



LEARN MORE
ABOUT OUR
E. MATH TUITION



REGISTER FOR
FREE MATH
ONLINE COURSE



STUDY GUIDE



VIDEO SOLUTIONS
FOR THIS
WORKSHEET

SEC 4 ELEMENTARY MATHEMATICS

UNIT 1: SETS

1.1 INTRODUCTION TO SET NOTATIONS

1.1 CONCEPTUAL BRIDGING: INTRODUCTION TO SET NOTATIONS

- **Universal set** ξ is the set of all elements.
- \in means 'is an element of'.
- \notin means 'is not an element of'.
- Listing all elements in set notation, e.g. $A = \{1, 3, 4, 5\}$.
- $n(A)$ means the number of the elements in the set A .
- **Equal set** contain exactly the same elements. E.g. $A = \{1, 3, 4, 5\}$, $B = \{5, 3, 4, 1\}$, thus $A = B$ and $n(A) = n(B)$.
- The **empty** or **null** set is the set containing no element. E.g. $A = \{ \}$ or $A = \phi$.

1.1 WORKED EXAMPLE 1

A is the set of odd positive integers less than 12.

- (a) List all the elements of A in set notation.
- (b) State whether each of the following statements is true or false.
- (i) $5 \in A$
 - (ii) $9 \notin A$
 - (iii) $0 \in A$
 - (iv) $13 \notin A$

1.1 PRACTICE NOW 1**QUESTION 1**

X is a set of all perfect cubes bigger than 1 and less than 60.

- (i) Is $16 \in X$?
- (ii) List all the elements of X in set notation.

1.1 WORKED EXAMPLE 2

Y is the set of numbers that are multiples of 3 and less than 20.

- (a) Write down all the elements of the set Y .
- (b) Find the value of $n(Y)$.

www.timganmath.com

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES

www.timganmath.com

1.1 WORKED EXAMPLE 3

It is given that

$$A = \{x : x \text{ is a positive integer such that } -2 < x \leq 5\}$$

$$B = \{x : x \text{ is a positive integer between 2 and 8 exclusive}\}$$

- (a) List all the elements in A and in B in set notation.
- (b) Are A and B equal sets? Why?

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES

www.timganmath.com

1.1 PRACTICE NOW 2

QUESTION 1

X is the set of numbers that are factors of 18. Write down all the elements of the set X .

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

QUESTION 2

List all the elements of the set $C = \{x : x \text{ is an integer such that } 4x - 7 < x \leq 2x + 3\}$.

TIMGANMATH

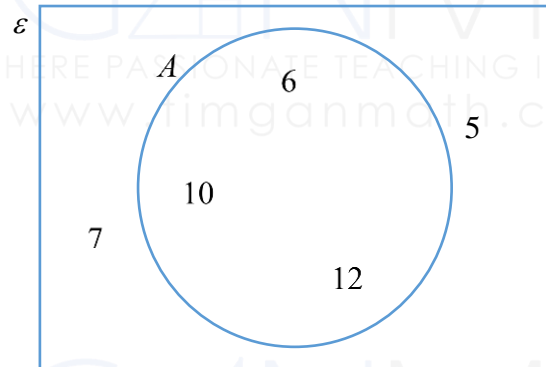
WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

TIMGANMATH

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

1.2 VENN DIAGRAMS, UNIVERSAL SETS AND COMPLEMENT OF A SET

1.2 CONCEPTUAL BRIDGING: VENN DIAGRAMS, UNIVERSAL SETS AND COMPLEMENT OF A SET



- ✓ Rectangle represents the set of all the elements. $\varepsilon = \{5, 6, 7, 10, 12\}$
- ✓ The circle represents the set $A = \{6, 10, 12\}$
- ✓ The elements outside the circle but inside the rectangle is the complement of $A \rightarrow A' = \{5, 7\}$

1.2 WORKED EXAMPLE 1

$\varepsilon = \{x : x \text{ is an integer and } 1 < x \leq 18\}$

$A = \{x : x \text{ is a multiple of } 3\}$

List the elements of

(a) ε ,

(b) A ,

(c) A' .

1.2 PRACTICE NOW 1

QUESTION 1

$$\varepsilon = \{x : x \text{ is an integer and } 2 \leq x \leq 20\}$$

$$A = \{x : x \text{ is a factor of } 12\}$$

$$B = \{x : x \text{ is divisible by } 3\}$$

List the elements of

(a) ε ,

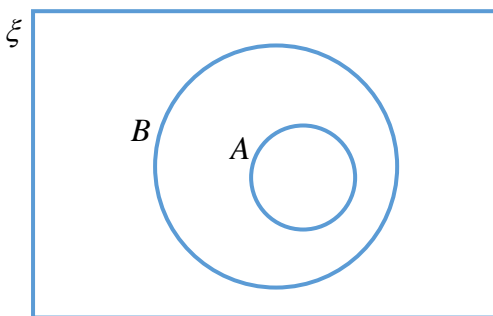
(b) A' ,

(c) B' .

1.3 PROPER SUBSETS

1.3 CONCEPTUAL BRIDGING: PROPER SUBSETS

$A \subset B$, A is a proper subset of B if all elements of A are elements of B .



Consider the set $B = \{2, 4, 6, 8, 10\}$ and

$$A = \{4, 8\}$$

✓ Every element of A is an element of B
BUT $B \neq A$.

$\therefore A$ is a proper subset of B .

1.3 WORKED EXAMPLE 1

List all the proper subsets of $X = \{2, 3, 4\}$.

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

1.3 PRACTICE NOW 1**QUESTION 1**

List all the proper subsets of $Z = \{a, b, c, d\}$.

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com

WHERE PASSIONATE TEACHING INSPIRES
www.timganmath.com