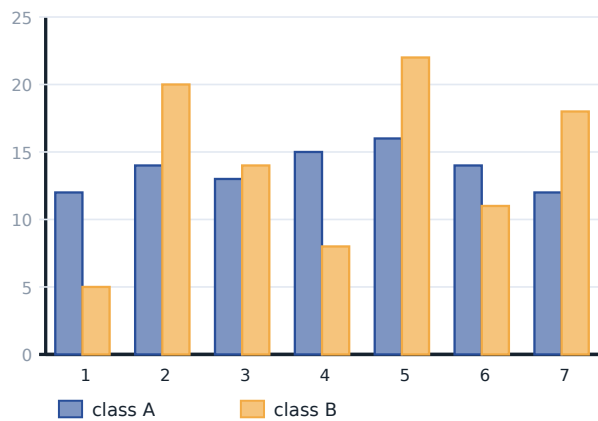
- To compare two data sets, quote **an average and a range**. Either one alone is half a comparison.
- The **average** says what is typical; the **range** says how much it varies.
- A **smaller range** means more **consistent**.
- Write the comparison as a **sentence about the situation**, with the numbers in it.
- A **trend** is the general direction. One dip does not end a rising trend.
- A trend describes what has happened; it does **not** promise what comes next.
- A **small sample** gives an unreliable conclusion — Unit 6's idea, used here.
- A **biased** sample is worse than a small one: no amount of correct arithmetic can fix it.
- Mention the **sources of variation**: the weather, the time of day, who was asked, how it was measured.

A · Fluency — Averages, ranges and what a statement tells you.

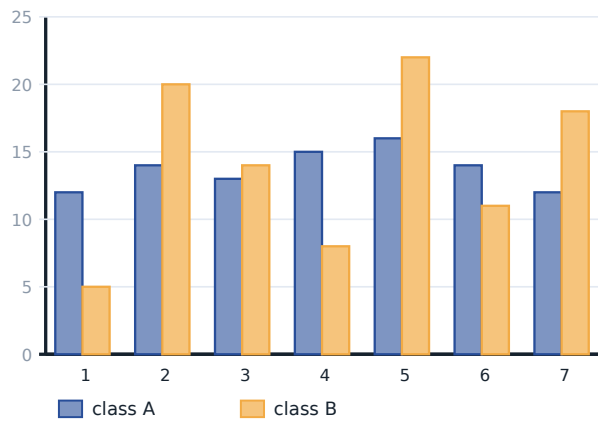
- 1 What is the mean for **class A**? Give the answer to one decimal place.



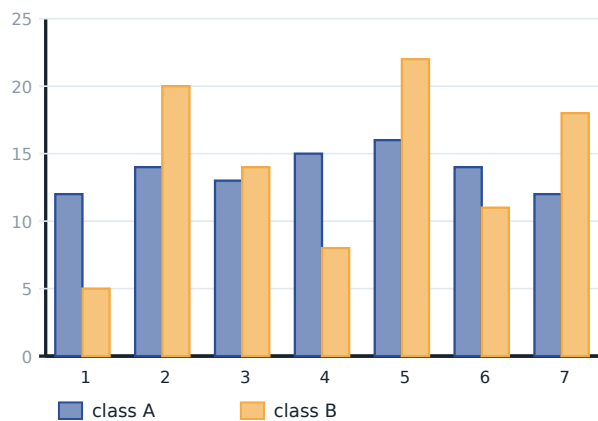
2 What is the mean for **class B**? Give the answer to one decimal place.



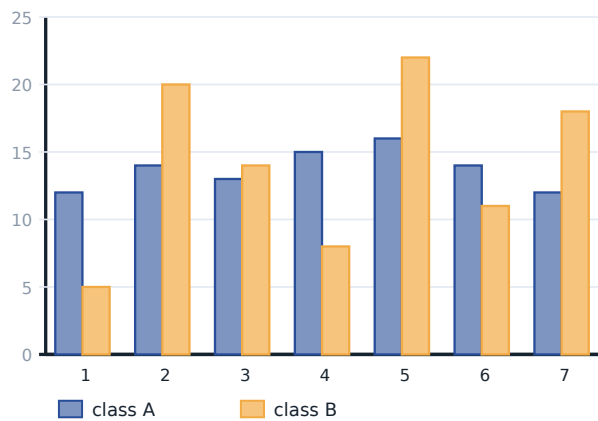
3 What is the range for **class A**?



