

Operations on Whole Numbers

Exercise 4.1

Question: 1

Fill in the blanks to make each of the following a true statement:

Solution:

(i) $359 + 476 = 476 + 359$ (Commutativity)

(ii) $2008 + 1952 = 1952 + 2008$ (Commutativity)

(iii) $90758 + 0 = 90758$ (Additive identity)

(iv) $54321 + (489 + 699) = 489 + (54321 + 699)$ (Associativity)

Question: 2

Add each of the following and check by reversing the order of addends:

Solution:

(i) $5628 + 39784 = 45412$

And,

$$39784 + 5628 = 45412$$

(ii) $923584 + 178 = 923762$

And,

$$178 + 923584 = 923762$$

(iii) $15409 + 112 = 15521$

And,

$$112 + 15409 = 15521$$

(iv) $2359 + 641 = 3000$

And,

$$641 + 2359 = 3000$$

Question: 3

Determine the sum by suitable rearrangements:

Solution:

(i) $953 + 407 + 647$

Therefore, $53 + 47 = 100$

Therefore, $(953 + 647) + 407 = 1600 + 407 = 2007$

(ii) $15409 + 178 + 591 + 322$

$409 + 91 = 500$

And,

$78 + 22 = 100$

Therefore, $(15409 + 591) + (178 + 322) = (16000) + (500)$

$= 16500$

(iii) $2359 + 10001 + 2641 + 9999$

Therefore, $59 + 41 = 100$

And, $99 + 01 = 100$

Therefore, $(2359 + 2641) + (10001 + 9999)$

$= (5000) + (20000)$

$= 25000$

(iv) $1 + 2 + 3 + 4 + 1996 + 1997 + 1998 + 1999$

Therefore, $99 + 1 = 100$

$98 + 2 = 100$

$97 + 3 = 100$

And

$96 + 4 = 100$

Therefore, $(1 + 1999) + (2 + 1998) + (3 + 1997) + (4 + 1996)$

$= 2000 + 2000 + 2000 + 2000$

$= 8000$

(v) $10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 + 20$

$10 + 20 = 30$

$1 + 9 = 10$

$$2 + 8 = 10$$

$$3 + 7 = 10$$

And,

$$4 + 6 = 10$$

$$\text{Therefore, } (10 + 20) + (11 + 19) + (12 + 18) + (13 + 17) + (14 + 16)$$

$$= 30 + 30 + 30 + 30 + 30 + 15$$

$$= 150 + 15$$

$$= 165$$

Question: 4

Which of the following statements are true and which are false?

- (i) The sum of two odd numbers is an odd number.
- (ii) The sum of two odd numbers is an even number.
- (iii) The sum of two even numbers is an even number.
- (iv) The sum of two even numbers is an odd number.
- (v) The sum of an even number and an odd number is an odd number.
- (vi) The sum of an odd number and an even number is an even number.
- (vii) Every whole number is a natural number.
- (viii) Every natural number is a whole number.
- (ix) There is a whole number which when added to a whole number, gives that number
- (x) There is a natural number which when added to a natural number, gives that number.
- (xi) Commutativity and associativity are properties of whole numbers.
- (xii) Commutativity and associativity are properties of addition of whole number.

Solution:

- (i) FALSE ($3 + 5 = 8$; 8 is an even number)
- (ii) TRUE ($3 + 5 = 8$; 8 is an even number)
- (iii) TRUE ($2 + 4 = 6$; 6 is an even number)
- (iv) FALSE ($2 + 4 = 6$; 6 is an even number)
- (v) TRUE ($2 + 3 = 5$; 5 is an odd number)

(vi) FALSE ($3 + 2 = 5$; 5 is not an even number)

(vii) FALSE [The whole number set is $\{0, 1, 2, 3, 4 \dots\}$, whereas the natural number set is $\{1, 2, 3, 4 \dots\}$]

(viii) TRUE [The whole number set is $\{0, 1, 2, 3, 4 \dots\}$, whereas the natural number set is $\{1, 2, 3, 4 \dots\}$]

(ix) TRUE [That number is zero.]

(x) FALSE

(xi) FALSE

(xii) TRUE

Exercise 4.2

Question: 1

A magic square is an array of numbers having the same number of rows and columns and the sum of numbers in each row, column or diagonal being the same. Fill in the blank cells of the following magic squares:

(i)

	8	13
	12	
11		

(ii)

22		6	13	20
	10	12	19	
9	11	18	25	
15	17	24	26	
16			7	14

Solution:

(i) It can be seen that diagonally, $13 + 12 + 11 = 36$.

Thus,

Number in the first cell of the first row = $36 - (8 + 13) = 15$

Number in the first cell of the second row = $36 - (15 + 11) = 10$

Number in the third cell of the second row = $36 - (10 + 12) = 14$

Number in the second cell of the third row = $36 - (8 + 12) = 16$

Number in the third cell of the third row = $36 - (11 + 16) = 9$

15	8	13
10	12	14
11	16	9

(ii) It can be seen that diagonally, $20 + 19 + 18 + 17 + 16 = 90$.

