पुna International School

Shree Swaminarayan Gurukul, Zundal

Grade VII MATHEMATICS Specimen Copy 2021-22

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CHAPTER : 1

NAME: INTEGERS

Key Points To Remember

1) Integers are bigger collection of numbers which is formed by whole numbers and their negatives.

2) Properties of addition and subtraction

  (a) Integers are closed for addition and subtraction both that is**, a + b** and **a – b** are again

   Integers, where **a** and **b** are any integers.

  (b) Addition is commutative for integers ,i.e., **a + b = b + a** for all integers **a and b.**

  (c) Addition is associative for integers ,i.e. **(a + b) + c = a + (b + c)** for all integers **a, b and c**

  (d) Integer **0** is the identity under addition . That is , **a + 0 = 0 + a = a** for every integer **a.**

3) Product of a positive and a negative integer is a negative integer. Whereas the products of two

   negative integers is a positive integer. For example **– 2 × 7 = - 14 and – 3 × - 8 = 24**

4) Product of even number of negative integer is positive , whereas , the product of odd number of

   integers is negative.

5) Properties of integers under multiplication.

  (a) Integers are closed under multiplication. That is **a × b** is an integer for any two integers

     a and b.

  (b) Multiplication is commutative for integers . That is **a × b = b × a** for any integers **a and b.**

  (c) The integer 1 is the identity under multiplication**, i.e., 1 × a = a × 1 = a** for any integer **a.**

  (d) Multiplication is associative for integers , i.e., **(a × b) × c = a × (b × c)** for any three

     integers **a , b and c**

6) Under addition and multiplication integers show a property called **distributive property ,**that is

   a × (b + c) = a × b + a × c for any three integers **a, b and c .**

7) The properties commutativity, associativity under addition and multiplication and distributive

   property help us to make our calculations easier.

 8) We find that :

  (a) **When a positive integer is divided by a negative integer the quotient obtained is a negative**

     Integer and vice – versa.

  (b) Division of a negative integer by another negative integer gives a positive integer as quotient.

9) For any integer **a** we have

(a) a ÷ 0 is not defined

(b) a ÷ 1 = a

1   Fill in the blanks using < or >.
   (a) -3 …… -4
   (b) 6 ……. -20
   (c) -8 …… -2
   (d) 5 …… -7

 Solution :

   (a) -3 > -4
   (b) 6 > -20
   (c) -8 < -2
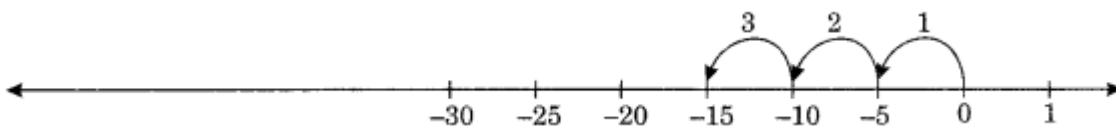   (d) 5 > -7

2. Very short answers:

   Using number line, find:
   (i) $3 \times (-5)$
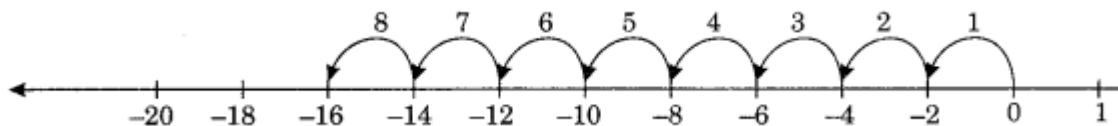   (ii) $8 \times (-2)$

 Solution:
   (i) 3 × (-5)

 From the number line, we have
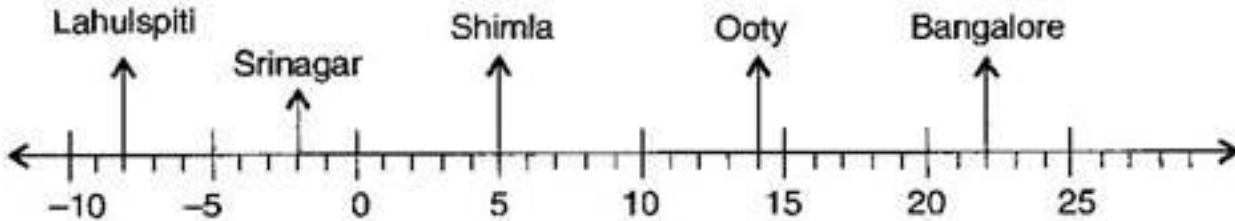$(-5) + (-5) + (-5) = 3 \times (-5) = -15$

(ii) 8 × (-2)

 From the number line, we have
$(-2) + (-2) + (-2) + (-2) + (-2) + (-2) + (-2) + (-2) = 8 \times (-2) = -16$

Question 1. Following number line shows the temperature in degree Celsius { $^{\circ}$C} at different places on a particular day:

(a) Observe this number line and write the temperature of the places marked on it.
(b) What is the temperature difference between the hottest and the coldest places among the above?
(c) What is the temperature difference between Lahulspiti and Srinagar?
(d) Can we say temperature of Srinagar and Shimla taken together is less than the temperature at Shimla? Is it also less than the temperature at Srinagar?

Answer: (a) The temperature of the places marked on it is:

Places	Temperature
Bangalore	22° C
Ooty	14° C
Shimla	5° C
Srinagar	-2° C
Lahulspiti	-8° C

(b) The temperature of the hottest place Bangalore = 22° C

The temperature of the coldest place Lahulspiti = -8° C

Difference = 22° C - (-8° C) = 22° C + 8° C = 30°

(c)The temperature of Srinagar – -2° C

The temperature of Lahulspiti = -8° C

Difference = -2° C - $(-8^{o}$ C) = -2° C + 8° C = 6°

(d)The temperature of Srinagar and Shimla = -2° C + 5° C = 3° C

The temperature at Shimla = 5° C

Therefore, 3° C < 5° C

Thus, temperature of Srinagar and Shimla taken together is less than the temperature at Shimla.

Now, Temperature of Srinagar = -2° C

Therefore, 3°C > -2° C

No, it is not less than the temperature at Srinagar.

Question 2.In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers . If Jack scores in five successive rounds were 25, -5, -10 , 15 and 10. What was his total at the end?

Answer: Jack's scores in five successive rounds are 25, - 5, - 10,15 and 10.

Total marks got by Jack = 25 + (- 5) + (-10) + 15 + 10 = 25 - 5 - 10 +15 + 10

= 25 – 15 + 25 = 35

Thus, 35 marks are got by Jack in a quiz.

Question 3. At Srinagar temperature was -5°C on Monday and then it dropped by 2°C on Tuesday. What was the temperature of Srinagar on Tuesday? On Wednesday, it rose by 4°C. What was the temperature on this day?

