GENERAL MATHEMATICS 2024

Unit 3
Key Topic Test 3 – Data Analysis Investigating and Modelling Linear Associations

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

$$y - intercept = 80$$
$$gradient = 6$$
$$Height = 80 + 6 \times Age$$

Question 2
Answer: C

Gradient > 0 therefore positive relationship
There is a strong correlation shown.

Question 3
Answer: D

$$Actual = Predicted + Residual = 69.6$$

Question 4
Answer: B

Explanation:

$$slope = 0.9 \times \frac{1.1}{0.9} = 1.1$$

$$y - intercept = 22.1 - 1.1 \times 11.2 = 9.78$$

Question 5
Answer: C

$$y = 21.82 - 0.04 \times 25 = 20.82$$

SECTION B – Short Answer

Question 1

    a. 81 mm

                    1 mark

    b. Height (cm) $= 79.2 + 1.10 \times$ Index Finger Length (mm)

                    2 marks

    c. Points correctly plotted at (80, 171) and (80, 150)

                    2 marks

    d. medium, positive, linear

                    1 mark

    e. On average, as index finger length increases by 1 mm, the height will increase by 1.10 cm.

                    1 mark

    f. 44.5 % of variation in height can be explained by variation in Index finger length.

                    2 marks

    g. Height(cm) $= 85.2 + 0.9 \times 82$
           $= 159$ cm

                    1 mark

                  Total 10 marks

SECTION B – Short Answer

Question 2

    a. Weight (kg)

                                                       1 mark

    b. $r = -0.92$

                                                       1 mark

    c. Strong, negative, non-linear

                                                       1 mark

    d. $10 = 19.777 - 0.005 \times \text{Weight}$
          $Weight = 1955$ kg

                                                       1 mark

    e. $Pred = 19.777 - 0.005 \times 1600$
          $= 11.777$
          $Resid = 10 - 11.777$
          $= -1.777$

                                                    2 marks

    f. There is a clear relationship on the residual plot indicating that the original relationship is nonlinear.

                                                    1 mark

    g. $Fuel\ Consumption = 82.934 - 22.410 \times \log(weight)$

                                                    2 marks

    h. $r = -0.95$

    The relationship is linearised as the correlation coefficient is closer to -1.

                                                    1 mark
                                               Total 10 marks

END OF KEY TOPIC TEST SOLUTIONS