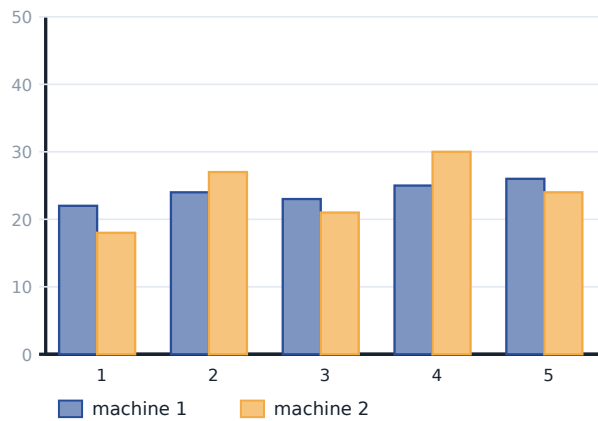
4 What is the range for **class B**?



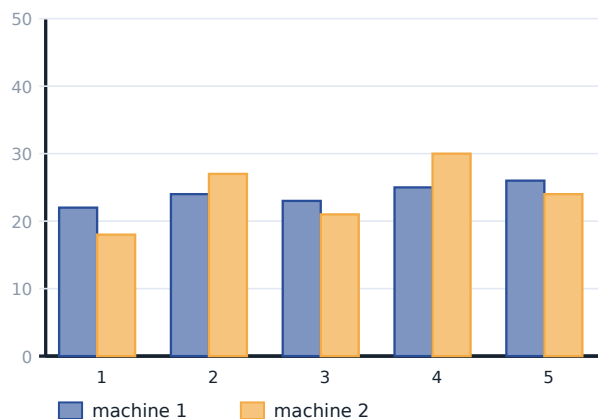
- 5 Which is the more **consistent**? Give the number, 1 for class A and 2 for class B.



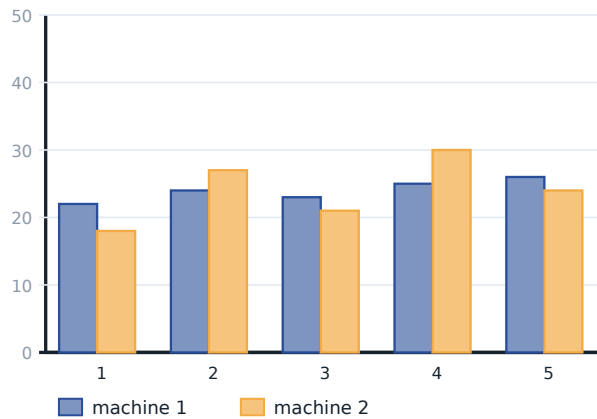
- 6 What is the mean for **machine 1**? Give the answer to one decimal place.



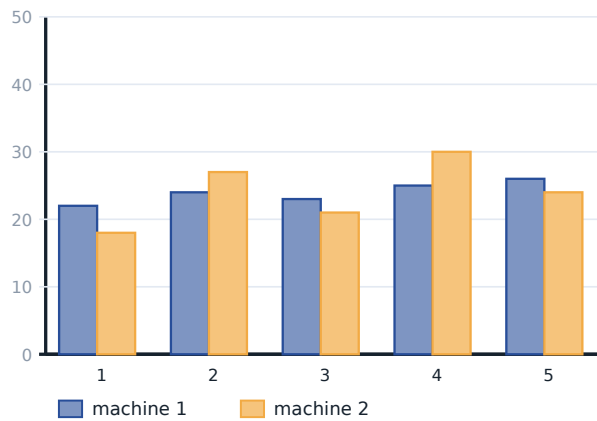
- 7 What is the mean for **machine 2**? Give the answer to one decimal place.



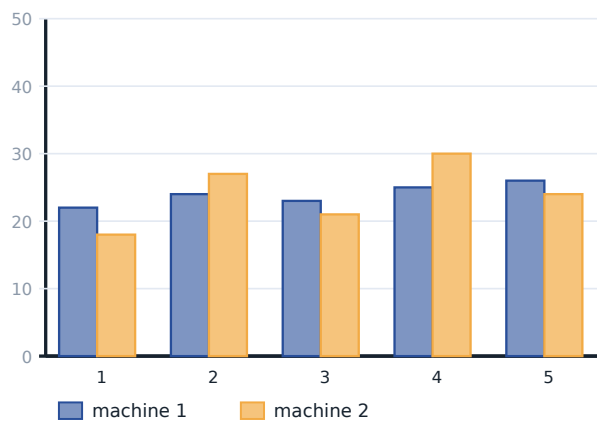
8 What is the range for **machine 1**?