Thus,

Number in the second cell of the first row = $90 - (22 + 6 + 13 + 20) = 29$

Number in the first cell of the second row = $90 - (22 + 9 + 15 + 16) = 28$

Number in the fifth cell of the second row = $90 - (28 + 10 + 12 + 19) = 21$

Number in the fifth cell of the third row = $90 - (9 + 11 + 18 + 25) = 27$

Number in the fifth cell of the fourth row = $90 - (15 + 17 + 24 + 26) = 8$

Number in the second cell of the fifth row = $90 - (29 + 10 + 11 + 17) = 23$

Number in the third cell of the fifth row = $90 - (6 + 12 + 18 + 24) = 30$

22	29	6	13	20
28	10	12	19	21
9	11	18	25	27
15	17	24	26	8
16	23	30	7	14

Question: 2

Perform the following subtractions and check your results by performing corresponding additions:

Solution:

(i) $57839 - 2983 = 54856$

Verification: $54856 + 2983 = 57839$

(ii) $92507 - 10879 = 81628$

Verification: $81628 + 10879 = 92507$

(iii) $400000 - 98798 = 301202$

Verification: $301202 + 98798 = 400000$

(iv) $5050501 - 969696 = 4080805$

Verification: $4080805 + 969696 = 5050501$

(v) $200000 - 97531 = 102469$

Verification: $102469 + 97531 = 200000$

$$(vi) 3030301 - 868686 = 2161615$$

$$\text{Verification: } 2161615 + 868686 = 3030301$$

Question: 3

Replace each * by the correct digit in each of the following:

Solution:

$$\begin{array}{r} \textcircled{6} \textcircled{16} \\ 87\cancel{8} \\ - *3* \\ \hline 6*7 \end{array}$$

Here, we can see that in the units digit, $6 - * = 7$, which means that the value of * is 9, as 1 gets carried from 7 at tens place to 6 at unit place and 6 at unit digit becomes 16 then $16 - 9 = 7$.

Now, when 7 gives 1 to 6, it becomes 6, so $6 - 3 = 3$.

Also, it can be easily deduced that in $(8 - * = 6)$, the value of * is 2.

$$\begin{array}{r} 876 \\ - 239 \\ \hline 637 \end{array}$$

(ii) Here, it is clear that in the units place, $9 - 4 = 5$;

And in the tens place,

$$8 - 3 = 5.$$

We can now easily find out the other missing blanks by subtracting 3455 from 8989. Addend (difference) = 3455

Thus, the correct answer is:

$$\begin{array}{r} 8989 \\ - 5534 \\ \hline 3455 \end{array}$$

(iii)

$$\begin{array}{r} \textcircled{5} \textcircled{9} \textcircled{9} \textcircled{9} \textcircled{10} \textcircled{9} \textcircled{17} \\ \cancel{6} \cancel{0} \cancel{0} \cancel{0} \cancel{1} \cancel{0} \cancel{7} \\ - 0 * * 8 9 7 8 \\ \hline 5 0 6 * * * * \end{array}$$

Here, in the units digit, $17 - 8 = 9$; in the tens digit, $9 - 7 = 2$;

in the hundreds place, $10 - 9 = 1$;

and in the thousands place, $9 - 8 = 1$.

Addend difference = 5061129.

So, in order to get the addend, we will subtract 5061129 from 6000107.

$$\begin{array}{r} 6000107 \\ - 5061129 \\ \hline 0938978 \end{array}$$

Thus, the correct answer is:

$$\begin{array}{r} 6000107 \\ - 0938978 \\ \hline 5061129 \end{array}$$

(iv)

$$\begin{array}{r} \textcircled{9} \textcircled{9} \textcircled{9} \textcircled{9} \textcircled{9} \textcircled{10} \\ \cancel{1} \cancel{0} \cancel{0} \cancel{0} \cancel{0} \cancel{0} \\ - \quad * * * * 1 \\ \hline * 7 0 4 2 * \end{array}$$

In the units place, $10 - 1 = 9$;

Also, in the lakhs place, $9 - 0 = 9$;

Addend difference = 970429.

So, in order to get the addend, we will subtract 970429 from 1000000.

$$\begin{array}{r} 1000000 \\ - 0970429 \\ \hline 0029571 \end{array}$$

Thus, the correct answer is:

$$\begin{array}{r} 1000000 \\ - 0029571 \\ \hline 0970429 \end{array}$$

(v)

$$\begin{array}{r}
 \textcircled{4} \textcircled{9} \textcircled{9} \textcircled{10} \textcircled{9} \textcircled{9} \textcircled{13} \\
 \cancel{5} \cancel{0} \cancel{0} \cancel{1} \cancel{0} \cancel{0} \cancel{3} \\
 - \quad 0 \quad * \quad * \quad 6 \quad 9 \quad 8 \quad 7 \\
 \hline
 4 \quad 8 \quad 4 \quad * \quad * \quad * \quad *
 \end{array}$$

Here, in the units digit, $13 - 7 = 6$;

in the tens digit, $9 - 8 = 1$;

in the hundreds place, $9 - 9 = 0$;

and in the thousands place, $10 - 6 = 4$.

