



H06-test The Normal Distribution: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 15 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 For each statement about the normal distribution, write down whether it is True or False.

(a) The normal distribution curve is symmetrical about the mean. (1)

(b) For a normal distribution, the mean, median and mode are all equal. (1)

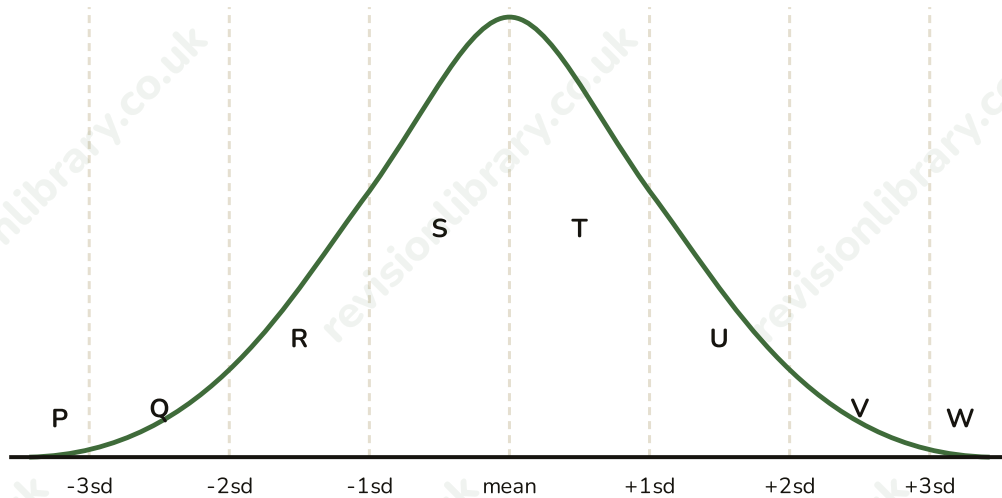
(c) The tails of a normal distribution curve eventually meet the horizontal axis. (1)

(d) A normal distribution curve can have two separate peaks. (1)

(Total for Question 1 is 4 marks)

- 2 The diagram shows a normal distribution curve. Dashed lines are drawn at the mean and at 1, 2 and 3 standard deviations above and below the mean, splitting the curve into 8 regions, labelled P to W.

Using the 68-95-99.7 rule, write down the approximate percentage of the distribution lying in each region described below.



- (a) Regions S and T combined (within 1 standard deviation of the mean). (1)

.....

- (b) Region R (between 2 and 1 standard deviations below the mean). (1)

.....

- (c) Region Q (between 3 and 2 standard deviations below the mean). (1)

.....

- (d) Region P (more than 3 standard deviations below the mean). (1)

.....

(Total for Question 2 is 4 marks)

3 The annual salaries of 500 employees at a company are normally distributed with a mean of £32,000 and a standard deviation of £4,000. For each statement, write down whether it is True or False.

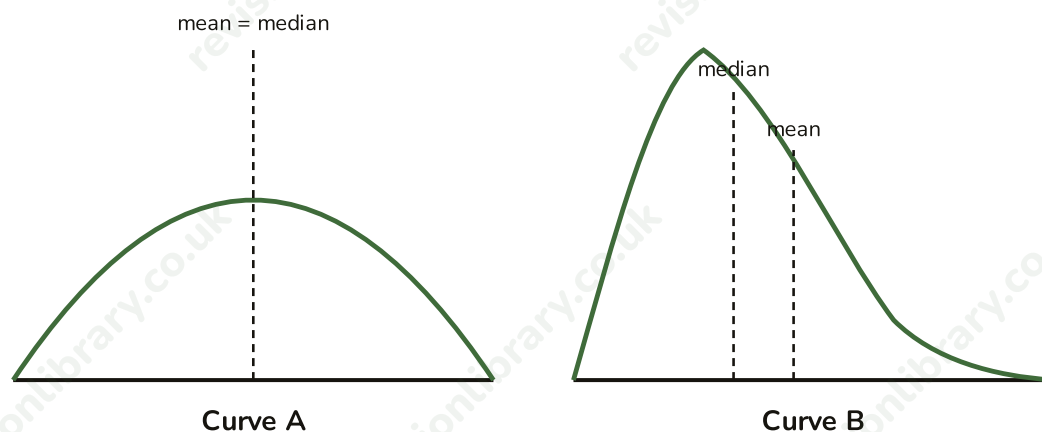
(a) Since about 95% of employees earn between £24,000 and £40,000, we can be certain that no employee earns less than £24,000. (1)

.....
(b) About 68% of employees earn between £28,000 and £36,000. (1)

.....
(c) It is impossible for an employee to earn more than £44,000. (1)

.....
(Total for Question 3 is 3 marks)

- 4 The diagrams show the distributions of the annual bonuses paid to staff at two companies, Company A and Company B.



- (a) Which company's bonus distribution, A or B, could be modelled by a normal distribution? Give a reason for your answer. (2)
- (b) For Company B's distribution, state whether the mean is greater than, less than, or equal to the median. Give a reason for your answer. (2)

(Total for Question 4 is 4 marks)

Mark scheme • H06-test The Normal Distribution: Test Pack

Question 1

- (a) **B1** True cao
- (a) **Answer: True**
- (b) **B1** True cao
- (b) **Answer: True**
- (c) **B1** False cao
- (c) **Answer: False**
- (d) **B1** False cao
- (d) **Answer: False**

Question 2

- (a) **B1** 68% cao
- (a) **Answer: 68%**
- (b) **B1** 13.5% cao
- (b) **Answer: 13.5%**
- (c) **B1** 2.35% cao
- (c) **Answer: 2.35%**
- (d) **B1** 0.15% cao
- (d) **Answer: 0.15%**

Question 3

- (a) **B1** False cao
- (a) **Answer: False**
- (b) **B1** True cao
- (b) **Answer: True**
- (c) **B1** False cao
- (c) **Answer: False**

Question 4

- (a) **B1** A cao
- (a) **B1** valid reason referring to symmetry, e.g. Curve A is symmetrical (bell-shaped) with mean equal to median
- (a) **Answer: Company A - because its distribution is symmetrical, with the mean and median equal.**
- (b) **B1** mean is greater than the median, cao
- (b) **B1** valid reason, e.g. the distribution is positively skewed, so the long tail of a few very large bonuses pulls the mean above the median
- (b) **Answer: The mean is greater than the median, because Company B's distribution is positively skewed - the long tail to the right, from a few very large bonuses, pulls the mean above the median.**