Answer:

On Monday, temperature at Srinagar = -5°C

On Tuesday, temperature dropped = 2°C

∴ Temperature on Tuesday = -5°C - 2°C = -7°C

On Wednesday, temperature rose up = $4^{o}C$

∴ Temperature on Wednesday = $-7^{o}C + 4^{o}C = -3^{o}C$

Thus, temperature on Tuesday and Wednesday was $-7^{o}C$ and $-3^{o}C$ respectively.

Question 4. A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine floating 1200 m below the sea level. What is the vertical distance between them?
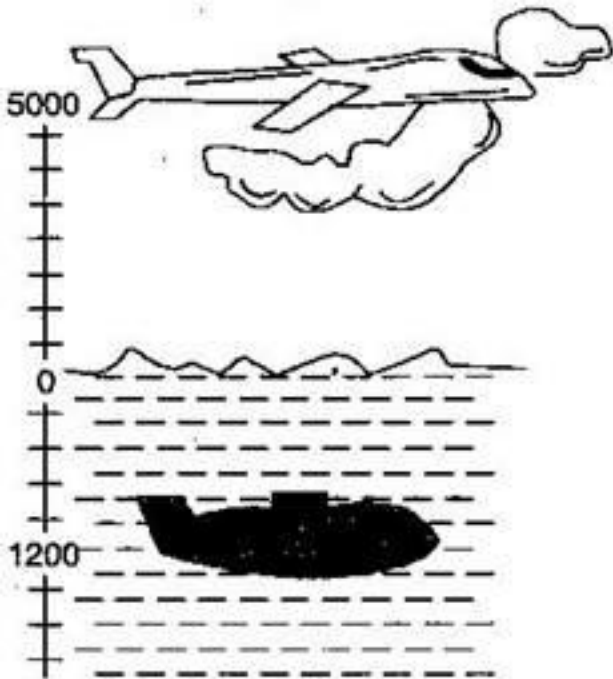
Answer:

Height of a plane above the sea level = 5000 m

Floating a submarine below the sea level = 1200 m

∴ The vertical distance between the plane and the submarine = 5000 + 1200 = 6200 m

Thus, the vertical distance between the plane and the submarine is 6200 m.

Question 5. Mohan deposits Rs. 2,000 in his bank account and withdraws Rs. 1,642 from it, the next day. If withdrawal of amount from the account is represented by a negative integer, then how will you represent the amount deposited? Find the balance in Mohan's accounts after the withdrawal?

Answer: Deposit amount = Rs. 2,000 and Withdrawal amount = Rs. 1,642

∴ Balance = 2,000 − 1,642 = Rs. 358

Thus, the balance in Mohan's account after withdrawal is Rs. 358.

Question 6. Rita goes 20 km towards east from a point A to the point B. From B, she moves 30

km towards west along the same road. If the distance towards east is represented by a positive integer then, how will you represent the distance travelled towards west? By which integer will you represent her final position from A?

Answer : According to the number line, Rita moves towards east is represented by a positive integer. But she moves in opposite direction means Rita moves west, is represented by negative integer.

Distance from A to B = 20 km

Distance from B to C = 30 km

Distance from A to C = 20 – 30 = –10 km

Thus, Rital is at final position from A to C is –10 km.

Question 7. In a magic square each row, column and diagonal have the same sum. Check which of the following is a magic square.

(i)

5	-1	4
-5	-2	7
0	3	-3

(ii)

1	-10	0
-4	-3	-2
-6	4	-7

Answer:

(i) Taking rows 5 + (–1) + (–4) = 5 – 5 = 0

(–5) + (–2) + 7 = –7 + 7 = 0

0 + 3 + (–3) = 3 – 3 = 0

Taking columns 5 + (–5) + 0 = 5 – 5 = 0

$(-1) + (-2) + 3 = -3 + 3 = 0$

$(-4) + 7 + (-3) = 7 - 7 = 0$

Taking diagonals $5 + (-2) + (-3) = 5 - 5 = 0$

$(-4) + (-2) + 0 = -6$

This box is not a magic square because all the sums are not equal.

(ii) Taking rows $1 + (-10) + 0 = 1 - 10 = -9$

$(-4) + (-3) + (-2) = -7 - 2 = -9$

$(-6) + 4 + (-7) = -2 - 7 = -9$

Taking columns $1 + (-4) + (-6) = 1 - 10 = -9$

$(-10) + (-3) + 4 = -13 + 4 = -9$

$0 + (-2) + (-7) = 0 - 9 = -9$

Taking diagonals $1 + (-3) + (-7) = 1 - 10 = -9$

$0 + (-3) + (-6) = -9$

This box is magic square because all the sums are equal.

Question 8. Verify $a - (-b) = a + b$ **for the following values of** a b:

(i) $a = 21, b = 18$

(ii) $a = 118, b = 125$

(iii) $a = 75, b = 84$

(iv) $a = 28, b = 11$

Answer:

(i) Given: $a = 21, b = 18$

We have $a - (-b) = a + b$

Putting the values in L.H.S. $= a - (-b) = 21 - (-18) = 21 + 18 = 39$

Putting the values in R.H.S. $= a + b = 21 + 19 = 39$

Since, L.H.S. = R.H.S Hence, verified.

(ii) Given: $a = 118, b = 125$

We have $a - (-b) = a + b$

Putting the values in L.H.S. $= a - (-b) = 118 - (-125) = 118 + 125 = 243$

Putting the values in R.H.S. $= a + b = 118 + 125 = 243$

Since, L.H.S. = R.H.S Hence, verified.

(iii) Given: $a = 75, b = 84$

We have $a - (-b) = a + b$

Putting the values in L.H.S. $= a - (-b) = 75 - (-84) = 75 + 84 = 159$

Putting the values in R.H.S. $= a + b = 75 + 84 = 159$

Since, L.H.S. = R.H.S Hence, verified.

(iv) Given: $a = 28, b = 11$

We have $a - (-b) = a + b$

Putting the values in L.H.S. $= a - (-b) = 28 - (-11) = 28 + 11 = 39$

Putting the values in R.H.S. $= a + b = 28 + 11 = 39$

Since, L.H.S. = R.H.S Hence, verified.

