

Ex 1.1

- 1) Is there a real number whose $\text{sq} = -1$
- a) Is there a real number x such that $x^2 = -1$
- b) Does there exist a real number x such that $x^2 = -1$
- 3) Given any two real numbers, there is a real number in between
- a) Given any two real numbers a and b , there is a real number c such that c is between a and b
- b) For any two real numbers a and b , there is a real number c such that $a < c < b$
- 8) For all objects \overline{J} , if \overline{J} is a sq then \overline{J} has 4 sides
- A) All sq's have 4 sides
- b) Every sq has 4 sides
- c) If an object is a sq, then it has 4 sides
- d) If \overline{J} is a sq, then \overline{J} has 4 sides
- e) For all sq's \overline{J} , \overline{J} has 4 sides
- 12) There is a real number whose product with every number leaves the number unchanged
- a) Some real number has the property that its product with every number leaves the number unchanged
- b) There is a real number r such that the product of r with every number leaves the number unchanged
- c) There is a real number r with the property that for every real number G , $r \cdot G = G$

Ex 1.2

1) $A = C \text{ \& } B = D$

2) a) $\{x \in \mathbb{R}^+ \mid 0 < x < 1\}$ - the set of all positive real numbers x such that $0 < x \text{ \& } x < 1$

b) $\{x \in \mathbb{R} \mid x \leq 0 \text{ or } \geq 1\}$ - the set of all real numbers x such that $0 \leq x$ or $1 \leq x$

c) $\{N \in \mathbb{Z} \mid N \text{ is a factor of } 6\}$ - the set of all integers N such that N is a factor of 6

d) $\{N \in \mathbb{Z}^+ \mid N \text{ is a factor of } 6\}$ - the set of all ^{positive} integers N such that N is a factor of 6

3) a) Is $4 = \{4\}$ - No

b) ~~$\{4\} \in \{4\}$~~ 3

c) 3

8) $A = \{c, d, f, g\}$ $B = \{f, 5\}$ $C = \{d, g\}$

a) No - $\overline{J} \in B \text{ \& } \overline{J} \notin A$

b) yes - $d \in A \text{ \& } g \in A$

c) yes

d) yes - C is inside of A , A is not inside of C

11) $A = \{w, x, y, z\}$ $B = \{a, b\}$

a) $A \times B = \{(w, a), (w, b), (x, a), (x, b), (y, a), (y, b), (z, a), (z, b)\}$

b) $B \times A = \{(a, w), (a, x), (a, y), (a, z), (b, w), (b, x), (b, y), (b, z)\}$

c) $A \times A = \{(w, w), (w, x), (w, y), (w, z), (x, w), (x, x), (x, y), (x, z), (y, w), (y, x), (y, y), (y, z), (z, w), (z, x), (z, y), (z, z)\}$

d) $B \times B = \{(a, a), (a, b), (b, b), (b, a)\}$

Ex 1.3

1) $A = \{2, 3, 4\}$ & $B = \{6, 8, 10\}$ Define a relation R from A to B as follows: for all $(x, y) \in A \times B$
 $(x, y) \in R$ means that $y/x = \text{INT}$

a) No, Yes, No, Yes

b) $R = \{(2, 6), (2, 8), (2, 10), (3, 6), (4, 8)\}$

c) Domain of $R = A = \{2, 3, 4\}$

Co-Domain of $R = B = \{6, 8, 10\}$

d) $2 \rightarrow 6$

$3 \rightarrow 6$

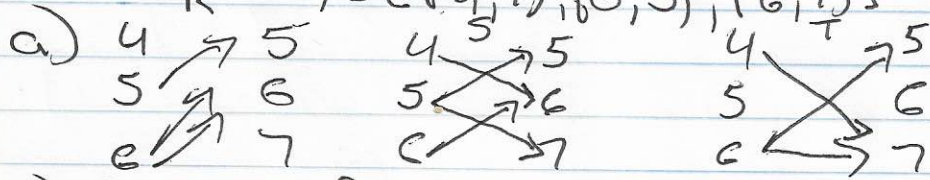
$4 \rightarrow 10$

7) $A = \{4, 5, 6\}$ $B = \{5, 6, 7\}$ Define relations R, S, T From A to B For all $(x, y) \in A \times B$

$(x, y) \in R$ means that $x > y$

$(x, y) \in S$ means that $\frac{x-y}{2} = \text{INT}$

$T = \{(4, 7), (6, 5), (6, 7)\}$



a) R Not a function

S Not a function

T Not a function

9) A) $0, \{(0, 1)\}, \{(1, 1)\}, \{(0, 1)\}, \{(1, 1)\}$

B) $\{(0, 1)\}, \{(1, 1)\}$

C) $1/4$

13) A) Domain $A = \{-1, 0, 1\}$

Co-Domain $B = \{u, v, w\}$

B) $F(-1) = u$

$F(0) = w$

$F(1) = u$