

## EXERCISE 1.1

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**1. Determine each of the following products:**

(i)  $12 \times 7$

(ii)  $(-15) \times 8$

(iii)  $(-25) \times (-9)$

(iv)  $125 \times (-8)$

**Solution:**

(i) Given  $12 \times 7$

Here we have to find the products of given numbers

$$12 \times 7 = 84$$

Because the product of two integers of like signs is equal to the product of their absolute values.

(ii) Given  $(-15) \times 8$

Here we have to find the products of given numbers

$$(-15) \times 8 = -120$$

Because the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

(iii) Given  $(-25) \times (-9)$

Here we have to find the products of given numbers

$$(-25) \times (-9) = + (25 \times 9) = +225$$

Because the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

(iv) Given  $125 \times (-8)$

Here we have to find the products of given numbers

$$125 \times (-8) = -1000$$

Because the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

**2. Find each of the following products:**

(i)  $3 \times (-8) \times 5$

(ii)  $9 \times (-3) \times (-6)$

(iii)  $(-2) \times 36 \times (-5)$

**(iv)  $(-2) \times (-4) \times (-6) \times (-8)$**

**Solution:**

(i) Given  $3 \times (-8) \times 5$

Here we have to find the product of given number.

$$3 \times (-8) \times 5 = 3 \times (-8 \times 5)$$

$$= 3 \times -40 = -120$$

Since the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

(ii) Given  $9 \times (-3) \times (-6)$

Here we have to find the product of given number.

$$9 \times (-3) \times (-6) = 9 \times (-3 \times -6) [\because \text{the product of two integers of like signs is equal to the product of their absolute values.}]$$

$$= 9 \times +18 = +162$$

(iii) Given  $(-2) \times 36 \times (-5)$

Here we have to find the product of given number.

$$(-2) \times 36 \times (-5) = (-2 \times 36) \times -5 [\because \text{the product of two integers of like signs is equal to the product of their absolute values.}]$$

$$= -72 \times -5 = +360$$

(iv) Given  $(-2) \times (-4) \times (-6) \times (-8)$

Here we have to find the product of given number.

$$(-2) \times (-4) \times (-6) \times (-8) = (-2 \times -4) \times (-6 \times -8) [\because \text{the product of two integers of like signs is equal to the product of their absolute values.}]$$

$$= -8 \times -48 = +384$$

**3. Find the value of:**

**(i)  $1487 \times 327 + (-487) \times 327$**

**(ii)  $28945 \times 99 - (-28945)$**

**Solution:**

(i) Given  $1487 \times 327 + (-487) \times 327$

By using the rule of multiplication of integers, we have

$$1487 \times 327 + (-487) \times 327 = 486249 - 159249$$

Since the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

$$= 327000$$

(ii) Given  $28945 \times 99 - (-28945)$

By using the rule of multiplication of integers, we have

$$28945 \times 99 - (-28945) = 2865555 + 28945$$

Since the product of two integers of like signs is equal to the product of their absolute values.

$$= 2894500$$

**4. Complete the following multiplication table:**

		Second number								
First number	x	-4	-3	-2	-1	0	1	2	3	4
	-4									
	-3									
	-2									
	-1									
	0									
	1									
	2									
	3									
	4									

**Is the multiplication table symmetrical about the diagonal joining the upper left corner to the lower right corner?**

**Solution:**

Second number

First number	x	-4	-3	-2	-1	0	1	2	3	4
	-4	16	12	8	4	0	-4	-8	-12	-16
	-3	12	9	6	3	0	-3	-6	-9	-12
	-2	8	6	4	2	0	-2	-4	-6	-8
	-1	4	3	2	1	0	-1	-2	-3	-4
	0	0	0	0	0	0	0	0	0	0
	1	-4	-3	-2	-1	0	1	2	3	4
	2	-8	-6	-4	-2	0	2	4	6	8
	3	-12	-9	-6	-3	0	3	6	9	12
	4	-16	-12	-8	-4	0	4	8	12	16

From the table it is clear that, the table is symmetrical about the diagonal joining the upper left corner to the lower right corner.

