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# SUBSTITUTION

**SUBJECT : MATHEMATICS**
**CHAPTER NUMBER:20**
**CHAPTER NAME :SUBSTITUTION**
**SUBTOPIC : Brackets, Opening or Removing Brackets**
**PERIOD NO: 2**



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# Learning outcomes

- Students will be able to open or remove brackets
- Students will be able to apply the above to solve sums.

# PREVIOUS KNOWLEDGE TEST

**1. If x = 2, y = 5 and z = 4, find the value of each of the following:**

**(i) $x / 2x^2$ (ii) $xz / yz$**

**(iii) $z^x$ (iv) $y^x$**

**(v) $x^2y^2z^2 / xz$**

**2. If a = 3, find the values of $a^2$ and $2^a$**

**3. If m = 2, find the difference between the values of $4m^3$ and $3m^4$.**

# PREVIOUS KNOWLEDGE TEST

**Solution:**

(i) $x / 2x^2$

The value of $x / 2x^2$ for x = 2, y = 5 and z = 4 is calculated as below

$x / 2x^2$

Now, adding x = 2, y = 5 and z = 4, we get

$x / 2x^2 = 2 / 2(2)^2$

On calculation, we get

= 2 / 8

= 1 / 4

# Negative numbers and Integers

- Students will Learn  removal of brackets with the help of a video .
- https://www.youtube.com/watch?v=fgr2eceD7Ow(3.58)

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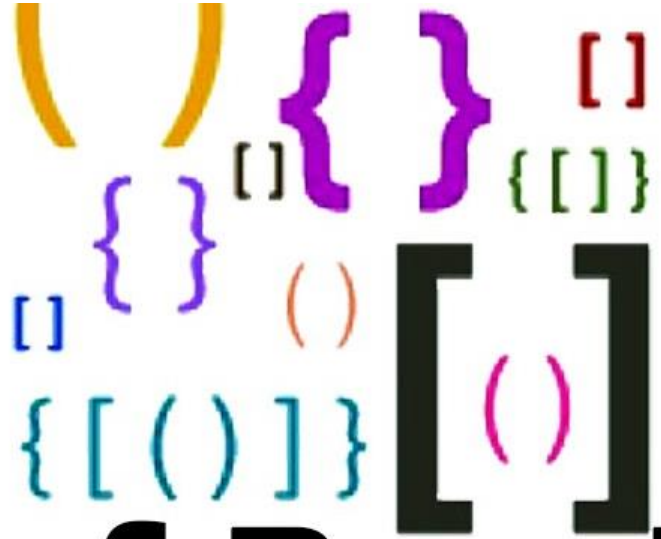



# Use of Brackets in Mathematics

# Removal Of Brackets

**Simplify : $2x - [3x - \{4x - (3y - 2x - 2y)\}]$**

Removing the brackets in order, we get

The expression $= 2x - [3x - \{4x - (3y - 2x - 2y)\}]$

$= 2x - [3x - \{4x - (y - 2x)\}]$

$= 2x - [3x - \{4x - y + 2x\}]$

$= 2x - [3x - \{6x - y\}]$

# Evaluation Question EX-20 B

**1. Evaluate:**

**(i) (23 – 15) + 4** **(ii) 5x + (3x + 7x)**

**(iii) 6m – (4m – m)** **(iv) (9a – 3a) + 4a**

**(v) 35b – (16b + 9b)**

**Solution:**(i) (23 – 15) + 4

The value of the given expression (23 – 15) + 4 is calculated as follows

(23 – 15) + 4 = 8 + 4= 12

Hence, the value of the given expression (23 – 15) + 4 = 12

# Evaluation Question EX-20 B

(ii) $5x + (3x + 7x)$

The value of the expression $5x + (3x + 7x)$ is calculated as follows

$5x + (3x + 7x) = 5x + 10x = 15x$

Hence, the value of the expression $5x + (3x + 7x) = 15x$

(iii) $6m - (4m - m)$

The value of the expression $6m - (4m - m)$ is calculated as follows

$6m - (4m - m) = 6m - 3m = 3m$

Hence, the value of the expression $6m - (4m - m) = 3m$

## Evaluation Question

**2. Simplify:**

**(i) 12x – (5x + 2x)** **(ii) 10m + (4n – 3n) – 5n**

**(iii) (15b – 6b) – (8b + 4b)** **(iv) – (- 4a – 8a)**

**(v) x – (x – y) – (- x + y)**

**Solution:**(i) 12x – (5x + 2x)

The simplified form of the expression 12x – (5x + 2x) is calculated as below

12x – (5x + 2x) = 12x – 7x= 5x

## Evaluation Question

(ii) $10m + (4n - 3n) - 5n$

The simplified form of the expression $10m + (4n - 3n) - 5n$ is calculated as below

$10m + (4n - 3n) - 5n = 10m + n - 5n$

$= 10m - 4n$

(iii) $(15b - 6b) - (8b + 4b)$

The simplified form of the expression $(15b - 6b) - (8b + 4b)$ is calculated as below

$(15b - 6b) - (8b + 4b) = 9b - 12b = -3b$

## Evaluation Question

**3. Simplify:**

**(i) x – (y – z) + x + (y – z) + y – (z + x)  (ii) x – [y + {x – (y + x)}]**

**(iii) 4x + 3 (2x – 5y)  (iv) 2 (3a – b) – 5 (a – 3b)**

(i) x – (y – z) + x + (y – z) + y – (z + x)

The simplified form of the expression x – (y – z) + x + (y – z) + y – (z + x) is calculated as follows

x – (y – z) + x + (y – z) + y – (z + x) = x – y + z + x + y – z + y – z – x

= x + y – z

## Evaluation Question

(ii) $x - [y + \{x - (y + x)\}]$

The simplified form of the expression $x - [y + \{x - (y + x)\}]$ is calculated as follows

$x - [y + \{x - (y + x)\}] = x - [y + \{x - y - x\}]$

$= x - [y + x - y - x]$

$= x - x + x - y + y$

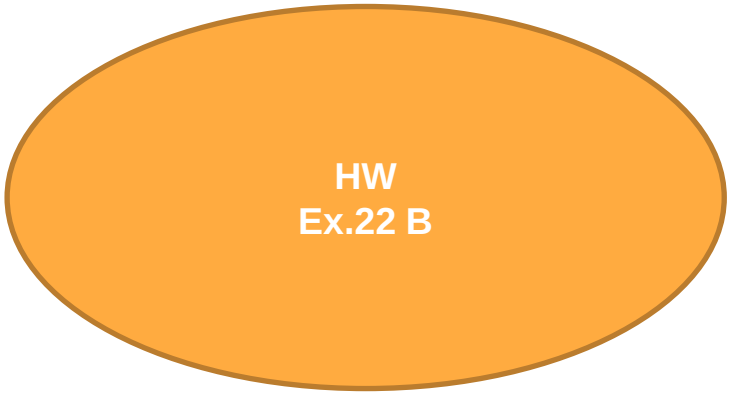
$= x$

# Additional Homework

**1. p + q – (p – q) + (2p – 3q)**

**2. 9x – (-4x + 5)**

**3. 6a – (- 5a – 8b) + (3a + b)**

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