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Class XII, Mathematics ***Worksheet 1- Relations***

05-04-2022

Q.1. For real numbers x and y define xRy if and only if x-y +$\sqrt{3}$ is an irrational number. Then the relation R is

A	reflexive	**B**	symmetric	**C**	transitive	**D**	none of these

Q.2. The relation R in ***R*** defined by R = $\{(a, b): a \leq b^3\}. Then$ R is

A	Reflexive but not symmetric	**B**	Symmetric but not symmetric	**C**	reflexive but not transitive	**D**	None of these

Q.3. Let R be the relation in the set {1, 2, 3, 4} given by R = {(1, 2), (2, 2), (1, 1), (4,4), (1, 3), (3, 3), (3, 2)} , then R is

A	Reflexive and symmetric but not transitive	**B**	Reflexive and transitive but not symmetric	*C*	Transitive and symmetric but not reflexive	**D**	an equivalence relation

Q.4. The number of all reflexive relations from set A = $\{1, 2, 3\}$ to itself is

A	3	**B**	9	**C**	64	**D**	512

Q.5. Let R =$\{(1, 3), (2,2), (3, 2)\}$ *is a relation defined on* $A = \{1, 2, 3\}$*, then minimum ordered pairs which should be added in relation R to make it reflexive and symmetric are*

A	$\{(1, 1), (2,3), (1, 2)\}$	**B**	$\{(3, 3), (3,1), (1, 2)\}$
C	$\{(1, 1), (3 ,3), (3, 1), (2, 3)\}$	**D**	$\{(1, 1), (3,3), (3, 1), (1,2\}$

Q.6. If R be the relation on set A = $\{1, 2, 3\}$ *given by* $R = \{(1, 2), (2, 1)\}$ *then* R is

A	only reflexive	**B**	*an equivalence relation*	**C**	only symmetric	**D**	only transitive

Q.7. Let A =$\{1, 2, 3\}$ *and consider the relation* $R = \{(1, 2), (2, 2), (3, 3), (1,2), (2,3), (1, 3)\}$ *then R is*

A	reflexive but not transitive	**B**	symmetric and transitive	**C**	*reflexive but not symmetric*	**D**	None of these

Q.8. If Relation R in the set Z of all integers defined as $R = \{(x, y): x - y$ *is an integer* $\}$ *then R is*

A	only a symmetric relation	**B**	Symmetric and transitive	**C**	Reflexive and transitive	**D**	an equivalence relation.

<table>
<tr><td>Q.9.</td><td colspan="8">If R == $\{(a, b): a = b\}, then\ R\ is$</td></tr>
<tr><td></td><td>A</td><td>only symmetric</td><td>B</td><td>Reflexive and symmetric</td><td>C</td><td>Symmetric and transitive</td><td>D</td><td>an equivalence relation</td></tr>
<tr><td>Q.10.</td><td colspan="8">If R == $\{(a, b): a \leq b, a, b\ are\ real\ numbers\}, then\ R\ is$</td></tr>
<tr><td></td><td>A</td><td>reflexive and symmetric</td><td>B</td><td>reflexive and transitive</td><td>C</td><td>Symmetric and transitive</td><td>D</td><td>none of these</td></tr>
<tr><td>Q11.</td><td colspan="8">Let $A = \{1,2,3,4,5,6,7\} and\ R\ be\ a\ relation\ in\ A \times A\ is\ defined\ by\ a + d = b + c$
$for\ all\ (a, b), (c, d) \in A \times A$. Prove that R is an equivalence relation. Hence obtain the equivalence class of (2, 5).</td></tr>
<tr><td>Q12.</td><td colspan="8">Let T be the set of all triangles in a plane with R a relation in T given by
R = $\{(T1,\ T2): T1\ is\ isimiar\ to\ T2\}$. Show that R is an equivalence relation.</td></tr>
<tr><td>Q13.</td><td colspan="8">Let L be the set of all lines in a plane and R be the relation in L defined as R = $\{(L1, L2): L1 \perp L2\}$. Show that R is symmetric but neither reflexive nor transitive.</td></tr>
<tr><td>Q14.</td><td colspan="8">Let the relation R be defined on the set A = {1, 2, 3, 4, 5} by
R = {(a, b): $|a^2 - b^2|$<8. Write the relation R. Also verify whether the relation is reflexive, symmetric and transitive</td></tr>
<tr><td>Q15.</td><td colspan="8">Prove that the relation R on the set NXN defined by (a, b) R (c, d), iff ad = bc, for all (a, b), (c, d)ϵNXN is an equivalence relation.</td></tr>
<tr><td>Q16.</td><td colspan="8">Show that the relation R defined on set A = $\{0, 1, 2, 3, \ldots .12\}$
R = $\{(a, b): |a - b| is\ diivisible\ by\ 4; a, b \in A\}$ is an equivalence relation</td></tr>
<tr><td rowspan="3">ANSWERS</td><td>1.</td><td>A</td><td>2.</td><td>D</td><td>3.</td><td>B</td><td>4.</td><td>D</td></tr>
<tr><td>5.</td><td>C</td><td>6.</td><td>C</td><td>7.</td><td>B</td><td>8.</td><td>D</td></tr>
<tr><td>9.</td><td>D</td><td>10</td><td>B</td><td>11</td><td colspan="3">$[(2, 5)] = \{(1,4), (2,5), (3,6), (4,7), (5,8), (6,9)\}$</td></tr>
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