**5. Determine the integer whose product with '-1' is**

(i) 58

(ii) 0

(iii) -225

**Solution:**

(i) Given 58

Here we have to find the integer which is multiplied by -1

We get,  $58 \times -1 = -58$

Since the product of two integers of opposite signs is equal to the additive inverse of the product of their absolute values.

(ii) Given 0

Here we have to find the integer which is multiplied by -1

We get,  $0 \times -1 = 0$  [because anything multiplied with 0 we get 0 as their result]

(iii) Given -225

Here we have to find the integer which is multiplied by -1

We get,  $-225 \times -1 = 225$

Since the product of two integers of like signs is equal to the product of their absolute values.

## EXERCISE 1.2

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**1. Divide:**

(i) 102 by 17

(ii) -85 by 5

(iii) -161 by -23

(iv) 76 by -19

(v) 17654 by -17654

(vi) (-729) by (-27)

(vii) 21590 by -10

(viii) 0 by -135

**Solution:**

(i) Given 102 by 17

We can write given question as  $102 \div 17$ 

$$102 \div 17 = |102/17| = |102|/|17| \text{ [by applying the mod]} \\ = 102/17 = 6$$

(ii) Given -85 by 5

We can write given question as  $-85 \div 5$ 

$$-85 \div 5 = |-85/5| = |-85|/|5| \text{ [by applying the mod]} \\ = -85/5 = -17$$

(iii) Given -161 by -23

We can write given question as  $-161 \div -23$ 

$$-161 \div -23 = |-161/-23| = |-161|/|-23| \text{ [by applying the mod]} \\ = 161/23 = 7$$

(iv) Given 76 by -19

We can write given question as  $76 \div -19$ 

$$76 \div -19 = |76/-19| = |76|/|-19| \text{ [by applying the mod]} \\ = 76/-19 = -4$$

(v) Given 17654 by 17654

We can write given question as  $17654 \div -17654$ 

$$17654 \div -17654 = |17654/-17654| = |17654|/|-17654| \text{ [by applying the mod]}$$

$$= 17654/-17654 = -1$$

(vi) Given  $(-729)$  by  $(-27)$

We can write given question as  $(-729) \div (-27)$

$$\begin{aligned} (-729) \div (-27) &= |-729/-27| = |-729|/|-27| \text{ [by applying the mod]} \\ &= 729/27 = 27 \end{aligned}$$

(vii) Given  $21590$  by  $-10$

We can write given question as  $21590 \div -10$

$$\begin{aligned} 21590 \div -10 &= |21590/-10| = |21590|/|-10| \text{ [by applying the mod]} \\ &= 21590/-10 = -2159 \end{aligned}$$

(viii) Given  $0$  by  $-135$

We can write given question as  $0 \div -135$

$$0 \div -135 = 0 \text{ [because anything is divided by 0 we get the result as 0]}$$

## EXERCISE 1.3

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**Find the value of**

**1.  $36 \div 6 + 3$**

**Solution:**

Given  $36 \div 6 + 3$

According to BODMAS rule we have operate division first then we have to do addition

Therefore  $36 \div 6 + 3 = 6 + 3 = 9$

**2.  $24 + 15 \div 3$**

**Solution:**

Given  $24 + 15 \div 3$

According to BODMAS rule we have operate division first then we have to do addition

Therefore  $24 + 15 \div 3 = 24 + 5 = 29$

**3.  $120 - 20 \div 4$**

**Solution:**

Given  $120 - 20 \div 4$

According to BODMAS rule we have operate division first then we have to do multiplication

Therefore  $120 - 20 \div 4 = 120 - 5 = 115$

**4.  $32 - (3 \times 5) + 4$**

**Solution:**

Given  $32 - (3 \times 5) + 4$

According to BODMAS rule we have operate in brackets first then we have move to addition and subtraction.

