

A look at z scores activity

1/ A manufacturer who produces cans of soup discovers that the contents of any given can of soup is normally distributed with a mean of 504 grams and a standard deviation of 1.5 grams. If the can of soup is less than 500 grams it will be rejected, calculate...

- a/ shade the region of cans that will be rejected on a scaled normal distribution that has z scores on the x axis with gram weights (2 marks)
- b/ the range of z scores applicable to cans that are not rejected (2 marks)
- c/ specify the z score of cans that are good for sale (2 marks)

Another manufacturer makes tins of fresh tuna. They look at their machines and determine that their tuna cans are normally distributed with a mean of 93 grams and a standard deviation of 1.2 grams. If the tin of tuna must weigh more than 90 grams for it to be rejected, calculate

- a/ The z score which tuna cans must be greater than to avoid being rejected (2 marks)
- b/ the range of z score where the tuna can is between 90 grams and 95 grams (3 marks)
- c/ the minimum z score of cans that will be within the top 16% for tuna mass (2 marks)
- d/ specify and shade a region of tuna cans that will be rejected on a scaled normal distribution (2 marks)

2/ Compare the distributions and determine which company rejects the larger proportion of cans, and hence if both companies make the same amount of cans determine the company who throws out the greatest number of cans. (2 marks)

3/ Bill scored 39 marks on a Maths test. The mean for his class was 34 marks with a standard deviation of 2.5. He also scored 17 marks for an English essay when the mean for his class was 14 with a standard deviation of 2.

- a/ If the maths test was out of 48 and the English essay was out of 22, determine Bill's percentage for both of the tests. (2 marks)
- b/ Percentage may not necessarily be a good indicator of Bill's performance relative to the rest of the class, determine using z scores whether he did better on his English essay or Maths test relative to his classmates. (3 marks)
- c/ Draw a scaled set of normal distribution to show this. (3 marks)

4/ A manufacturer who produces sushi discovers that the contents of any given package is normally distributed with a mean of 203 grams and a standard deviation of 2.3 grams. If a packet of sushi is less than 198.5 grams it will be rejected, calculate...

- a/ shade the region on the normal distribution that will have the rejected sushi packages with z scores on the x axis with gram weights (2 marks)
- b/ the range of z scores applicable to sushi packages that are not rejected (2 marks)
- c/ specify the z score of sushi packages that are good for sale if a sushi package with a weight of 207 grams or more will also be rejected (2 marks)

Another manufacturer makes small biscuits. They look at their machines and determine that their biscuits are normally distributed with a mean of 21 grams and a standard deviation of 0.9 grams. If the tin of biscuit must weigh more than 20 grams for it to be rejected, calculate

- a/ The z score which biscuits must be greater than to avoid being rejected (2 marks)
- b/ the range of z score where the biscuit is between 20 grams and 22.5 grams (3 marks)
- c/ the minimum z score of cans that will be within the top 16% for biscuits (2 marks)
- d/ specify and shade a region of tuna cans that will be rejected on a scaled normal distribution (2 marks)

5/ Compare the distributions and determine which company rejects the larger proportion of food items, and hence if both companies make the same amount of packaged items (with the same number of items per package) determine the company who throws out the greatest number of packages. (2 marks)

6/ Bill scored 49 marks on a Science test. The mean for his class was 44 marks with a standard deviation of 2.5. He also scored 38 marks for a mathematics test when the mean for his class was 35 with a standard deviation of 1.2.

- a/ If the science test was out of 54 and the mathematics test was out of 42, determine Bill's percentage for both of the tests. (2 marks)
- b/ Percentage may not necessarily be a good indicator of Bill's performance relative to the rest of the class, determine using z scores whether he did better on his science test or Maths test relative to his classmates. (3 marks)
- c/ Draw a scaled set of normal distribution to show this. (3 marks)