Addend difference = 4844016.

So, in order to get the addend, we will subtract 4844016 from 5001003.

$$\begin{array}{r}
 5 \quad 0 \quad 0 \quad 1 \quad 0 \quad 0 \quad 3 \\
 - \quad 4 \quad 8 \quad 4 \quad 4 \quad 0 \quad 1 \quad 6 \\
 \hline
 0 \quad 1 \quad 5 \quad 6 \quad 9 \quad 8 \quad 7
 \end{array}$$

(vi)

$$\begin{array}{r}
 \textcircled{0} \textcircled{10} \textcircled{10} \textcircled{10} \textcircled{10} \textcircled{11} \\
 \cancel{1} \cancel{1} \cancel{1} \cancel{1} \cancel{1} \cancel{1} \\
 - \quad * \quad 6 \quad 7 \quad 8 \quad 9 \\
 \hline
 5 \quad 4 \quad 3 \quad 2 \quad *
 \end{array}$$

It is clear from the units place that $11 - 9 = 2$.

Addend difference = 54322.

To get the other addend, we will subtract 54322 from 111111.

$$\begin{array}{r}
 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \\
 - \quad 5 \quad 4 \quad 3 \quad 2 \quad 2 \\
 \hline
 5 \quad 6 \quad 7 \quad 8 \quad 9
 \end{array}$$

Thus, the other addend is 56789.

The correct answer is:

$$\begin{array}{r}
 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \\
 - \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \\
 \hline
 5 \quad 4 \quad 3 \quad 2 \quad 2
 \end{array}$$

Question: 4

What is the difference between the largest number of five digits and smallest number of six digits?

Solution:

The largest five – digit number is 99999.

The smallest six – digit number is 100000.

Therefore, difference between them = $100000 - 99999 = 1$

Question: 5

Find the difference between the largest number of 4 digits and the smallest number of 6 digits.

Solution:

The largest four – digit number is 9999.

The smallest seven – digit number is 1000000.

Therefore, difference between them = $1000000 - 9999 = 990001$

Question: 6

Rohit deposited Rs 125000 in his savings bank account. Later he withdrew Rs 35425 from it. How much money was left in his account?

Solution:

Money deposited by Rohit = Rs 125000

Money withdrawn by Rohit = Rs 35425

Therefore, money left in the account = Rs $(125000 - 35425) = \text{Rs } 89575$

Question: 7

The population of a town is 96209. If the number of men is 29642 and that of women is 29167, determine the number of children.

Solution:

Total population of the town = 96209

Number of men = 29642

Number of women = 29167

Sum of men and women = $(29642 + 29167) = 58809$

Therefore, Number of children in the town = (Total population) – (Sum of men and women)
= $96209 - 58809 = 37400$

Question: 8

The digits of 6 and 9 of the number 36490 are interchanged. Find the difference between the original number and the new number.

Solution:

Original number = 39460

New number = – 36490

Difference = $39460 - 36490 = 2970$

Question: 9

The population of a town was 59000. In one year it was increased by 4563 due to new births. However, 9218 persons died or left the town during the year. What was the population at the end of the year?

Solution:

Population of the town = 59000

Increase in the population = 4536

Decrease in the population = 9218

New population = $59000 + 4536 - 9218 = 54318$

Exercise 4.3

Question: 1

Fill in the blanks to make each of the following a true statement:

Solution:

(i) $785 \times 0 = 0$

(ii) $4567 \times 1 = 4567$ (Multiplicative identity)

(iii) $475 \times 129 = 129 \times 475$ (Commutativity)

(iv) $1243 \times 8975 = 8975 \times 1243$ (Commutativity)

(v) $10 \times 100 \times 10 = 10000$

(vi) $27 \times 18 = 27 \times 9 + 27 \times 4 + 27 \times 5$

(vii) $12 \times 45 = 12 \times 50 - 12 \times 5$

(viii) $78 \times 89 = 78 \times 100 - 78 \times 16 + 78 \times 5$

(ix) $66 \times 85 = 66 \times 90 - 66 \times 4 - 66$

(x) $49 \times 66 + 49 \times 34 = 49 \times (66 + 34)$

Question: 2

Determine each of the following products by suitable rearrangements:

Solution:

(i) $2 \times 1497 \times 50$

$= (2 \times 50) \times 1497 = 100 \times 1497 = 149700$

(ii) $4 \times 358 \times 25$

$= (4 \times 25) \times 358 = 100 \times 358 = 35800$

(iii) $495 \times 625 \times 16$

$= (625 \times 16) \times 495 = 10000 \times 495 = 4950000$

(iv) $625 \times 20 \times 8 \times 50$

$= (625 \times 8) \times (20 \times 50) = 5000 \times 1000 = 5000000$

Question: 3

Using distributivity of multiplication over addition of whole numbers, find each of the following products:

Solution:

$$(i) 736 \times 103 = 736 \times (100 + 3)$$

{Using distributivity of multiplication over addition of whole numbers}

$$= (736 \times 100) + (736 \times 3)$$

$$= 73600 + 2208 = 75808$$

$$(ii) 258 \times 1008 = 258 \times (1000 + 8)$$

{Using distributivity of multiplication over addition of whole numbers}

$$= (258 \times 1000) + (258 \times 8)$$

$$= 258000 + 2064 = 260064$$

$$(iii) 258 \times 1008 = 258 \times (1000 + 8)$$

{Using distributivity of multiplication over addition of whole numbers}

$$= (258 \times 1000) + (258 \times 8)$$

$$= 258000 + 2064 = 260064$$

Question: 4

Find each of the following products:

Solution:

$$(i) 736 \times 93$$

$$\text{Since, } 93 = (100 - 7)$$

$$\text{Therefore, } 736 \times (100 - 7)$$

$$= (736 \times 100) - (736 \times 7)$$

(Using distributivity of multiplication over subtraction of whole numbers)

$$= 73600 - 5152 = 68448$$

$$(ii) 816 \times 745$$

$$\text{Since, } 745 = (750 - 5)$$

$$\text{Therefore, } 816 \times (750 - 5)$$

$$= (816 \times 750) - (816 \times 5)$$

(Using distributivity of multiplication over subtraction of whole numbers)

$$= 612000 - 4080 = 607920$$

(iii) 2032×613

Since, $613 = (600 + 13)$

Therefore, $2032 \times (600 + 13)$

$$= (2032 \times 600) + (2032 \times 13)$$

$$= 1219200 + 26416 = 1245616$$

Question: 5

Find the values of each of the following using properties:

Solution:

(i) $493 \times 8 + 493 \times 2$

$$= 493 \times (8 + 2)$$

(Using distributivity of multiplication over addition of whole numbers)

$$= 493 \times 10 = 4930$$

(ii) $24579 \times 93 + 7 \times 24579$

$$= 24579 \times (93 + 7)$$

(Using distributivity of multiplication over addition of whole numbers)

$$= 24579 \times 100 = 2457900$$

(iii) $1568 \times 184 - 1568 \times 84$

$$= 1568 \times (184 - 84)$$

(Using distributivity of multiplication over subtraction of whole numbers)

$$= 1568 \times 100 = 156800$$

(iv) $15625 \times 15625 - 15625 \times 5625$

$$= 15625 \times (15625 - 5625)$$

(Using distributivity of multiplication over subtraction of whole numbers)

$$= 15625 \times 10000 = 156250000$$

Question: 6

Determine the product of:

(i) the greatest number of four digits and the smallest number of three digits.

(ii) the greatest number of five digits and the greatest number of three digits.

Solution:

(i) The largest four-digit number = 9999

The smallest three – digit number = 100

Therefore, Product of the smallest three-digit number and the largest four-digit number = $9999 \times 100 = 999900$

(ii) The largest five – digit number = 9999

The largest number of three digits = 999

Therefore, Product of the largest three-digit number and the largest five-digit number

$$= 9999 \times 999$$

$$= 9999 \times (1000 - 1)$$

$$= (9999 \times 1000) - (9999 \times 1)$$

$$= 9999000 - 9999$$

$$= 9989001$$

Question: 7

In each of the following, fill in the blanks, so that the statement is true:

Solution:

(i) $(500 + 7) (300 - 1)$

$$= 507 \times 299$$

$$= 299 \times 507 \text{ (Commutativity)}$$

(ii) $888 + 777 + 555$

$$= 111 (8 + 7 + 5)$$

$$= 111 \times 20 \text{ (Distributivity)}$$

(iii) 75×425

$$= (70 + 5) \times 425$$

$$= (70 + 5) (340 + 85)$$

(iv) $89 \times (100 - 2)$

$$= 89 \times 98$$

$$= 98 \times 89$$

$$= 98 \times (100 - 11) \text{ (Commutativity)}$$

$$(v) (15 + 5) (15 - 5)$$

$$= 20 \times 10$$

$$= 200$$

$$= 225 - 25$$

$$(vi) 9 \times (10000 + 974)$$

$$= 98766$$

Question: 8

A dealer purchased 125 color television sets. If the cost of each set is Rs 19820, determine the cost of all sets together.

Solution:

Cost of 1 color television set = Rs 19820

Therefore, Cost of 125 color television sets = Rs (19820×125)

$$= \text{Rs } 19820 \times (100 + 25)$$

$$= \text{Rs } (19820 \times 100) + (19820 \times 25)$$

$$= \text{Rs } 1982000 + 495500$$

$$= \text{Rs } 2477500$$

Question: 9

The annual fee charged from a student of class 6th in a school is Rs 8880. If there are, in all, 235 students in class 6th, find the total collection.