Therefore  $32 - (3 \times 5) + 4 = 32 - 15 + 4$   
 $= 32 - 11 = 21$

**5.  $3 - (5 - 6 \div 3)$**

**Solution:**

Given  $3 - (5 - 6 \div 3)$

According to BODMAS rule we have operate in brackets first then we have move to subtraction.

$$\begin{aligned}\text{Therefore } 3 - (5 - 6 \div 3) &= 3 - (5 - 2) \\ &= 3 - 3 = 0\end{aligned}$$

**6.  $21 - 12 \div 3 \times 2$**

**Solution:**

Given  $21 - 12 \div 3 \times 2$

According to BODMAS rule we have perform division first then multiplication and addition.

$$\begin{aligned}\text{Therefore, } 21 - 12 \div 3 \times 2 &= 21 - 4 \times 2 \\ &= 21 - 8 = 13\end{aligned}$$

**7.  $16 + 8 \div 4 - 2 \times 3$**

**Solution:**

Given  $16 + 8 \div 4 - 2 \times 3$

According to BODMAS rule we have perform division first then followed by multiplication, addition and subtraction.

$$\begin{aligned}\text{Therefore, } 16 + 8 \div 4 - 2 \times 3 &= 16 + 2 - 2 \times 3 \\ &= 16 + 2 - 6 \\ &= 18 - 6 \\ &= 12\end{aligned}$$

**8.  $28 - 5 \times 6 + 2$**

**Solution:**

Given  $28 - 5 \times 6 + 2$

According to BODMAS rule we have perform multiplication first then followed by addition and subtraction.

$$\begin{aligned}\text{Therefore, } 28 - 5 \times 6 + 2 &= 28 - 30 + 2 \\ &= 28 - 28 = 0\end{aligned}$$

**9.  $(-20) \times (-1) + (-28) \div 7$**

**Solution:**

$$\text{Given } (-20) \times (-1) + (-28) \div 7$$

According to BODMAS rule we have perform division first then followed by multiplication, addition and subtraction.

$$\begin{aligned}\text{Therefore, } (-20) \times (-1) + (-28) \div 7 &= (-20) \times (-1) - 6 \\ &= 20 - 6 = 16\end{aligned}$$

**10.  $(-2) + (-8) \div (-4)$**

**Solution:**

$$\text{Given } (-2) + (-8) \div (-4)$$

According to BODMAS rule we have perform division first then followed by addition and subtraction.

$$\begin{aligned}\text{Therefore, } (-2) + (-8) \div (-4) &= (-2) + 2 \\ &= 0\end{aligned}$$

**11.  $(-15) + 4 \div (5 - 3)$**

**Solution:**

$$\text{Given } (-15) + 4 \div (5 - 3)$$

According to BODMAS rule we have perform division first then followed by addition and subtraction.

$$\begin{aligned}\text{Therefore, } (-15) + 4 \div (5 - 3) &= (-15) + 4 \div 2 \\ &= -15 + 2 \\ &= -13\end{aligned}$$

**12.  $(-40) \times (-1) + (-28) \div 7$**

**Solution:**

$$\text{Given } (-40) \times (-1) + (-28) \div 7$$

According to BODMAS rule we have perform division first then followed by multiplication, addition and subtraction.

$$\begin{aligned}(-40) \times (-1) + (-28) \div 7 &= (-40) \times (-1) - 4 \\ &= 40 - 4 \\ &= 36\end{aligned}$$

**13.  $(-3) + (-8) \div (-4) - 2 \times (-2)$**

**Solution:**

$$\text{Given } (-3) + (-8) \div (-4) - 2 \times (-2)$$

According to BODMAS rule we have perform division first then followed by multiplication, addition and subtraction.

$$(-3) + (-8) \div (-4) - 2 \times (-2) = -3 + 2 - 2 \times (-2)$$

$$= -3 + 2 + 4$$

$$= 6 - 3$$

$$= 3$$

$$14. (-3) \times (-4) \div (-2) + (-1)$$

**Solution:**

$$\text{Given } (-3) \times (-4) \div (-2) + (-1)$$

According to BODMAS rule we have perform division first then followed by multiplication, addition and subtraction.

