

Preboards

Marking Scheme

Mathematics - Set B

Q1 (d) $\frac{3}{4}$

Q2 (b) $\sec x + \tan x$

Q3 (b) 4

Q4 (c) transitive if (1,1) is added

Q5 (c) y^2

Q6 (d) -2

Q7 (b) $\frac{18}{25}(3\hat{j} + 4\hat{k})$

Q8 (b) $\sqrt{15}$

Q9 (b) (1, 4, -1)

Q10 (a) -1

Q11 (b) 6

Q12 (b) $\frac{6}{7}$

Q13 (c) $\frac{3}{8}$

Q14 (c) I

Q15 (a) 3×3

Q16 (a) ~~1~~

Q17 (c) Null Matrix

Q18 (a) 2

Q19 (a)

Q20 (d)

Q21 → same as Q23 of Set A

Q22 → same as Q24

Q23 → same as Q22

Q24 → same as Q25

$$\begin{aligned} \underline{Q25} \rightarrow (ABA')' &= [(AB)A']' = (A')'(AB)' \\ &= A \cdot B'A' = A(-B)A' \\ &= -ABA' \end{aligned}$$

Hence skew symmetric

Q26 → same as Q28

Section C

Q27 → same as Q29

Q28 - same as Q27

Q29 $f(x) = x^2 + x + 1$

one-one → let $x_1, x_2 \in \mathbb{N}$

$$\& f(x_1) = f(x_2)$$

$$x_1^2 + x_1 + 1 = x_2^2 + x_2 + 1$$

$$(x_1^2 - x_2^2) + (x_1 - x_2) = 0$$

$$(x_1 - x_2)(x_1 + x_2 + 1) = 0$$

$$\Rightarrow x_1 - x_2 = 0 \quad \text{as } x_1 + x_2 + 1 \neq 0 \text{ as } x_1, x_2 \in \mathbb{N}$$

$$\Rightarrow x_1 = x_2$$

Hence one-one.

Onto for $1 \in \mathbb{N}$, codomain we have $f(x) = 1$

$$x^2 + x + 1 = 1$$

$$x(x+1) = 0$$

$$\text{or } x = 0 \text{ or } x = -1$$

but $0, -1 \notin \mathbb{N}$

$\Rightarrow f$ is not onto

Q30 → same as Q31

Q31 → same as Q26

Section D

Q32 E_1 : Getting 1 or 2 when a die is thrown, bag A is chosen

E_2 : Getting otherwise (3, 4, 5 or 6) on dice & bag B is chosen

A: Two balls are drawn at random, one of them is red & another black

$$P(A) = P(A|E_1) + P(A|E_2)$$

$$= \frac{1}{3} \times \frac{8}{15} + \frac{2}{3} \times \frac{7}{15} = \frac{8}{45} + \frac{14}{45} = \frac{22}{45}$$

Q33 → same as Q35 of set A

Q34 → same as Q32

Q35 → same as Q33

Section E

Q36 → same as Q38

Q37 → same as Q37

Q38 → same as Q36.