Statistics: Spread, Ogives & Box Plots (Grade 11)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 31

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

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1 The mean of 64, 71, 58, 67 and x is 66. Solve for x. **(3)**

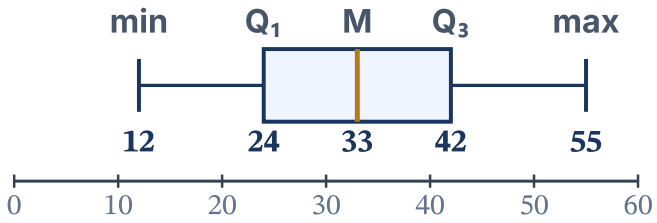
$\frac{64 + 71 + 58 + 67 + x}{5} = 66$ *(1)*

$260 + x = 66 \times 5 = 330$ *(1)*

$\boldsymbol{x = 330 - 260 = 70}$ *(1)* ✓✓✓ (3)

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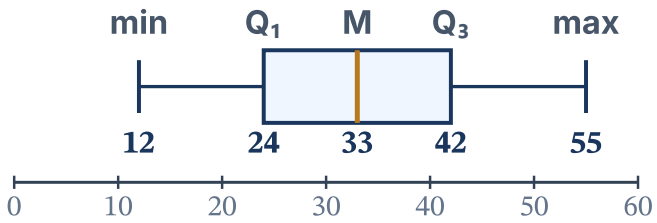
2 For the box-and-whisker diagram below, write down the five-number summary. **(3)**



min = 12, Q_1 = 24, median = 33, Q_3 = 42, max = 55 ✓✓✓ (3)

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3 Calculate the interquartile range from the diagram below. **(2)**



$42 - 24 = \mathbf{18}$ ✓✓ (2)

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4 Calculate the mean of 12 ; 15 ; 18 ; 18 ; 21 ; 24 ; 27 ; 30 ; 33. **(2)**

$\frac{198}{9} = \mathbf{22{,}00}$ ✓✓ (2)

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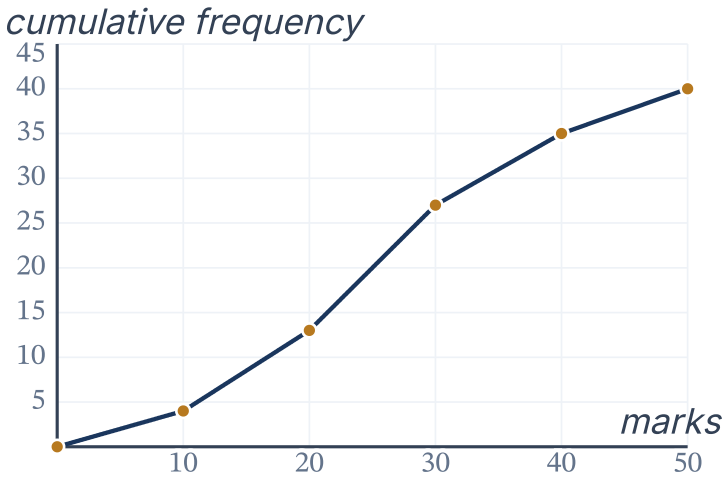
5 Calculate the standard deviation of 12 ; 15 ; 18 ; 18 ; 21 ; 24 ; 27 ; 30 ; 33. **(3)**

variance = 44,00 $\rightarrow$ $\sigma = \mathbf{6{,}63}$ ✓✓✓ (3)

6 How many data values lie within one standard deviation of the mean for the data above? (2)

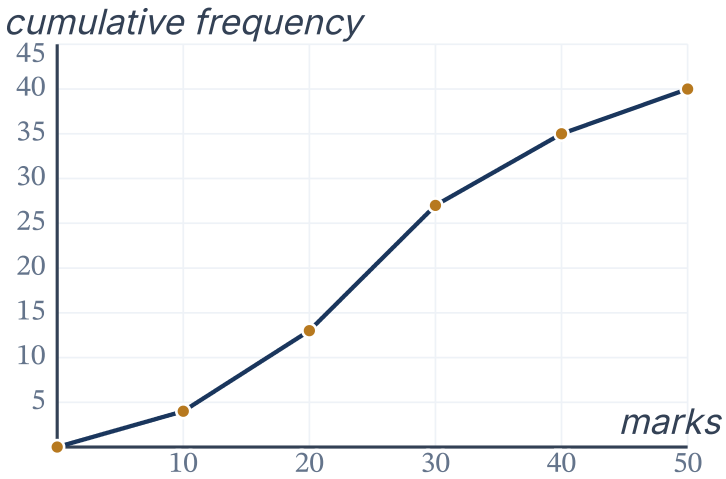
Interval [15,37 ; 28,63] contains **5 values** ✓✓ (2)

7 Use the ogive below to estimate the median mark. (2)



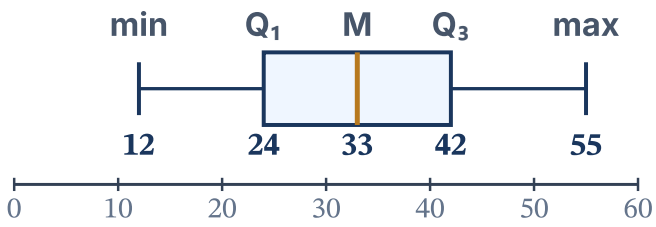
The 20th of 40 values → **≈ 25 marks** ✓✓ (2)

8 Use the ogive below to write down the total number of learners. (1)



40 ✓ (1)

9 Determine the outlier boundaries for the box plot below. (3)



IQR = 18, 1,5 × 18 = 27 → below **−3** or above **69**; there are no outliers ✓✓✓ (3)

10 Estimate the mean of: 0–10 ($f = 4$), 10–20 ($f = 9$), 20–30 ($f = 12$), 30–40 ($f = 5$). **(4)**

> Midpoints 5, 15, 25, 35 ✓; $\sum(x \cdot f) = 20 + 135 + 300 + 175 = 630$ ✓; $\sum f = 30$ ✓; mean $= 630 \div 30 = 21$ ✓ **(4)**

11 Why can the mean of grouped data only be ESTIMATED? **(2)**

> The individual values are lost once the data is grouped ✓; the midpoint is used to stand in for every value in the interval, which is an approximation ✓ **(2)**

12 At which point of each interval must a frequency polygon be plotted, and why? **(2)**

> At the midpoint ✓, because the midpoint represents the interval — plotting at a boundary shifts the whole distribution ✓ **(2)**

13 State ONE difference between a frequency polygon and an ogive. **(2)**

> A frequency polygon plots frequency and is drawn with straight lines between midpoints ✓; an ogive plots CUMULATIVE frequency and is used to read off the median and quartiles ✓ **(2)**

TOTAL: 31 marks

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