Question 9.Use the sign of $>, <$ or $=$ in the box to make the statements true:

(a) $(-8) + (-4) \square (-8) - (-4)$

(b) $(-3) + 7 - (19) \square 15 - 8 + (-9)$

(c) $23 - 41 + 11 \square 23 - 41 - 11$

(d) $39 + (-24) - (15) \square 36 + (-52) - (-36)$

(e) $(-231) + 79 + 51 \square (-399) + 159 + 81$

Answer:

(a) $(-8) + (-4) \square (-8) - (-4) \Rightarrow -8 - 4 \square - 8 + 4$

$\Rightarrow -12 \square - 4 \Rightarrow -12 < -4$

(b) $(-3) + 7 - (19) \square 15 - 8 + (-9) \Rightarrow -3 + 7 - 19 \square 15 - 8 - 9$

$\Rightarrow 4 - 19 \square 15 - 17 \Rightarrow -15 \square - 2$

$\Rightarrow -15 < | - 2$

(c) $\quad -41 + 11 \,\square\, 23 - 41 - 11 \Rightarrow -18 + 11 \,\square\, 23 - 52$

$\Rightarrow -7 \,\square\, - 29 \Rightarrow -7 \,\boxed{>}\, -29$

(d) $\quad 39 + (-24) - (15) \,\square\, 36 + (-52) - (-36) \Rightarrow 39 - 24 - 15 \,\square\, 36 - 52 + 36$

$\Rightarrow 39 - 39 \,\square\, 72 - 52 \Rightarrow 0 \,\square\, 20$

$\Rightarrow 0 \,\boxed{<}\, 20$

$\quad (-231) + 79 + 51 \,\square\, (-399) + 159 + 81 \Rightarrow -231 + 130 \,\square\, - 399 + 240$

$\Rightarrow -101 \,\square\, - 159 \Rightarrow -101 \,\underline{\boxed{>}}\, - 159$

Question 10. A water tank has steps inside it. A monkey is sitting on the topmost step (i.e., the first step). The water level is at the ninth step:

(i) He jumps 3 steps down and then jumps back 2 steps up. In how many jumps will he reach the water level?

(ii) After drinking water, he wants to go back. For this, he jumps 4 steps up and then jumps back 2 steps down in every move. In how many jumps will he reach back the top step?

(iii) If the number of steps moved down is represented by negative integers and the number of steps move up by positive integers, represent his moves in part (i) and (ii) by completing the following:
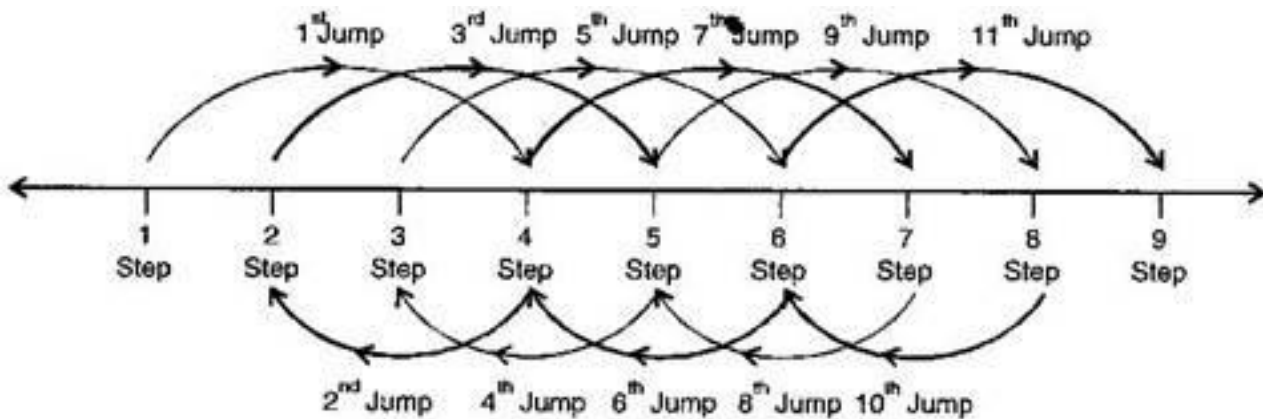
(a) $-3 + 2 - \ldots\ldots\ldots = -8$

(b) $4 - 2 + \ldots\ldots\ldots = 8$

In (a) the sum (-8) represent going down by eight steps. So, what will the sum 8 in (b) represent?

Answer:

(i) He jumps 3 steps down and jumps back 2 steps up. Following number ray shows the

jumps of monkey:

First jump = 1 + 3 = 4 steps Second jump = 4 – 2 = 2 steps

Third jump = 2 + 3 = 5 steps Fourth jump = 5 – 2 = 3 steps

Fifth jump = 3 + 3 = 6 steps Sixth jump = 6 – 2 = 4 steps

Seventh jump = 4 + 3 = 7 steps Eighth jump = 7 – 2 = 5 steps

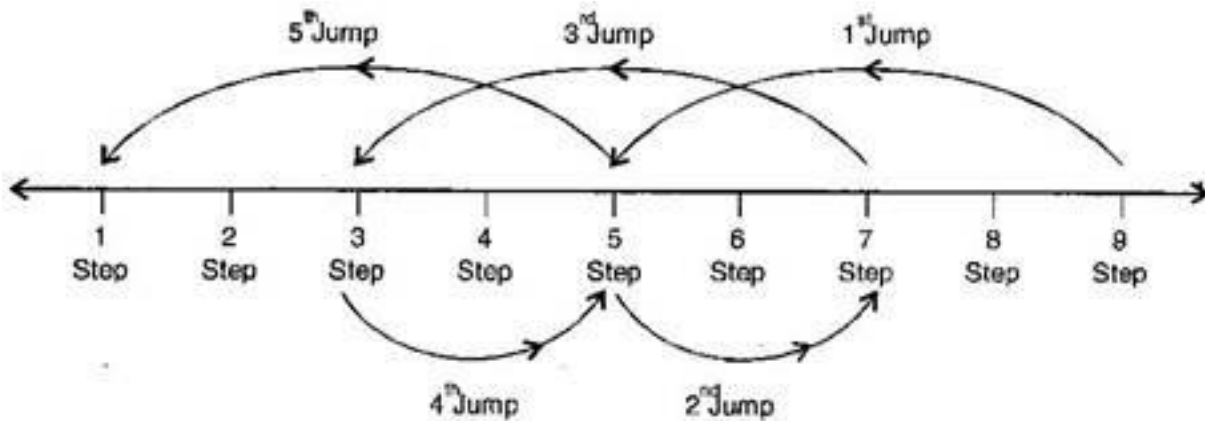Ninth jump = 5 + 3 = 8 steps Tenth jump = 8 – 2 = 6 steps

Eleventh jump = 6 + 3 = 9 steps

He will reach ninth steps in 11 jumps.

(ii) He jumps four steps and them jumps down 2 steps. Following number

ray shows the jumps of monkey:

Thus monkey reach back on the first step in fifth jump

(iii) (a) $-3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 = -8$

(b) $4 - 2 + 4 - 2 + 4 - 2 + 4 - 2 = 8$

EXERCISE 1.2

1.Write down a pair of integers whose:
(a) sum is -7
(b) difference is -10
(c) sum is 0.

Answer :
(a) Let us take a pair of integers -3 and -4.
∴ (-3) + (-4) = -3 – 4 = -7
(b) Let us take a pair of integers -12 and -2
∴ (-12) – (-2) = -12 + 2 = -10
(c) Let us take a pair of integers -3 and 3
∴ (-3) + (3) = -3 + 3 = 0

2. (a) Write a pair of negative integers whose difference gives 8.
(b) Write a negative integer and positive integer whose sum is -5.
(c) Write a negative integer and a positive integer whose difference is -3.

