GENERAL MATHEMATICS 2024

Unit 3
Key Topic Test 1 – Data Analysis Investigating Data Distributions

Recommended writing time*: 45 minutes
Total number of marks available: 25 marks

SOLUTIONS

SECTION A – Multiple Choice (1 mark per question)

Question 1
Answer: B

$$\frac{7}{15} \times 100 \approx 47\%$$

Question 2
Answer: D

$Q_1 = 11$
$Q_3 = 36$
Upper fence $= 36 + 1.5 \times 25$
$= 73.5$

Question 3
Answer: D

CAS – enter midpoints and frequency
$\bar{x} = 3.8$

Question 4
Answer: C

% between 2 and 8 $= 60\%$
$$\frac{60}{100} \times 250 = 150$$

Question 5
Answer: C

1.4 = 1 standard deviation above the mean
16% of data lies one standard deviation above mean

SECTION B – Short Answer

Question 1

    a. $\frac{6}{20} \times 100 = 30\%$

<div align="right">1 mark</div>

    b. Shape is positively skewed (with outliers)

<div align="right">1 mark</div>

    c. $\bar{x} = 14.1$ kg

<div align="right">1 mark</div>

    d. $s_x = 6.29$ kg

<div align="right">1 mark</div>

    e. Mode $= 14$ (occurs 3 times)

<div align="right">1 mark</div>

    f. $Q_1 = 9.5$, $Q_3 = 17$
       Upper fence $= 17 + 1.5 \times 7.5 = 28.25$
       $30 > 28.25$ and hence is an outlier

<div align="right">2 marks
Total 7 marks</div>

Question 2

    a. 50%

<div align="right">1 mark</div>

    b. 68% (one confidence interval)

<div align="right">1 mark</div>

    c. $100 - 0.15 - 2.5 = 97.35\%$

<div align="right">1 mark</div>

    d. $11 - 10.6 = 0.4$
       $0.4 = 2$ standard deviations
       Standard deviation $= 0.2$

<div align="right">2 marks</div>

    e. 97.5% of NSW runners ran slower than $11.2 - 2 \times 0.3 = 10.6$ seconds
       $10.6 = 1$ standard deviation below VIC mean
       16% of Victorian competitors ran faster than 10.6 seconds

<div align="right">2 marks
Total 7 marks</div>

Question 3

   a. $100 \text{ g} = 0.1 \text{ kg}$
       $0.1 = -1$ on log scale
       2 species less than -1
       $\frac{2}{25} \times 100 = 8\%$

                             2 marks

   b. Median $= 13^{\text{th}}$ piece of data
       Interval $0 - 1$ (log kg)
       Median weight $1 - 10$ kg

                               2 marks

   c. $\log(2.4) = 0.38$

                               1 mark

   d. $\log(x) = 2.5$
       $x = 10^{2.5} \approx 316$ kg

                               1 mark
                         Total 6 marks

END OF KEY TOPIC TEST SOLUTIONS