Solution:

Fees charged from 1 student = Rs 8880

Therefore, Fees charged from 235 students = Rs 8880×235

$$= 2086800$$

Thus, the total collection from class VI students is Rs 2086800.

Question: 10

A group housing society constructed 350 flats. If the cost of construction for each flat is Rs 993570, what is the total cost of construction of all the flats.

Solution:

Cost of construction of 1 flat = Rs 993,570

Total number of flats constructed = 350

Total cost of construction of 350 flats = Rs $(993,570 \times 350)$

= Rs 347,749,500

Question: 11

The product of two whole numbers is zero. What do you conclude?

Solution:

If the product of two whole numbers is zero, then it means that either one of them is zero or both of them are zero.

Question: 12

What are the whole numbers which when multiplied with itself gives the same number?

Solution:

There are two numbers which when multiplied with themselves give the same numbers.

(i) $0 \times 0 = 0$

(ii) $1 \times 1 = 1$

Question: 13

In a large housing complex, there are 15 small buildings and 22 large building. Each of the large buildings has 10 floors with 2 apartments on each floor. Each of the small buildings has 12 floors with 3 apartments on each floor. How many apartments are there in all.

Solution:

Number of large buildings = 22

Number of small buildings = 15

Number of floors in 1 large building = 10

Number of apartments on 1 floor = 2

Therefore, Total apartments in 1 large building = $10 \times 2 = 20$

Similarly,

Total apartments in 1 small building = $12 \times 3 = 36$

Therefore, Total apartments in the entire housing complex = $(22 \times 20) + (15 \times 36)$

= $440 + 540$

= 980

Exercise 4.4

Question: 1

Does there exists a whole number 'a' such that $a/a = a$?

Solution:

Yes, there exists a whole number 'a' such that $a/a = a$.

The whole number is 1 such that,

$$1/1 = 1$$

Question: 2

Find the value of:

Solution:

(i) $23457 / 1 = 23457$

(ii) $0 / 97 = 0$

(iii) $476 + (840 / 84) = 476 + 10 = 486$

(iv) $964 - (425 / 425) = 964 - 1 = 963$

(v) $(2758 / 2758) - (2758 + 2758) = 1 - 1 = 0$

(vi) $72450 / (583 - 58) = 72450 + 525 = 138$

Question: 3

Which of the following statements are true:

Solution:

(i) False

LHS: $10 / (5 \times 2)$

$$= 10 / 10$$

$$= 1$$

RHS: $(10 / 5) \times (10 / 2)$

$$= 2 \times 5 = 10$$

(ii) True

$$\text{LHS: } (35 - 14) / 7$$

$$= 21 / 7$$

$$= 3$$

$$\text{RHS: } 35 / 7 - 14 / 7$$

$$= 5 - 2 = 3$$

(iii) False

$$\text{LHS: } 35 - 14 / 7$$

$$= 35 - 2 = 33$$

$$\text{RHS: } 35 / 7 - 14 / 7$$

$$= 5 - 2$$

$$= 3$$

(iv) False

$$\text{LHS: } (20 - 5) / 5$$

$$= 15 / 5$$

$$= 3$$

$$\text{RHS: } 20 / 5 - 5$$

$$= 4 - 5 = -1$$

(v) False

$$\text{LHS: } 12 \times (14 / 7)$$

$$= 12 \times 2$$

$$= 24$$

$$\text{RHS: } (12 \times 14) / (12 \times 7)$$

$$= 168 / 84$$

$$= 2$$

(vi) True

$$\text{LHS: } (20 / 5) / 2$$

$$= 4 / 2$$

$$= 2$$

$$\text{RHS : } (20 / 2) / 5$$

$$= 10 / 5$$

$$= 2$$

Question: 4

Divide and check the quotient and remainder:

Solution:

(i) $7777 / 58 = 134$

$$\begin{array}{r}
 134 \\
 58 \overline{) 7772} \\
 \underline{-58} \\
 197 \\
 \underline{-174} \\
 232 \\
 \underline{-232} \\
 0
 \end{array}$$

Verification: [Dividend = Divisor \times Quotient + Remainder]

$$7772 = 58 \times 134 + 0$$

$$7772 = 7772$$

$$\text{LHS} = \text{RHS}$$

(ii) $6906/35$ gives quotient = 197 and remainder = 11

$$\begin{array}{r}
 197 \\
 35 \overline{) 6906} \\
 \underline{-35} \\
 340 \\
 \underline{-315} \\
 256 \\
 \underline{-245} \\
 11
 \end{array}$$

Verification: [Dividend = Divisor \times Quotient + Remainder]

$$6906 = 35 \times 197 + 11$$

$$6906 = 6895 + 11$$

$$6906 = 6906$$

$$\text{LHS} = \text{RHS}$$

(iii) $16135 / 875$ gives quotient = 18 and remainder = 385.

