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Quiz 1

Q1 $e^0 = 1$

Q2 $e^3 \times e^4 = e^7$

Q3 $2 = \log_{10} x$

$x = 10^2$

$= 100$

Q4 $\log_{10} 2 + \log_{10} 3$

$= \log_{10} (2 \times 3)$

$= \log_{10} 6$

Q5 $\sum_{i=1}^{4} i = 1 + 2 + 3 + 4 = 10$

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Quiz 2

Q1 $I_{2\times 2} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Q2 $\begin{bmatrix} 1 & 2 \end{bmatrix}\begin{bmatrix} 3 \\ 4 \end{bmatrix} = 1(3) + 2(4)$

$= 11$

Q3 $\begin{bmatrix} 3 \\ 4 \end{bmatrix}\begin{bmatrix} 1 & 2 \end{bmatrix} = \begin{bmatrix} 3(1) & 3(2) \\ 4(1) & 4(2) \end{bmatrix}$

$= \begin{bmatrix} 3 & 6 \\ 4 & 8 \end{bmatrix}$

Q4 $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}\begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix}$

$= \begin{bmatrix} 1(0)+0(1) & 1(2)+0(0) \\ 0(0)+2(1) & 0(2)+2(0) \end{bmatrix} = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

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Q5 $AA^{-1} = I$

$$A^{-1} = \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix}^{-1}$$

$$A \begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{4} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

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Quiz 3

Q1. C
Q2. D
Q3. A
Q4. A
Q5. B

Quiz 4 $\sigma(z) = \frac{1}{1+e^{-z}}$

Q1

Logit = $Z = \theta_0 + \theta_1 x_1 + \theta_2 x_2 \ldots$

log-odds = $\log\left(\frac{p}{1-p}\right)$

$\log\left(\frac{p}{1-p}\right) = z$

Q1. $\sigma(0) = \frac{1}{1+e^{-0}} = \frac{1}{1+e^{0}} = \frac{1}{1+1}$

$= \frac{1}{2}$

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$Q_2.$ $\log\left(\frac{p}{1-p}\right) = z$

if $z=3$, log-odd $= 3$

$Q_3.$ $z = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \dots$

$z = -4 + 1(3)$

$= -1$

$$\sigma(-1) = \frac{1}{1+e^{-(-1)}} = \frac{1}{1+e} = 0.269$$

if the value is ≥ 0.5, the class is 1
if the value is ≤ 0.5, the class is 0

Answer: 0

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Q4

$$\vec{v} = \begin{bmatrix} 1 \\ 3 \end{bmatrix}, \quad \vec{w} = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$$

$$\vec{v}^T = \begin{bmatrix} 1 & 3 \end{bmatrix}$$

$$\vec{v}^T \vec{w} = \begin{bmatrix} 1 & 3 \end{bmatrix} \begin{bmatrix} 2 \\ 4 \end{bmatrix} = 1(2) + 3(4) = 14$$

Q5

$$\vec{x} = \begin{bmatrix} 2 \\ 4 \end{bmatrix} \qquad \vec{\theta} = \begin{bmatrix} 3 \\ 6 \\ 5 \end{bmatrix}$$

$$Z = 3 + 2(6) + 4(5)$$

$$= 35$$