

Q1

2 Points

Let $X = \{1, 2, 3, 4, 5\}$. Which of the following relations on X is symmetric and transitive? (There is only one correct answer.)

- $\{(1, 2), (2, 1), (2, 3), (1, 3), (3, 2), (3, 1)\}$
- $\{(3, 4), (3, 4), (1, 5), (5, 1)\}$
- $\{(1, 4), (4, 1), (1, 1), (4, 4)\}$
- $\{(1, 2), (2, 2)\}$

Q2

6 Points

Determine if the following statements are true or false.

Q2.1

2 Points

Let $X = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and suppose R is an equivalence relation on X . If $[1] = \{1, 3, 5, 7\}$, then it must be that there are exactly 2 distinct equivalence classes.

- True
- False

Q2.2

2 Points

Let $X = \{1, 2, 3, 4, 5, 6, 7, 8\}$. Then every relation on X gives a function from X to X .

- True
- False

Q2.3

2 Points

Let $X = \{1, 2, 3\}$ and $Y = \{a, b, c, d\}$. Then every function $f : X \rightarrow Y$ fails to be onto.

- True
- False

Q3

2 Points

How many 4 letter strings are there containing letters from ABCDEF that start with A or end with F? The strings cannot have repetition. That is, each letter can be used at most once.

- $P(6, 4) - P(5, 3)$
- $2 \cdot P(5, 3)$
- $2 \cdot C(5, 3)$
- $2 \cdot P(5, 3) - P(4, 2)$

Q4

2 Points

A club has 12 members, 2 freshman, 3 sophomores, 3 juniors, and 4 seniors. How many ways can they form a committee of 4 people if there has to be at least one senior?

- $C(4, 1)C(8, 3) + C(4, 2)C(8, 2) + C(4, 3)C(8, 1) + 1$
- $C(4, 1)C(11, 3)$
- $P(4, 1)P(8, 3)$
- $C(12, 4)$

Q5

2 Points

Which of the following could be a matrix of a reflexive relation on a set with 3 elements?

- $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$
- $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$
- $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$
- $\begin{pmatrix} -1 & -1 & 1 \\ 10 & 0 & 1 \\ 2 & 1 & 0 \end{pmatrix}$

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TOTAL POINTS

12 / 14 pts

QUESTION 1

(no title)

0 / 2 pts

QUESTION 2

(no title)

6 / 6 pts

2.1 (no title)

2 / 2 pts

2.2 (no title)

2 / 2 pts

2.3 (no title)

2 / 2 pts

QUESTION 3

(no title)

2 / 2 pts

QUESTION 4

(no title)

2 / 2 pts

QUESTION 5

(no title)

2 / 2 pts