$$(-3) \times (-4) \div (-2) + (-1) = -3 \times 2 - 1$$

$$= -6 - 1$$

$$= -1$$

## EXERCISE 1.4

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**Simplify each of the following:**

1.  $3 - (5 - 6 \div 3)$

**Solution:**

Given  $3 - (5 - 6 \div 3)$

According to removal of bracket rule firstly remove inner most bracket

We get  $3 - (5 - 6 \div 3) = 3 - (5 - 2)$

$= 3 - 3$

$= 0$

2.  $-25 + 14 \div (5 - 3)$

**Solution:**

Given  $-25 + 14 \div (5 - 3)$

According to removal of bracket rule firstly remove inner most bracket

We get  $-25 + 14 \div (5 - 3) = -25 + 14 \div 2$

$= -25 + 7$

$= -18$

3.  $25 - \frac{1}{2} \{5 + 4 - (3 + 2 - \overline{1 + 3})\}$

**Solution:**

Given  $25 - \frac{1}{2} \{5 + 4 - (3 + 2 - \overline{1 + 3})\}$

According to removal of bracket rule first we have to remove vinculum we get

$= 25 - \frac{1}{2} \{5 + 4 - (5 - 4)\}$

Now by removing the innermost bracket we get

$= 25 - \frac{1}{2} \{5 + 4 - 1\}$

By removing the parentheses we get

$= 25 - \frac{1}{2} (8)$

Now simplifying we get

$= 25 - 4$

$= 21$

4.  $27 - [38 - \{46 - (15 - \overline{13 - 2})\}]$

**Solution:**

Given  $27 - [38 - \{46 - (15 - \overline{13 - 2})\}]$

According to removal of bracket rule first we have to remove vinculum we get

$$= 27 - [38 - \{46 - (15 - 11)\}]$$

Now by removing inner most bracket we get

$$= 27 - [38 - \{46 - 4\}]$$

By removing the parentheses we get

$$= 27 - [38 - 42]$$

Now by removing braces we get

$$= 27 - (-4)$$

$$= 27 + 4$$

$$= 31$$

5.  $36 - [18 - \{14 - (15 - 4 \div 2 \times 2)\}]$

**Solution:**

Given  $36 - [18 - \{14 - (15 - 4 \div 2 \times 2)\}]$

By removing innermost bracket we get

$$= 36 - [18 - \{14 - (11 \div 2 \times 2)\}]$$

$$= 36 - [18 - \{14 - 11\}]$$

Now by removing the parentheses we get

$$= 36 - [18 - 3]$$

Now remove the braces we get

$$= 36 - 15$$

$$= 21$$

6.  $45 - [38 - \{60 \div 3 - (6 - 9 \div 3) \div 3\}]$

**Solution:**

Given  $45 - [38 - \{60 \div 3 - (6 - 9 \div 3) \div 3\}]$

First remove the inner most brackets

$$= 45 - [38 - \{20 - (6 - 3) \div 3\}]$$

$$= 45 - [38 - \{20 - 3 \div 3\}]$$

Now remove the parentheses we get

$$= 45 - [38 - 19]$$

Now remove the braces we get

$$= 45 - 19$$
$$= 26$$

7.  $23 - [23 - \{23 - (23 - \overline{23 - 23})\}]$

**Solution:**

Given  $23 - [23 - \{23 - (23 - \overline{23 - 23})\}]$

Now first remove the vinculum we get

$$= 23 - [23 - \{23 - (23 - 0)\}]$$

Now remove the innermost bracket we get,

$$= 23 - [23 - \{23 - 23\}]$$

By removing the parentheses we get,

$$= 23 - [23 - 0]$$

Now we have to remove the braces and on simplifying we get,

$$= 23 - 23$$

$$= 0$$

8.  $2550 - [510 - \{270 - (90 - \overline{80 + 70})\}]$

**Solution:**

Given  $2550 - [510 - \{270 - (90 - \overline{80 + 70})\}]$