Answer :
(a) Let us have -2 and -10
∴ Difference = (-2) – (-10) = -2 + 10 = 8
(b) Let us have -7 and 2
∴ (-7) + (2) = -7 + 2 = -5
(c) Let us have -2 and 1
∴ (-2) – (1) = – 2 – 1 = -3

3 In a quiz, team A scored -40, 10, 0 and team B scored 10, 0, -40 in three successive rounds.
Which team scored more? Can you say that we can add integers in any order?
table
Solution:
Total score of team
A = (-40) + (10) + (0) – -40 + 10 + 0 = -30
Total score of team
B = 10 + 0 + (-40) = 10 + 0 – 40 – -30
∴ The scores of both the teams are same i.e. -30.
Yes, we can add the integers in any order.

4 Fill in the blanks to make the following statements true:

 (i) (-5) + (-8) = (-8) + (…)

 (ii) -53 + … = -53

 (iii) 17 + … = 0

 (iv) [13 + (-12)] + (…) = 13 + [(-12) + (-7)]

 (v) (-4) + [15 + (-3)] = [-4 + 15] + …

Answers

(i) -5 + (-8) – (-8) + **(-5)** [Commutative law of additions]

(ii) -53 + **0** = -53   [Additive Identity]

   [Adding 0 to any integer, it gives the same value]

(iii) 17 + **(-17)** = 0 [Additive inverse]

(iv) [13 + (-12)] + **(-7)** = 13 + [(-12) + (-7)] [Associative law of addition]

(v) (-4) + [15 + (-3)] – [-4 + 15] + **(-3)** [Associative law of addition]

NAME : INTEGERS

EXERCISE 1.3

Find each of the following products:
(a) 3 × (-1)
(b) (-1) × 225
(c) (-21) × (-30)
(d) (-316) × (-1)
(e) (-15) × 0 × (-18)
(f) (-12) × (-11) × (10)
(g) 9 × (-3) × (-6)
(h) (-18) × (-5) × (-4)
(i) (-1) ×(-2) × (-3) × 4
(j) (-3) × (-6) × (-2) × (-1)

Solution:
(a) 3 × (-1) = -3 × 1 = -3
(b) (-1) × 225 = -1 × 225 = -225
(c) (-21) × (-30) = (-) × (-) × 21 × 30 = 630
(d) (-316) × (-1) = (-) × (-) × 316 × 1 = 316
(e) (-15) × 0 × (-18) = 0 [∵ a × 0 = a]
(f) (-12) × (-11) × (10)
   = (-) × (-) × 12 × 11 × 10 = 1320
(g) 9 × (-3) × (-6) = (-3) × (-6) × 9
   = (—) × (-) × 3 × 6 × 9 = 162
(h) (-18) × (-5) × (-4)
   = (-) × (-) × (-) × 18 × 5 × 4 = -360
(i) (-1) × (-2) × (-3) × 4
   = (-) × (-) × (-) × 1 × 2 × 3 × 4 = -24
(j) (-3) × (-6) × (-2) × (-1)
   = (-) × (-) × (-) × (-) × 3 × 6 × 2 × 1 = 36olution:

Q 2 Verify the following:
(a) 18 × [7 + (-3)] = [18 × 7] + [18 × (-3)]
(b) (-21) × [(-4) + (-6)] = [(-21) × (-4)] + [(-21) × (-6)]

a) 18 × [7 + (-3)] = [18 × 7] + [18 × (-3)]
LHS = 18 × [7 + (-3)] = 18 × 4 = 72
RHS = [18 × 7] + [18 × (-3)] = 126 + (-54)
= 126 – 54 = 72
LHS = RHS
Hence, verified.

b) (-21) × [(-4) + (-6)] = [(-21) × (-4)] + [(-21) × (-6)]

LHS = (-21) × [(-4) + (-6)]

= (-21) × (-10)

= (-) × (-) × 21 × 10 = 210

RHS = [(-21) × (-4)] + [(-21) × (-6)]

= (84) + (126) = 84 + 126 = 210

LHS = RHS

Hence, verified.

3 (i) For any integer a, what is (-1) × a equal to?

(ii) Determine the integer whose product with (-1) is 0.

(a) -22

(b) 37

(c) 0

Solution:

(i) (-1) × a = -a

(ii) (-1) × 0 = 0 [∵ a × 0 = 0]

Hence (c) 0 is the required integer.

4 Starting from (-1) × 5, write various products showing some pattern to show (-1) × (-1) = 1

Solution:

(-1) × 5 = -5

(-1) × 4 = -4 = (-5) + 1

(-1) × 3 = -3 = (-4) + 1

(-1) × 2 = -2 = (-3) + 1

(-1) × (1) = -1 = (-2) + 1

(-1) × 0 = 0 − (-1) + 1

(-1) × (-1) = 1 = 0+1

5 Find the product, using suitable properties:

(a) 26 × (-48) + (-48) × (-36)

(b) 8 × 53 × (-125)

(c) 15 × (-25) × (-4) × (-10)

(d) (-41) × 102

(e) 625 × (-35) + (-625) × 65

(f) 7 × (50 − 2)

(g) (-17) × (-29)

(h) (-57) × (-19) + 57

Solution

a) 26 × (-48) + (-48) × (-36)

= -48 × [26 + (-36)] = -48 × [26 – 36] = -48 × -10 = 480 [Distributive property of multiplication over addition]

(b) 8 × 53 × (-125) = 53 × [8 × (-125)]
[Associative property of multiplication] = 53 × (-1000) = -53000

c) 15 × (-25) × (-4) × (-10)
= [(-25) × (-4)] × [15 × (-10)]
[Regrouping the terms] = 100 × (-150) = -15000

d) (-41) × 102 = (-41) × [100 + 2]
= (-41) × 100 + (-41) × 2
[Distributive property of multiplication over addition] = -4100 – 82 = -4182

(e) 625 × (-35) + (-625) × 65
= 625 × [(-35) + (-65)]
[Distributive property of multiplication over addition]
= 625 × (-100) = -62500

(f) 7 × (50 – 2) = 7 × 48 = 336 or
7 × (50 – 2) = 7 × 50 -7 × 2 = 350 – 14 = 336 [Distributive property of multiplication over addition]

(g) (-17) × (-29) = (-17) × [30 + (-1)]
= (-17) × 30 + (-17) × (-1)
= -510 + 17 = -493
[Distributive property of multiplication over addition]

(h) (-57) × (-19) + 57 = 57 × 19 + 57
= 57 × 19 + 57 × 1 [Y (-) × (-) = (+)] [Distributive property of multiplication over addition]
= 57 × (19 + 1) = 57 × 20 = 1140

6 A certain freezing process requires that room temperature be lowered from 40°C at the rate of 5°C every hour. What will be the room temperature 10 hours after the process begins?

