

Maths Tutorial 4

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1 Question 1

List the elements of the following sets

1.1 $A = \{x | x \in \mathbb{Z} \text{ and } 1 \leq x \leq 7\}$

1, 2, 3, 4, 5, 6

1.2 $B = \{x | x \in \mathbb{R} \text{ and } x \times x = 2\}$

1, 2, -2, -1 < WRONG. Read question CAREFULLY

1.3 $C = \{x | x \in \mathbb{N} \text{ and } x < 5 \text{ and } x^2 > 30\}$

\emptyset

2 Question 2

Write the following sets in the form $\{x | P(x)\}$

2.1 $A = \{4, 9, 16, 25, \dots\}$

$\{x | x > 1 \text{ and } x * x\}$

2.2 $B = \{0, 2, 0, 2, 0, 2, \dots\}$

$\{x | x \text{ is } 0 \text{ or } x \text{ is } 2\}$

2.3 $C = \{2, 4, 6, 8, 10, \dots\}$

$\{x | x * 2\}$

REMEMBER TO ALWAYS WRITE WHAT NUMBER SYSTEM THIS IS FROM!!!

3 Question 3

Which of the following statements are true?

3.1 $\{3, 4\} \subseteq \{4, 3\}$

True

3.2 $\{\text{Leeds, Leeds}\} \subseteq \{\text{Leeds}\}$

True

3.3 $\emptyset \in \{\text{Leeds, Liverpool}\}$

Not true

3.4 $\emptyset \subseteq \{\text{Leeds, Liverpool}\}$

True

3.5 $\emptyset \in \{\emptyset\}$?

True

3.6 $\emptyset = \{\emptyset\}$?

Not true because the empty set is a set.

4 Question 4

In this question the universal set U is $\{1,2,3,4,5,6,7,8\}$. Let $A=\{1,2,3,4\}$, $B=\{3,5,7\}$ and $C=\{1,4,5,6\}$. Find the elements of

4.1 $A \cap B$

$$A \cap B = \{3\}$$

4.2 $A \cup C$

$$A \cup C = \{1, 2, 3, 4, 5, 6\}$$

4.3 $\sim C$

2, 3, 7, 8. Because not c is the universal set take away c , and the universal set is strictly defined here.

4.4 $\sim \sim A$

2 nots make a right, so this is 1, 2, 3, 4

4.5 $A \cap B \cap C$

$$\emptyset$$

4.6 $\sim A \cup B$

$$A \cup B = \{1, 2, 3, 4, 5, 7\} \text{ NOT THAT WOULD BE } 6, 8$$

4.7 $B - C$

$$3, 7$$

4.8 $B \Delta C$

$$1, 3, 4, 7, 6$$

5 Question 5

Let S be the following ordered sequence of elements $S=\{1,2,3,4,5,6\}$. Write down the characteristic vectors of

5.1 $A=1,2,4,5$

$$(110110)$$

5.2 $B=\{3,5\}$

(001010)

5.3 \emptyset

(000000)

5.4 $A \cup B$

(111110)

5.5 $A \cup \sim B$

(110101)

5.6 $A \Delta B$

(111100)