First we have to remove the vinculum from the given equation we get,

$$= 2550 - [510 - \{270 - (90 - 150)\}]$$

By removing innermost bracket we get,

$$= 2550 - [510 - \{270 - (-60)\}]$$

$$= 2550 - [510 - \{270 + 60\}]$$

Now remove the parentheses we get,

$$= 2550 - [510 - 330]$$

Now we have to remove parentheses

$$= 2550 - 180$$

$$= 2370$$

9.  $4 + \frac{1}{5} [\{-10 \times (25 - \overline{13 - 3})\} \div (-5)]$

**Solution:**

Given

$$4 + \frac{1}{5} [\{-10 \times (25 - \overline{13 - 3})\} \div (-5)]$$

First we have to remove vinculum from the given equation,

$$= 4 + 1/5 \{ \{-10 \times (25 - 10)\} \div (-5) \}$$

Now remove the innermost bracket, we get

$$= 4 + 1/5 \{ \{-10 \times 15\} \div (-5) \}$$

Now by removing the parenthesis we get,

$$= 4 + 1/5 [-150 \div -5]$$

By removing the braces we get,

$$= 4 + 1/5 (30)$$

On simplifying we get,

$$= 4 + 6$$

$$= 10$$

$$10. 22 - \frac{1}{4} \{ -5 - (-48) \div (-16) \}$$

**Solution:**

$$\text{Given } 22 - \frac{1}{4} \{ -5 - (-48) \div (-16) \}$$

Now we have to remove innermost bracket

$$= 22 - \frac{1}{4} \{ -5 - (-48 \div -16) \}$$

$$= 22 - \frac{1}{4} \{ -5 - 3 \}$$

Now remove the parenthesis we get

$$= 22 - \frac{1}{4} (-8)$$

On simplifying we get,

$$= 22 + 2$$

$$= 24$$

$$11. 63 - [(-3) \{ -2 - \overline{8 - 3} \}] \div [3 \{ 5 + (-2)(-1) \}]$$

**Solution:**

$$\text{Given } 63 - [(-3) \{ -2 - \overline{8 - 3} \}] \div [3 \{ 5 + (-2)(-1) \}]$$

First we have to remove vinculum from the given equation then we get,

$$= 63 - [(-3) \{ -2 - 5 \}] \div [3 \{ 5 + 2 \}]$$

Now remove the parenthesis from the above equation

$$= 63 - [(-3) (-7)] \div [3 (7)]$$

$$= 63 - [21] \div [21]$$

$$= 63 - 1$$

$$= 62$$

12.  $[29 - (-2) \{6 - (7 - 3)\}] \div [3 \times \{5 + (-3) \times (-2)\}]$

**Solution:**

Given  $[29 - (-2) \{6 - (7 - 3)\}] \div [3 \times \{5 + (-3) \times (-2)\}]$

First we have to remove the innermost brackets then we get,

$$= [29 - (-2) \{6 - 4\}] \div [3 \times \{5 + 6\}]$$

Now remove the parenthesis in the above equation,

$$= [29 + 2(2)] \div [3 \times 11]$$

Now remove all braces present in the above equation,

$$= 33 \div 33$$

$$= 1$$

13. Using brackets, write a mathematical expression for each of the following:

(i) Nine multiplied by the sum of two and five.

(ii) Twelve divided by the sum of one and three.

(iii) Twenty divided by the difference of seven and two.

(iv) Eight subtracted from the product of two and three.

(v) Forty divided by one more than the sum of nine and ten.

(vi) Two multiplied by one less than the difference of nineteen and six.

**Solution:**

(i)  $9(2 + 5)$

(ii)  $12 \div (2 + 3)$

(iii)  $20 \div (7 - 2)$

(iv)  $2 \times 3 - 8$

(v)  $40 \div [1 + (9 + 10)]$

(vi)  $2 \times [(19 - 6) - 1]$