Solution:
Temperature of the room in the beginning = 40°C
Temperature after 1 hour
= 40°C – 1 × 5°C = 40°C – 5°C – 35°C
Similarly, temperature of the room after 10 hours
= 40°C – 10 × 5°C = 40°C – 50°C = -10°C

7 In a class test containing 10 questions, 5 marks are awarded for every correct answer and (-2) marks are awarded for every incorrect answer and 0 for questions not attempted.
(i) Mohan gets four correct and six incorrect answers. What is his score?
(ii) Reshma gets five correct answers and five incorrect answers, what is her score?
(iii) Heena gets two correct and five incorrect answers out of seven questions she attempts. What is her score?

Solution

i) Marks awarded to Mohan = 4 × 5
=20 for correct answers Marks awarded to Mohan = 6 × (-2)
= -12 for incorrect answers.

∴ Total marks obtained by Mohan
= 20 + (-12) = 20 – 12 = 8

(ii) Marks awarded to Reshma for correct answers
= 5 × 5 = 25
Marks awarded to Reshma for incorrect answers
= 5 × (-2) = -10
∴ Total marks obtained by Reshma
= 25 + (-10) = 25 – 10 = 15

iii) Marks awarded to Heena for correct answers
= 2 × 5 = 10
Marks awarded to Heena for incorrect answers
= 5 × (-2) = -10
Number of question not attempted by Heena
= 10 – (2 + 5) = 10 – 7 = 3
Marks awarded to Heena for non-attempted questions
=3×0=0
∴ Total marks obtained by Heena
= 10 + (-10) + 0 = 10-10+ 0 = 0

8 A cement company earns a profit of ₹ 8 per bag of white cement sold and a loss of ₹ 5 per bag of grey cement sold.
(a) The company sells 3,000 bags of white cement and sold 5,000 bags of grey cement in a month. What is its profit or loss?
(b) What is the number of white cement bags it must sell to have neither profit nor loss, if the number of grey bags sold is 6,400 bags.

Solution
(a) Profit on one white cement bag = ₹ 8
loss on one grey cement bag = ₹ – 5
Profit on 3,000 bags of white cement
= ₹ (8 × 3,000) = ₹ 24,000
Loss on 5,000 bags of grey cement
= ₹ (-5 × 5000) = – ₹ 25,000
Total loss = – ₹ 25,000 + ₹ 24,000
= – ₹ 1000 i.e. ₹ 1000

(b) Selling price of grey bags at a loss of ₹ 5
= ₹ (5 × 6,400) – ₹ 32,000
For no profit and no loss, the selling price of white bags = ₹ 32,000
Rate of selling price of white bags at a profit of ₹ 8 per bag.
∴ Number of white cement bags sold
$=\frac{32000}{8}=4000$
Hence, the required number of bags = 4,000

9 Replace the blank with an integer to make it a true statement.
(a) (-3) × __ = 27
(b) 5 × __ = -35
(c) __ × (-8) = -56
(d) __ × (-12) = 132

Solution
a) (-3) × __ = 27 = (-3) × (-9) = 27 [∵ (-) × (-) = (+)]
(b) 5 × __ = -35 = 5 × (-7) = -35 [∵ (+) × (-) = (-)]
(c) __ × (-8) = -56 = 7 × (-8) = -56 [∵ (+) × (-) = (-)]
(d) __ × (-12) = 132 = (-11) × (-12) = 132 [∵ (-) × (-) = (+)]

DIVISION OF INTEGERS

Key Points to Remembers

1) a ÷ (– b) = (–a) ÷ b   Where b ≠ 0

(– 12) ÷ (– 6) = 2;
(– 20) ÷ (–4) = 5;
(– 32) ÷ (–8) = 4 ;

So, we can say that when we divide a negative integer by a negative integer, we first divide
Them as whole numbers and then put a positive sign (+). That is , we get a positive integer.
In general , for any two positive integers a and b

(–a) ÷ (– b) = a ÷ b where b ≠ 0

2) a ÷ 1 = a
What happens when we divide any integer by (-1)
(-8) ÷ (-1) = 8
11 ÷ (-1) = (-11)
If any integer is divided by (-1) it does not give the same integer.

**Example : In a test (+ 5) marks are given for very correct answer and (- 2) marks are
given for every incorrect answer. (1) Radhika answered all the questions and scored 30
marks though she got 10 correct answers .**
**(ii) Jay also answered all the questions and scored (-12) marks though he got 4 correct
answers. How many incorrect answers had they attempted ?**

Solution
(1) Marks given for one correct answer = 5
    So, marks given for 10 correct answer = 5 × 10 = 50
    Radhika's score = 30
    Marks obtained for incorrect answers = 30 – 50 = -20

Marks given for one incorrect answer = (-2)
Therefore, number of incorrect answers =(-20) ÷ (-2) = 10
(ii) Marks given for 4 correct answers = 5 × 4 = 20
Jay's score = (-12)
Marks obtained for incorrect answers = -12 – 20 = - 32
Marks given for one incorrect answer = (-2)
Therefore number of incorrect answers = (- 32) ÷ (-2) = 16

Q1 Fill in the blanks :

a) 369 ÷ ___ = 369
(b) (-75) ÷ ___ = -1
(c) (-206) ÷ ___ =1
(d) -87 ÷ ___ = -87
(e) ___ ÷ 1 = -87
(f) ___ ÷ 48 =
(g) 20 ÷ ___ = -2
(h) ___ ÷ (4) = -3

Solution

a) 369 ÷ ___ = 369 = 369 ÷ 1 = 369
(b) (-75) ÷ ___ = -1 = (-75) ÷ 75 = -1
(c) (-206) ÷ ___ = 1 = (-206) ÷ (-206) = 1
(d) 87 ÷ ___ = 87 = -87 ÷ (-1) = 87
(e) ___ ÷ 1 = -87 = -87 ÷ 1 = -87
(f) ___ ÷ 48 = -1 = (-48) ÷ 48 = -1
(g) 20 + ___ = -2 = 20 ÷ (-10) = -2
(h) ___ + (4) = -3 = (-12) ÷ (4) = -3

Q2 Multiple choice questions
(a) 42 ÷ 7 = _____
   (i) -6   (ii)   294   (iii) 6   (iv) 35

(b) (- 54) ÷ 9 = _____
   (i)   6   (ii)   -6   (iii)   -7   (iv) 7

(c) (-45) ÷ (-5) = _____
   (i)   -3   (ii) -9   (iii)   3   (iv) 9

(d) 0 ÷ (- 5) = _____
   (i)   0   (ii)   1   (iii)   -5   (iv) -1

(e) (-25) ÷ (-25) = ___
   (i) 1   (ii) -1   (iii)   0   (iv) 50

(f) 39 ÷ (-1) =   ____

i) **39**   (ii)   **-39**   (iii)   **-1**   (iv)   **1**

Exercise 1.4

Q1 Evaluate each of the following:

(a) (-30) ÷ 10
(b) 50 ÷ (-5)
(c) (-36) ÷ (-9)
(d) (-49) ÷ (49)
(e) 13 ÷ [(-2) + 1]
(f) 0 ÷ (-12)
(g) (-31) ÷ [(-30) + (-1)]
(h) [(-36) ÷ 12] ÷ 3
(i) [(-6) + 5] ÷ [(-2) + 1]

Solution

a) (-30) ÷ 10 = $\frac{-30}{10}$ = -3 50

(b) 50 ÷ (-5) = $\frac{50}{-5}$ = -10

(c) (-36) ÷ (-9) = $\frac{-36}{-9}$ = 4

(d) (-49) ÷ (49) = $\frac{-49}{-49}$ = -1

(e) 13 ÷ [(-2) + 1] = 13 ÷ -1 = $\frac{13}{1}$ = -13

(f) 0 ÷ (-12) = $\frac{0}{-12}$ = 0

(g) (-31) ÷ [(-30) + (-1)] = (-31) ÷ (-31= $\frac{-31}{-31}$ = 1

(h) [(-36) + 12] ÷ 3 = [$\frac{-36}{12}$] ÷ 3 = -3 ÷ 3
   = $\frac{-3}{3}$ =-1

(i) [(-6) + 5] + [(-2) + 1] = (-1) − (-1) = $\frac{-1}{-1}$ = 1

Q2 Verify that: a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c) for each of the following values of a, b and c.
(a) a = 12, b = − 4, c = 2
(b) a = (-10), b = 1, c = 1

Solution

(a) a = 12, 6 = – 4, c = 2
    $a \div (b + c) = 12 \div [(-4) + 2]$
    $= 12 \div (-2) = \frac{12}{-2} = -6$
 $(a \div b) + (a \div c) = [12 \div (-4)] + [12 \div 2]$
 $= \frac{12}{-4} + \frac{12}{2} = -3 + 6 = 3$
 Since, (-6) + 3
 Hence, $a \div (b + c) + (a \div b) + (a \div c)$

b) a = (-10), b = 1, c = 1
   $a \div (b + c) = (-10) \div (1 + 1)$
   $= (-10) \div 2 = \frac{-10}{2} = -5$
   $(a \div b) + (a \div c)$
   $= [(-10) \div 1] + [(-10) \div 1]$
   $= \frac{(-10)}{1} + \frac{(-10)}{1}$
   $= (-10) + (-10) = -20$
   Since (-5) ≠ (-20)
   Hence, $a \div (b + c) \neq (a \div b) + (a \div c)$

Q3 Write five pairs of integers (a, b) such that a ÷ b = -3. One such pair is (6, -2)
   because 6 + (-2) = -3.

   Solution:
   (a) (24, -8) because 24 ÷ (-8) = -3
   (b) (-12, 4) because (-12) ÷ 4 = -3
   (c) (15, -5) because 15 ÷ (-5) = -3
   (d) (18, -6) because 18 ÷ (-6) = -3
   (e) (60, -20) because 60 ÷ (-20) = -3

Q5 The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, at what time would the temperature be 8°C below zero? What would be the temperature at midnight?
Solution:
Temperature at 12 noon was 10°C above zero i.e. +10°C
Rate of decrease in temperature per hour = 2°C
Number of hours from 12 noon to midnight = 12
∴ Change in temperature in 12 hours
$= 12 \times (-2°C) = -24°C$
∴ Temperature at midnight
$= +10°C + (-24°C) = -14°C$
Hence, the required temperature at midnight = -14°C
Difference in temperature between + 10°C and -8°C
$= +10°C - (-8°C) = +10°C + 8°C = 18°C$
Number of hours required $= \frac{18°C}{2°C} = 9$ hours
∴ Time after 9 hours from 12 noon = 9 pm.

Q6. In a class test (+3) marks are given for every correct answer and (-2) marks are given for every incorrect answer and no marks for not attempting any question:
(i) Radhika scored 20 marks. If she has got 12 correct answers, how many questions has she attempted incorrectly?
(ii) Mohini scores -5 marks in this test, though she has got 7 correct answers. How many questions has she attempted incorrectly?

Solution
Given that:
+3 marks are given for each correct answer. (-2) marks are given for each incorrect answer.
Zero marks for not attempted questions.

(i) Marks obtained by Radhika for 12 correct answers = (+3) × 12 = 36
Marks obtained by Radhika for correct answers = 12 × 3 = 36
Total marks obtained by Radhika = 20
∴ Marks obtained by Radhika for incorrect answers = 20 – 36 = -16
Number of incorrect answers
$$=(-16) \div (-2) = \frac{-16}{-2} = 8$$
Hence, the required number of incorrect answers = 8

(ii) Marks scored by Mohini = -5
Number of correct answers = 7
∴ Marks obtained by Mohini for 7 correct answers = 7 × (+3) – 21
Marks obtained for incorrect answers
= -5 – 21 = (-26)
∴ Number of incorrect answers
= (-26) ÷ (-2) = 13
Hence, the required number of incorrect answers – 13.

Q 7 An elevator descends into a nine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach -350 m.

Solution:
The present position of the elevator is at 10 in above the ground level.
Distance moved by the elevator below the ground level = 350 m
∴ Total distance moved by the elevator = 350 m + 10 m = 360 m
Rate of descent = 6 m/min.
Total time taken by the elevator
$$= \frac{360 min}{6 \, m/min}$$
= 60 minutes = 1 hour
Hence, the required time = 1 hour.

CHAPTER 2

NAME : FRACTIONS AND DECIMALS

1) A proper fraction ; A fraction whose numerator is less than its denominator is called a proper fraction.

Eg. $\dfrac{2}{9}$, $\dfrac{4}{5}$, $\dfrac{9}{10}$ etc.

2) An Improper fraction: A fraction whose numerator is more than or equal to its denominator is called an improper fraction.

Eg. $\dfrac{3}{2}$, $\dfrac{5}{4}$, $\dfrac{11}{9}$ etc

3) Mixed Fraction: A number which can be expressed as the sum of a natural number and a proper fraction is called a mixed fraction.

Eg. $1\dfrac{3}{4}$, $3\dfrac{4}{7}$, $7\dfrac{4}{5}$ etc

4) Like Fractions: Fractions having the same denominator but different numerators are called like fractions.

Eg. $\dfrac{2}{11}$, $\dfrac{3}{11}$, $\dfrac{4}{11}$

5) Unlike Fractions; Fractions having different denominator are called, unlike fractions.