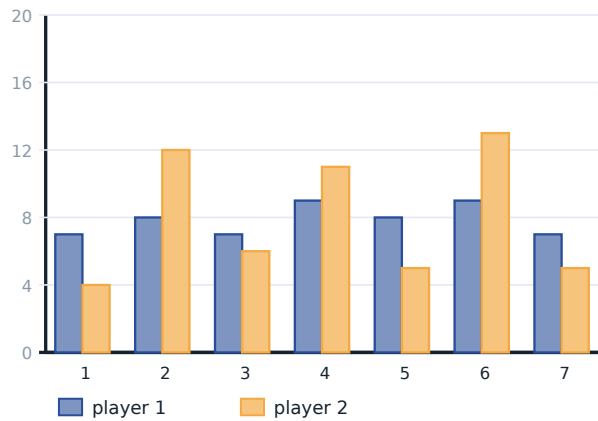
9 What is the range for **machine 2**?



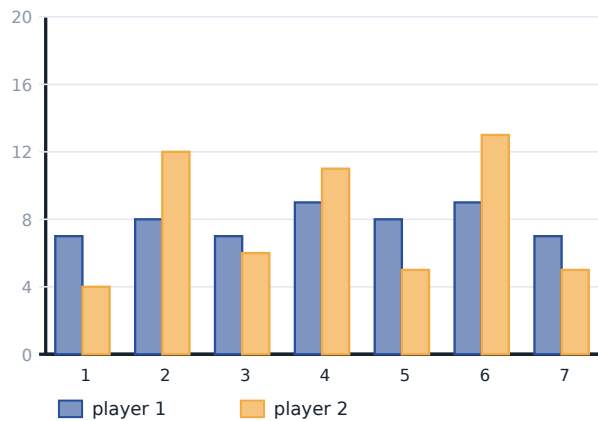
10 Which is the more **consistent**? Give the number, 1 for machine 1 and 2 for machine 2.



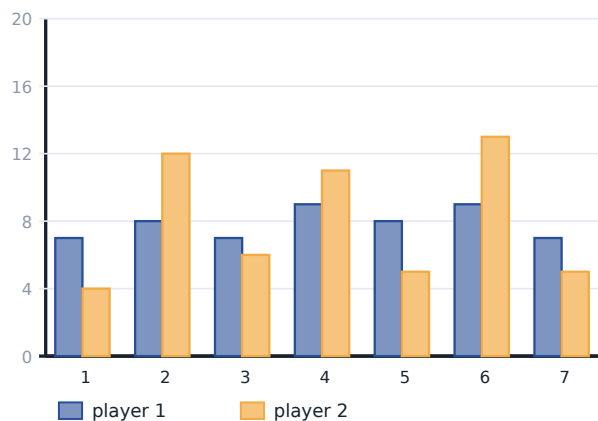
11 What is the mean for **player 1**? Give the answer to one decimal place.



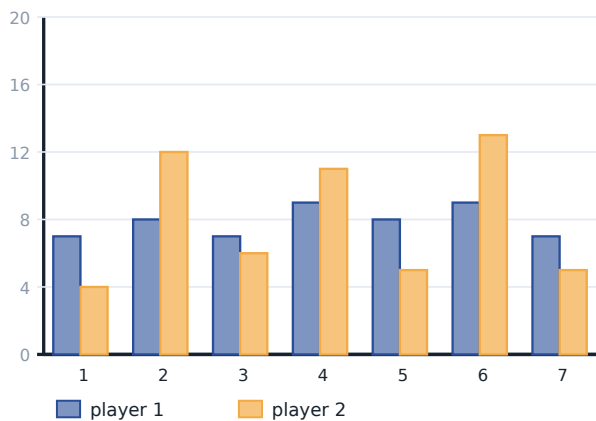
12 What is the mean for **player 2**? Give the answer to one decimal place.



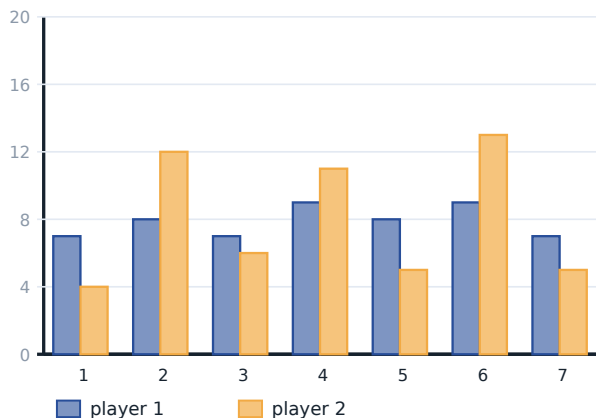
13 What is the range for **player 1**?