$$\begin{array}{r}
 18 \\
 875 \overline{) 16135} \\
 \underline{- 875} \\
 7385 \\
 \underline{- 7000} \\
 385
 \end{array}$$

Verification: [Dividend = Divisor \times Quotient + Remainder]

$$16135 = 875 \times 18 + 385$$

$$16135 = 15750 + 385$$

$$16135 = 16135$$

$$\text{LHS} = \text{RHS}$$

(iv) $16025/1000$ gives quotient and remainder = 25

$$\begin{array}{r}
 16 \\
 1000 \overline{) 16025} \\
 \underline{- 1000} \\
 6025 \\
 \underline{- 6000} \\
 25
 \end{array}$$

Verification: [Dividend = Divisor \times Quotient + Remainder]

$$16025 = 1000 \times 16 + 25$$

$$16025 = 16000 + 25$$

$$16025 = 16025$$

$$\text{LHS} = \text{RHS}$$

Question: 5

Find a number which when divided by 35 gives the quotient 20 and remainder 18.

Solution:

$$\text{Dividend} = \text{Divisor} \times \text{Quotient} + \text{Remainder}$$

$$\begin{aligned}
 \text{Dividend} &= 35 \times 20 + 18 \\
 &= 700 + 18 \\
 &= 718
 \end{aligned}$$

Question: 6

Find the number which when divided by 58 gives a quotient 40 and remainder 31.

Solution:

$$\begin{aligned}
 \text{Dividend} &= \text{Divisor} \times \text{Quotient} + \text{Remainder} \\
 \text{Dividend} &= 58 \times 40 + 31 \\
 &= 2320 + 31 \\
 &= 2351
 \end{aligned}$$

Question: 7

The product of two numbers is 504347. If one of the numbers is 1591, find the other.

Solution:

Product of two numbers = 504347

One of the two numbers = 1591

Let the number be A.

Therefore, $A \times 1591 = 504347$

$$\begin{array}{r}
 317 \\
 1591 \overline{) 504347} \\
 \underline{- 4773} \\
 2704 \\
 \underline{- 1591} \\
 11137 \\
 \underline{- 11137} \\
 0
 \end{array}$$

$$A = 504347 \div 1591 = 317$$

Question: 8

On dividing 59761 by a certain number, the quotient is 189 and the remainder is 37. Find the divisor.

Solution:

Dividend = 59761

Quotient = 189

Remainder = 37

Divisor = A

Now, Dividend = Divisor \times Quotient + Remainder

$$59761 = A \times 189 + 37$$

$$59761 - 37 = A \times 189$$

$$59724 = A \times 189$$

$$\text{Therefore, } A = 59724 \div 189$$

$$= 316$$

Question: 9

On dividing 55390 by 299, the remainder is 75. Find the quotient.

Solution:

Dividend = 55390

Divisor = 299

Remainder = 75

Quotient = A

Dividend = Divisor \times Quotient + Remainder

$$55390 = 299 \times A + 75$$

$$55390 - 75 = A \times 299$$

$$55315 = A \times 299$$

$$\text{Therefore, } A = 55315 \div 299 = 185$$

Exercise 4.5

Question: 1

Without drawing a diagram, find:

Solution:

(i) 10th square number:

A square number can easily be remembered by the following rule

N^{th} square number = $n \times n$

10th square number = $10 \times 10 = 100$

(ii) 6th triangular number:

A triangular number can easily be remembered by the following rule

N^{th} triangular number = $n \times (n + 1) / 2$

Therefore, 6th triangular number = $6 \times (6 + 1) / 2 = 21$

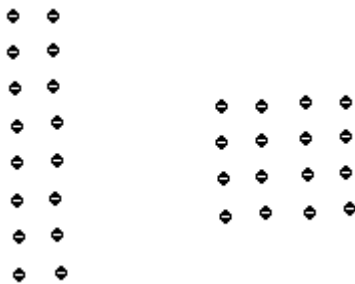
Question: 2

(i) Can a rectangle number also be a square number?

(ii) Can a triangular number also be a square number?

Solution:

(i) Yes, a rectangular number can also be a square number; for example, 16 is a square number also a rectangular number.



(ii) Yes, there exists only one triangular number that is both a triangular number and a square number, and that number is 1.

Question: 3

Write the first four products of two numbers with difference 4 starting from in the following order:

1 , 2 , 3 , 4 , 5 , 6 ,

Identify the pattern in the products and write the next three products.

