

CISC 2210 Spring 2018 Quiz 4

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1 Relations

1.1 For the following relations, explain if each is Reflexive, Symmetric, and/or Transitive

1. Define R_1 on $\mathbb{N}$. $x R_1 y$ means that x is a multiple of y .

2. Define R_2 on $\mathbb{Z}$. $x R_2 y$ means that $x - y = -2$.

2 Graphs

2.1 Mathematical Definition of a Graph

Consider the digraph G depicted below. Define G by specifying V , E , and γ

2.2 Drawing a Picture of a Graph

Let $H = (V, E, \gamma)$ be the undirected graph given by:

$$V = \{v_1, v_2, v_3, v_4\}$$

$$E = \{a, b, c, d, e\}$$

	edge	endpoints
$\gamma =$	a	$\{v_1, v_2\}$
	b	$\{v_2, v_3\}$
	c	$\{v_3, v_1\}$
	d	$\{v_4, v_2\}$
	e	$\{v_1, v_4\}$

Draw a picture of H .

3 Matrices

Let $A = [a_{ij}]$ such that $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \\ 3 & 1 & 2 \end{bmatrix}$ and let $B = [b_{ij}]$ such that $B = \begin{bmatrix} 1 & -3 & 5 \\ -2 & 3 & 1 \\ 2 & 1 & 0 \end{bmatrix}$.

Find:

1. a_{23}

2. $B[1, 1]$

3. A^T

4. $3A$

5. $(A + B)^T$