14 What is the range for **player 2**?



15 Which is the more **consistent**? Give the number, 1 for player 1 and 2 for player 2.



16 The mean of class A is higher than the mean of class B. What does that tell you?

- ☐ nothing useful
- ☐ A typically scores better
- ☐ the data is wrong
- ☐ the chart is misleading

17 The range of class A is smaller than the range of class B. What does that tell you?

- ☐ nothing useful
- ☐ A is more consistent
- ☐ the data is wrong
- ☐ the chart is misleading

18 Both classes have the same mean but different ranges. What does that tell you?

- ☐ nothing useful
- ☐ they are typically the same, but one varies more
- ☐ the data is wrong
- ☐ the chart is misleading

19 One value is far above all the others. What does that tell you?

- ☐ nothing useful
- ☐ there is an outlier, which will have pulled the mean up
- ☐ the data is wrong
- ☐ the chart is misleading

20 The line graph rises every year. What does that tell you?

- ☐ nothing useful
- ☐ there is an upward trend
- ☐ the data is wrong
- ☐ the chart is misleading

21 The sample was only 5 people. What does that tell you?

- ☐ nothing useful
- ☐ the sample is too small to be confident
- ☐ the data is wrong
- ☐ the chart is misleading

B · Reasoning — What makes a comparison, a trend and a fair sample.

22 To compare two data sets properly you should quote ...

- ☐ an average only
- ☐ a range only
- ☐ an average and a range
- ☐ the largest values

23 Two classes have the same mean but different ranges. What can you say?

- ☐ They are identical
- ☐ They typically score the same, but one is more consistent
- ☐ One is better
- ☐ Nothing

24 A smaller range means ...

- ☐ a lower average
- ☐ more consistent data
- ☐ less data
- ☐ a mistake

25 Why is a conclusion from 5 people unreliable?

- ☐ Five is an odd number
- ☐ The sample is too small to represent the whole population
- ☐ It is not unreliable
- ☐ Because of the mean

26 What is a **trend**?

- ☐ A single high value
- ☐ The general direction the data is moving in
- ☐ The mode
- ☐ The range

- 27** Does a rising trend prove that the rise will continue?
- ☐ Yes
 - ☐ No
- 28** A survey asked only people leaving a gym how much they exercise. The problem is ...
- ☐ the sample is too small
 - ☐ the sample is biased — those people are not typical
 - ☐ the question is unclear
 - ☐ there is no problem
- 29** Which of these is a source of variation worth mentioning?
- ☐ The weather on the day of an outdoor experiment
 - ☐ The colour of the paper
 - ☐ The name of the school
 - ☐ Nothing
- 30** Should a conclusion mention how the data was collected?
- ☐ Yes
 - ☐ No
- 31** A good comparison sentence ...
- ☐ quotes only the numbers
 - ☐ quotes the numbers and says what they mean in the context
 - ☐ avoids numbers
 - ☐ is as short as possible

C · Challenge — Differences between summaries, and predicting carefully.

- 32** Class A scores 12, 14, 13, 15, 16, 14, 12. What is its range?
- _____
- 33** Class B scores 5, 20, 14, 8, 22, 11, 18. What is its range?
- _____
- 34** Class A totals 96 over 7 learners and class B totals 98 over 7. What is the difference between their means, to one decimal place?
- _____
- 35** Two shops have mean sales of 40. Shop A's range is 5, shop B's is 35. How much larger is B's range?
- _____
- 36** A survey of 8 people found a mean of 6. A survey of 800 found a mean of 9. Which mean is more reliable? Answer 1 for the first and 2 for the second.
- _____
- 37** Sales rose 20, 24, 28, 32 over four years. If the trend continued, what would year 5 be?
- _____
- 38** Two data sets have means of 25 and 25 and ranges of 3 and 18. How many of the two summary statistics differ?
- _____

D · Word problems — Machines, players, shops and surveys.

- 39** Machine 1 fills bottles to 22, 24, 23, 25, 26 ml. What is its range, in millilitres?

- 40** Machine 2 fills bottles to 18, 27, 21, 30, 24 ml. What is its range, in millilitres?

- 41** Both machines have the same mean fill of 24 ml. Which should the factory keep? Answer 1 or 2.

- 42** A player scores 7, 8, 7, 9, 8, 9, 7 goals; another scores 4, 12, 6, 11, 5, 13, 5. What is the first player's range?

- 43** For those two players, what is the second player's range?

- 44** A shop's sales rose each month for six months. In the seventh they fell. Does that end the upward trend? Answer 1 for yes and 2 for no.

- 45** A class of 28 was surveyed about the whole school of 900. What percentage of the school was asked, to the nearest whole percent?

- 46** Rainfall was measured on 3 days and on 300 days. Which gives the better estimate of the yearly mean? Answer 1 for 3 days and 2 for 300 days.