Solution:

$$1 \times 5 = 5 \quad (5 - 1 = 4)$$

$$2 \times 6 = 12 \quad (6 - 2 = 4)$$

$$3 \times 7 = 21 \quad (7 - 3 = 4)$$

$$4 \times 8 = 32 \quad (8 - 4 = 4)$$

Question: 4

Observe the pattern in the following and fill in the blanks:

Solution:

$$9 \times 9 + 7 = 88$$

$$98 \times 9 + 6 = 888$$

$$987 \times 9 + 5 = 8888$$

$$9876 \times 9 + 4 = 88888$$

$$98765 \times 9 + 3 = 888888$$

$$987654 \times 9 + 2 = 8888888$$

$$9876543 \times 9 + 1 = 88888888$$

Question: 5

Observe the following pattern and extend it to three more steps:

Solution:

$$6 \times 2 - 5 = 7$$

$$7 \times 3 - 12 = 9$$

$$8 \times 4 - 21 = 11$$

$$9 \times 5 - 32 = 13$$

$$10 \times 6 - 45 = 15$$

$$11 \times 7 - 60 = 17$$

$$12 \times 8 - 77 = 19$$

Question: 6

Study the following pattern:

$$1 + 3 = 2 \times 2$$

$$1 + 3 + 5 = 3 \times 3$$

$$1 + 3 + 5 + 7 = 4 \times 4$$

$$1 + 3 + 5 + 7 + 9 = 5 \times 5$$

By observing the above pattern, find:

Solution:

$$(i) 1 + 3 + 5 + 7 + 9 + 11$$

$$= 6 \times 6$$

$$= 36$$

$$(ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$$

$$= 8 \times 8$$

$$= 64$$

$$(iii) 21 + 23 + 25 + \dots + 51$$

$$= (21 + 23 + 25 + \dots + 51) \text{ can also be written as}$$

$$(1 + 3 + 5 + 7 + \dots + 49 + 51) - (1 + 3 + 5 + \dots + 17 + 19)$$

$$(1 + 3 + 5 + 7 + \dots + 49 + 51) = 26 \times 26 = 676$$

$$\text{and, } (1 + 3 + 5 + \dots + 17 + 19) = 10 \times 10 = 100$$

Now,

$$(21 + 23 + 25 + \dots + 51) = 676 - 100 = 576$$

Question: 7

Study the following pattern:

$$1 \times 1 + 2 \times 2 = \frac{2 \times 3 \times 5}{6}$$

$$1 \times 1 + 2 \times 2 + 3 \times 3 = \frac{3 \times 4 \times 7}{6}$$

$$1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 = \frac{4 \times 5 \times 9}{6}$$

By observing the above pattern, write next two steps.

Solution:

The next two steps are as follows:

$$1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5$$

$$= 5 \times 6 \times 116$$

$$= 55$$

$$1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5 + 6 \times 6$$

$$= 6 \times 7 \times 136$$

$$= 91$$

Question: 8

Study the following pattern:

$$1 = \frac{1 \times 2}{2}$$

$$1 + 2 = \frac{2 \times 3}{2}$$

$$1 + 2 + 3 = \frac{3 \times 4}{2}$$

$$1 + 2 + 3 + 4 = \frac{4 \times 5}{2} <$$

By observing the above pattern, find:

Solution:

$$(i) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10$$

$$= 10 \times 112$$

$$= 55$$

(ii) $50 + 51 + 52 + \dots + 100$

This can also be written as

$$(1 + 2 + 3 + \dots + 99 + 100) - (1 + 2 + 3 + 4 + \dots + 47 + 49)$$

Now,

$$(1 + 2 + 3 + \dots + 99 + 100) = 100 \times 1012$$

$$\text{and, } (1 + 2 + 3 + 4 + \dots + 47 + 49) = 49 \times 502$$

$$\text{So, } (50 + 51 + 52 + \dots + 100) = 100 \times 1012 - 49 \times 502$$

$$= 5050 - 1225$$

$$= 3825$$

(iii) $2 + 4 + 6 + 8 + 10 + \dots + 100$

This can also be written as $2 \times (1 + 2 + 3 + 4 + \dots + 49 + 50)$

Now,

$$(1 + 2 + 3 + 4 + \dots + 49 + 50) = 50 \times 512$$

$$= 1275$$

$$\text{Therefore, } (2 + 4 + 6 + 8 + 10 + \dots + 100) = 2 \times 1275 = 2550$$

Exercise 4.6

Question: 1

Which one of the following is the smallest whole number?

(a) 1 (b) 2 (c) 0 (d) None of these

Solution:

The set of whole numbers is $\{0, 1, 2, 3, 4, \dots\}$.

So, the smallest whole number is 0.

Hence, the correct option is (c).

Question: 2

Which one of the following is the smallest even whole number?

(a) 0 (b) 1 (c) 2 (d) None of these

Solution:

The natural numbers along with 0 form the collection of whole numbers.

So, the numbers 0, 1, 2, 3, 4, ... form the collection of whole numbers.

The number which is divisible by 2 is an even number.

So, in the collection "0, 1, 2, 3, 4, ...", 2 is the smallest even number.

Hence, the correct option is (c).

Question: 3

Which one of the following is the smallest odd whole number?

(a) 0 (b) 1 (c) 3 (d) 5

Solution:

The natural numbers along with 0 form the collection of whole numbers.

So, the numbers 0, 1, 2, 3, 4, ... form the collection of whole numbers.