Eg. $\dfrac{3}{7}$, $\dfrac{5}{11}$, $\dfrac{11}{9}$

6) To multiply a whole number with a proper or an improper fraction, we multiply the whole number with the numerator of the fraction, keeping the denominator same.

Eg. $2\times\dfrac{5}{7} = \dfrac{2\times5}{7} = \dfrac{10}{7}$

7) To multiply a mixed fraction to whole numbers, first convert the mixed fraction to an improper fraction and then multiply.

Eg. $3 \times 2\dfrac{5}{7}$

$= 3 \times \dfrac{19}{7} = \dfrac{57}{7} = 8\dfrac{1}{7}$

8) In $\frac{1}{2}$ of 2 , $\frac{1}{2}$ of 3 , $\frac{1}{5}$ of 20 etc. " of " represent multiplication

9) Multiplication of two fractions $= \dfrac{\textbf{product of numerators}}{\textbf{product of denominators}}$

In $\dfrac{3}{5} \times \dfrac{1}{7} = \dfrac{3 \times 1}{5 \times 7} = \dfrac{3}{35}$

The value of the product of two proper fractions is smaller than each of the two fractions.

The value of the product of two improper fractions is more than each of the two fractions.

Q1 Multiple choice questions

a) Which of the following is proper fraction?

(i) $\dfrac{7}{4}$ (ii) $\dfrac{19}{4}$ (iii) $\dfrac{14}{5}$ (iv) $\dfrac{4}{11}$

Solution (iv) $\dfrac{4}{11}$

Hint   4 < 11

b) Which of the following is proper fraction?

(i) $\dfrac{17}{3}$ (ii) $\dfrac{43}{12}$ (iii) $\dfrac{15}{11}$ (iv) $\dfrac{4}{5}$

Solution (iv) $\dfrac{4}{5}$

Hint   4 < 5

c) Which of the following is an improper fraction?

(i) $\dfrac{2}{7}$ (ii) $\dfrac{1}{2}$ (iii) $\dfrac{2}{3}$ (iv) $\dfrac{63}{10}$

Solution (iv) $\dfrac{63}{10}$ Hint   63 > 10

d) Which of the following is an improper fraction?

(i) $\dfrac{1}{12}$ (ii) $\dfrac{5}{9}$ (iii) $\dfrac{4}{13}$ (iv) $\dfrac{7}{2}$

Solution (iv) $\dfrac{7}{2}$ Hint $7 > 2$

e) Which of the following is a mixed fraction?

(i) $\dfrac{2}{17}$ (ii) $\dfrac{3}{14}$ (iii) $2\dfrac{13}{15}$ (iv) $\dfrac{5}{27}$

Solution iii) $2\dfrac{13}{15}$ Hint It is sum of natural number and a fraction

f) **T**he improper fraction $\dfrac{33}{4}$ in the form of a mixed fraction is

(i) $8\dfrac{1}{4}$ (ii) $4\dfrac{1}{8}$ (iii) $3\dfrac{8}{4}$ (iv) $4\dfrac{7}{8}$

Solution i) $8\dfrac{1}{4}$ Hint It is sum of natural number and a fraction

Exercise 2.1

Solve:

(i) $2 - \dfrac{3}{5}$. (ii) $4 + \dfrac{7}{8}$

(iii) $\dfrac{3}{5} + \dfrac{2}{7}$ (iv) $\dfrac{9}{11} - \dfrac{4}{15}$

(v) $\dfrac{7}{10} + \dfrac{2}{5} + \dfrac{3}{2}$ (vi) $2\dfrac{2}{3} + 3\dfrac{1}{2}$

(vii) $8\dfrac{1}{2} - 3\dfrac{5}{8}$

Solution:

(i) $2 - \dfrac{3}{5} = \dfrac{2}{1} - \dfrac{3}{5} = \dfrac{2 \times 5 - 3 \times 1}{1 \times 5}$

$= \dfrac{10 - 3}{5} = \dfrac{7}{5} = 1\dfrac{2}{5}$

Hence, $2 - \dfrac{3}{5} = 1\dfrac{2}{5}$

$$\begin{array}{r} 5 \overline{)\,7\,(1} \\ \underline{-5} \\ 2 \end{array}$$

(ii) $4 + \dfrac{7}{8} = \dfrac{4}{1} + \dfrac{7}{8} = \dfrac{4 \times 8 + 1 \times 7}{1 \times 8}$

$= \dfrac{32 + 7}{8} = \dfrac{39}{8} = 4\dfrac{7}{8}$

Hence, $4 + \dfrac{7}{8} = 4\dfrac{7}{8}$

$$\begin{array}{r} 8 \overline{)\,39\,(4} \\ \underline{-32} \\ 7 \end{array}$$

(iii) $\dfrac{3}{5} + \dfrac{2}{7} = \dfrac{3 \times 7 + 2 \times 5}{5 \times 7} = \dfrac{21 + 10}{35} = \dfrac{31}{35}$

Hence, $\dfrac{3}{5} + \dfrac{2}{7} = \dfrac{31}{35}$

(iv) $\dfrac{9}{11} - \dfrac{4}{15} = \dfrac{9 \times 15 - 4 \times 11}{11 \times 15} = \dfrac{135 - 44}{165} = \dfrac{91}{165}$

Hence, $\dfrac{9}{11} - \dfrac{4}{15} = \dfrac{91}{165}$

(v) $\dfrac{7}{10} + \dfrac{2}{5} + \dfrac{3}{2} = \dfrac{7 + 4 + 15}{10}$

[LCM of 10, 5 and 2 = 10]

$= \dfrac{26}{10} = \dfrac{26 \div 2}{10 \div 2} = \dfrac{13}{5} = 2\dfrac{3}{5}$

Hence, $\dfrac{7}{10} + \dfrac{2}{5} + \dfrac{3}{2} = 2\dfrac{3}{5}$

$$\begin{array}{r} 5 \overline{)\,13\,(2} \\ \underline{-10} \\ 3 \end{array}$$

(vi) $2\dfrac{2}{3} + 3\dfrac{1}{2} = \dfrac{8}{3} + \dfrac{7}{2} = \dfrac{8 \times 2 + 3 \times 7}{3 \times 2}$

$= \dfrac{16 + 21}{6} = \dfrac{37}{6} = 6\dfrac{1}{6}$

Hence, $2\dfrac{2}{3} + 3\dfrac{1}{2} = 6\dfrac{1}{6}$

$$\begin{array}{r} 6 \overline{)\,37\,(6} \\ \underline{-36} \\ 1 \end{array}$$

(vii) $8\dfrac{1}{2} - 3\dfrac{5}{8} = \dfrac{17}{2} - \dfrac{29}{8}$ [LCM of 2 and 8 = 8]

$$= \dfrac{17 \times 4 - 29 \times 1}{8}$$

$$= \dfrac{68 - 29}{8} = \dfrac{39}{8} = 4\dfrac{7}{8}$$

```
8 ) 39 ( 4
    32
    7
```

