Year 8 · Statistics: Making Sense of Data

Name: _____ Date: _____

Kia ora! This sheet helps you sort out the different types of variables and work out the mean, median, mode and range. Take your time and sort your numbers carefully before you start.

Warm-up

1. Decide whether each variable is categorical, discrete numerical, or continuous numerical: (a) favourite ice cream flavour, (b) number of pets in a house, (c) the height of a student in centimetres.

2. Find the mean of these test scores: 6, 8, 7, 9, 10.

3. Find the median of: 12, 5, 9, 3, 7.

4. Find the range of these temperatures (°C): 14, 21, 18, 9, 25.

Practice

5. Find the mode of these shoe sizes recorded at Vertex Academy: 7, 8, 8, 6, 9, 8, 7, 10.

6. For the data set 4, 11, 6, 4, 9, 8, find (a) the mean, (b) the median, (c) the range.

7. Mila measured the length of everyone's right foot in her whānau (in cm): 22, 24, 24, 26, 29. Her statistical question is 'Are our feet the same length?' Find the median foot length and the range, then answer her question.

8. At a Saturday market in Avondale, a stall sold these numbers of pies each hour: 15, 22, 18, 22, 13. Find the mean number of pies sold per hour and the mode.

9. Tane wants to answer 'How long do students take to walk to school?' He records these times in minutes: 8, 15, 10, 12, 20, 15. (a) Is walking time a discrete or continuous variable? (b) Find the mean and (c) the range.

10. A netball team scored these goals over 7 games: 24, 30, 28, 24, 35, 24, 31. Find the mean, median, mode and range.

Challenge

11. A group of 5 students has a mean age of 12 years. A sixth student joins and the new mean becomes 12.5 years. How old is the sixth student?

12. A data set of five whole numbers has a mode of 6, a median of 6, a mean of 7, and a range of 8. Find a possible set of five numbers.

Answer key (for parents and tutors)

1. Decide whether each variable is categorical, discrete numerical, or continuous numerical: (a) favourite ice cream flavour, (b) number of pets in a house, (c) the height of a student in centimetres.
   (a) Favourite flavour puts people into groups, so it is categorical. (b) You count whole pets, so it is discrete numerical. (c) Height is measured and can take any value, so it is continuous numerical.

2. Find the mean of these test scores: 6, 8, 7, 9, 10.
   Add them: 6 + 8 + 7 + 9 + 10 = 40. Divide by how many values (5): 40 ÷ 5 = 8. The mean is 8.

3. Find the median of: 12, 5, 9, 3, 7.
   Sort the values: 3, 5, 7, 9, 12. The middle value is the third one, which is 7. The median is 7.

4. Find the range of these temperatures (°C): 14, 21, 18, 9, 25.
   Highest value is 25, lowest value is 9. Range = 25 − 9 = 16°C.

5. Find the mode of these shoe sizes recorded at Vertex Academy: 7, 8, 8, 6, 9, 8, 7, 10.
   Count how often each size appears: size 7 appears 2 times, size 8 appears 3 times, sizes 6, 9 and 10 appear once each. The size with the highest frequency is 8, so the mode is size 8.

6. For the data set 4, 11, 6, 4, 9, 8, find (a) the mean, (b) the median, (c) the range.
   (a) Mean: 4 + 11 + 6 + 4 + 9 + 8 = 42, then 42 ÷ 6 = 7. (b) Median: sort them 4, 4, 6, 8, 9, 11. With 6 values the median is the average of the two middle numbers (6 and 8): (6 + 8) ÷ 2 = 7. (c) Range: 11 − 4 = 7.

7. Mila measured the length of everyone's right foot in her whānau (in cm): 22, 24, 24, 26, 29. Her statistical question is 'Are our feet the same length?' Find the median foot length and the range, then answer her question.
   The data is already sorted: 22, 24, 24, 26, 29. The middle value (third of five) is the median = 24 cm. Range = 29 − 22 = 7 cm. Because the range is 7 cm, the feet are not all the same length, they vary by up to 7 cm.

8. At a Saturday market in Avondale, a stall sold these numbers of pies each hour: 15, 22, 18, 22, 13. Find the mean number of pies sold per hour and the mode.
   Mean: 15 + 22 + 18 + 22 + 13 = 90, then 90 ÷ 5 = 18 pies per hour. Mode: the value 22 appears twice (more than any other), so the mode is 22 pies.

9. Tane wants to answer 'How long do students take to walk to school?' He records these times in minutes: 8, 15, 10, 12, 20, 15. (a) Is walking time a discrete or continuous variable? (b) Find the mean and (c) the range.
   (a) Time is measured, so walking time is a continuous numerical variable. (b) Mean: 8 + 15 + 10 + 12 + 20 + 15 = 80, then 80 ÷ 6 = 13.33 minutes (about 13.3 minutes). (c) Range: 20 − 8 = 12 minutes.

10. A netball team scored these goals over 7 games: 24, 30, 28, 24, 35, 24, 31. Find the mean, median, mode and range.
    Mean: 24 + 30 + 28 + 24 + 35 + 24 + 31 = 196, then 196 ÷ 7 = 28. Median: sort them 24, 24, 24, 28, 30, 31, 35; the middle value (fourth of seven) is 28. Mode: 24 appears three times, so the mode is 24. Range: 35 − 24 = 11.

11. A group of 5 students has a mean age of 12 years. A sixth student joins and the new mean becomes 12.5 years. How old is the sixth student?
    The total age of the first 5 students = mean × count = 12 × 5 = 60 years. With 6 students the new total = 12.5 × 6 = 75 years. The sixth student's age = 75 − 60 = 15 years.

12. A data set of five whole numbers has a mode of 6, a median of 6, a mean of 7, and a range of 8. Find a possible set of five numbers.
    List positions as a, b, c, d, e in order. The median (middle value) is 6, so c = 6. The mode is 6, so 6 must appear most often, make b = 6 as well. The mean is 7, so the total = 7 × 5 = 35. So far a + 6 + 6 + d + e = 35, meaning a + d + e = 23. The range is 8, so e − a = 8. Try a = 4, then e = 12, giving d = 23 − 4 − 12 = 7. Check order: 4, 6, 6, 7, 12 (sorted correctly). Mode = 6 (appears twice, most often), median = 6, mean = (4+6+6+7+12) ÷ 5 = 35 ÷ 5 = 7, range = 12 − 4 = 8. A possible set is 4, 6, 6, 7, 12.