A natural number which is not divisible by 2 is called an odd whole number.

So, in the collection "0, 1, 2, 3, 4, ...", 1 is the smallest odd whole number.

Hence, the correct option is (b).

Question: 4

How many whole numbers are between 437 and 487?

(a) 50 (b) 49 (c) 51 (d) None of these

Solution:

The whole numbers between 437 and 487 are 438, 439, 440, 441, ... , 484, 485 and 486. To find the required number of whole numbers,

We need to subtract 437 from 487 and then subtract again 1 from the result.

Thus, there are $(487 - 437) - 1$ whole numbers between 437 and 487.

Now, $(487 - 437) - 1 = 50 - 1 = 49$

Hence, the correct option is (b).

Question: 5

The product of the successor 999 and predecessor of 1001 is:

(a) one lakh (b) one billion (c) one million (d) one crore

Solution:

Successor of 999 = $999 + 1 = 1000$

Predecessor of 1001 = $1001 - 1 = 1000$

Now,

Product = (Successor of 999) \times (Predecessor of 1001)

= 1000×1000

= 1000000

= one million

Hence, the correct option is (c).

Question: 6

Which one of the following whole numbers does not have a predecessor?

(a) 1 (b) 0 (c) 2 (d) None of these

Solution:

The numbers 0, 1, 2, 3, 4, form the collection of whole numbers.

The smallest whole number is 0.

So, 0 does not have a predecessor.

Hence, the correct option is (b).

Question: 7

The number of whole numbers between the smallest whole number and the greatest 2 digit number is:

(a) 101 (b) 100 (c) 99 (d) 98

Solution:

Smallest whole number = 0

Greatest 2-digit whole number = 99

The whole numbers between 0 and 99 are 1, 2, 3, 4 97, 98.

To find the number of whole numbers between 0 and 99,

Subtract 1 from the difference of 0 and 99.

Therefore, Number of whole numbers between 0 and 99 = $(99 - 0) - 1$

= $99 - 1$

= 98

Hence, the correct option is (d).

Question: 8

If n is a whole number such that $n + n = n$, then $n = ?$

(a) 1 (b) 2 (c) 3 (d) None of these

Solution:

Here, $0 + 0 = 0$, $1 + 1 = 2$, $2 + 2 = 4$

So, the statement $n + n = n$ is true only when $n = 0$.

Hence, the correct option is (d).

Question: 9

The predecessor of the smallest 3 digit number is:

(a) 999 (b) 99 (c) 100 (d) 101

Solution:

Smallest 3-digit number = 100

Predecessor of 3-digit number = $100 - 1 = 99$

Hence, the correct option is (b).

Question: 10

The least number of 4 digits which is exactly divisible by 9 is:

(a) 1008 (b) 1009 (c) 1026 (d) 1018

Solution:

Least 4-digit number = 1000

The least 4-digit number exactly divisible by 9 is $1000 + (9 - 1) = 1008$.

Hence, the correct option is (a).

Question: 11

The number which when divided by 53 gives 8 as quotient and 5 as remainder is:

(a) 424 (b) 419 (c) 429 (d) None of these

Solution:

Here, Divisor = 53, Quotient = 8 and Remainder = 5.

Now, using the relation Dividend = Divisor \times Quotient + Remainder

We get

$$\text{Dividend} = 53 \times 8 + 5$$

$$= 424 + 5$$

$$= 429$$

Thus, the required number is 429.

Hence, the correct option is (c).

Question: 12

The whole number n satisfying $n + 35 = 101$ is:

(a) 65 (b) 67 (c) 64 (d) 66

Solution:

Here, $n + 35 = 101$.

Adding $- 35$ on both sides, we get

$$n + 35 + (- 35) = 101 + (- 35)$$

$$n + 0 = 66$$

$$n = 66$$

Hence, the correct option is (d).

Question: 13

The value of $4 \times 378 \times 25$ is:

(a) 37800 (b) 3780 (c) 9450 (d) 30078

Solution:

By regrouping, we get

$$4 \times 378 \times 25 = 4 \times 25 \times 378$$

$$= 100 \times 378$$

$$= 37800$$

Hence, the correct option is (a).

Question: 14

The value of $1735 \times 1232 - 1735 \times 232$ is:

(a) 17350 (b) 173500 (c) 1735000 (d) 173505

Solution:

Using distributive law of multiplication over subtraction, we get

$$1735 \times 1232 - 1735 \times 232 = 1735 (1232 - 232)$$

$$= 1735 \times 1000$$

$$= 1735000$$

Hence, the correct option is (c).

Question: 15

The value of 47×99 is:

(a) 4635 (b) 4653 (c) 4563 (d) 6453

Solution:

Since, $99 = 100 - 1$

Therefore, $47 \times 99 = 47 \times (100 - 1)$

$$= 47 \times 100 - 47$$

$$= 4700 - 47$$

$$= 4653$$

Thus, the value of 47×99 is 4653.

Hence, the correct option is (b).