Hence, $8\dfrac{1}{2} - 3\dfrac{5}{8} = 4\dfrac{7}{8}$

2 **Arrange the following in descending order:**

(i) $\dfrac{2}{9}$, $\dfrac{2}{3}$, $\dfrac{8}{21}$

(ii) $\dfrac{1}{5}$, $\dfrac{3}{7}$, $\dfrac{7}{10}$

Solution

(i) $\dfrac{2}{9}, \dfrac{2}{3}, \dfrac{8}{21}$

LCM of 9, 3 and 21 = 3 × 3 × 7 = 63

Making the denominator same, we have

$$\dfrac{2}{9} \times \dfrac{7}{7} = \dfrac{14}{63}, \quad \dfrac{2}{3} \times \dfrac{21}{21} = \dfrac{42}{63}$$

and $\dfrac{8}{21} \times \dfrac{3}{3} = \dfrac{24}{63}$

Since 42 > 24 > 14

Thus $\dfrac{42}{63} > \dfrac{24}{63} > \dfrac{14}{63}$

3	9, 3, 21
3	3, 1, 7
7	1, 1, 7
	1, 1, 1

Hence, $\dfrac{2}{3} > \dfrac{8}{21} > \dfrac{2}{9}$

(ii) $\dfrac{1}{5}, \dfrac{3}{7}, \dfrac{7}{10}$

LCM of 5, 7 and 10

$$= 2 \times 5 \times 7$$

$$= 70$$

2	5, 7, 10
5	5, 7, 5
7	1, 7, 1
	1, 1, 1

Making the denominator same, we have

$$\frac{1}{5} \times \frac{14}{14} = \frac{14}{70} \qquad\qquad [\because 70 \div 5 = 14]$$

$$\frac{3}{7} \times \frac{10}{10} = \frac{30}{70} \qquad\qquad [\because 70 \div 7 = 10]$$

$$\frac{7}{10} \times \frac{7}{7} = \frac{49}{70} \qquad\qquad [\because 70 \div 10 = 7]$$

Since 49 > 30 > 14

Thus $\dfrac{49}{70} > \dfrac{30}{70} > \dfrac{14}{70}$

Hence, $\dfrac{7}{10} > \dfrac{3}{7} > \dfrac{1}{5}$

3 In a "magic square" the sum of number in each row, in each column and along the diagonals is the same. Is this a magic square?

$\frac{4}{11}$	$\frac{9}{11}$	$\frac{2}{11}$
$\frac{3}{11}$	$\frac{5}{11}$	$\frac{7}{11}$
$\frac{8}{11}$	$\frac{1}{11}$	$\frac{6}{11}$

Solution

Along first row, $\dfrac{4}{11} + \dfrac{9}{11} + \dfrac{2}{11} = \dfrac{15}{11}$

Along second row, $\dfrac{3}{11} + \dfrac{5}{11} + \dfrac{7}{11} = \dfrac{15}{11}$

Along third row, $\dfrac{8}{11} + \dfrac{1}{11} + \dfrac{6}{11} = \dfrac{15}{11}$

Along first column, $\dfrac{4}{11} + \dfrac{3}{11} + \dfrac{8}{11} = \dfrac{15}{11}$

Along second column, $\dfrac{9}{11} + \dfrac{5}{11} + \dfrac{1}{11} = \dfrac{15}{11}$

Along third column, $\dfrac{2}{11} + \dfrac{7}{11} + \dfrac{6}{11} = \dfrac{15}{11}$

Along first diagonal, $\dfrac{4}{11} + \dfrac{5}{11} + \dfrac{6}{11} = \dfrac{15}{11}$

Along second diagonal, $\dfrac{2}{11} + \dfrac{5}{11} + \dfrac{8}{11} = \dfrac{15}{11}$

Since, the sum of all the fraction row wise, column wise and the diagonal wise is same i.e. $\dfrac{15}{11}$

Hence, it is a magic square.

4 A rectangular sheet of paper is $12\dfrac{1}{2}$ cm long and $10\dfrac{2}{3}$ cm wide. Find its perimeter.

Length of sheet $= 12\dfrac{1}{2}$ cm $= \dfrac{25}{2}$ cm

Breadth of the sheet $= 10\dfrac{2}{3} = \dfrac{32}{3}$ cm

Perimeter $= 2 \times$ [length + breadth]

$$= 2 \times \left[\dfrac{25}{2} + \dfrac{32}{3}\right] \text{ cm}$$

$$= 2 \times \left[\dfrac{25 \times 3 + 32 \times 2}{2 \times 3}\right] \text{ cm}$$

$$= 2 \times \left[\dfrac{75 + 64}{6}\right] \text{ cm}$$

[LCM of 2 and 3 = 6]

$$= {}^1\!\!\!\not{2} \times \dfrac{139}{\not{6}_3} = \dfrac{139}{3}$$
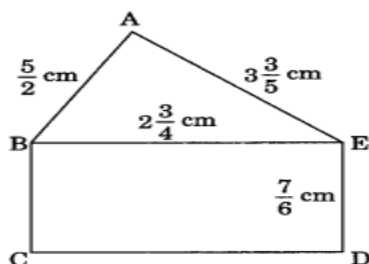
$$= 46\dfrac{1}{3} \text{ cm}$$

$$\begin{array}{r} 3)\,\overline{139}\,(46 \\ \underline{12} \\ 19 \\ \underline{18} \\ 1 \end{array}$$

Hence, the required perimeter $= 46\dfrac{1}{3}$ cm.

5 Find the perimeter of (i) ΔABE (ii) the rectangle BCDE in this figure. Whose perimeter is greater?
Solution:

$= \text{AB} + \text{BE} + \text{AE}$

$= \dfrac{5}{2} \text{ cm} + 2\dfrac{3}{4} \text{ cm} + 3\dfrac{3}{5} \text{ cm}$

$= \left(\dfrac{5}{2} + \dfrac{11}{4} + \dfrac{18}{5}\right) \text{ cm}$

$= \left(\dfrac{5 \times 10 + 11 \times 5 + 18 \times 4}{20}\right) \text{ cm}$

[LCM of 2, 4, 5 = 20]

$= \left(\dfrac{50 + 55 + 72}{20}\right) \text{ cm}$

$= \dfrac{177}{20} \text{ cm} = 8\dfrac{17}{20} \text{ cm}$

$$\begin{array}{r} 20)\,\overline{177}\,(8 \\ \underline{160} \\ 17 \end{array}$$

Hence, the perimeter of ΔABE $= 8\dfrac{17}{20}$ cm.

6 Salil wants to put a picture in a frame. The picture is $7\dfrac{3}{5}$ cm wide. To fit in the frame, the picture cannot be more than $7\dfrac{3}{10}$ cm wide. How much should the picture be trimmed?

Solution

The width of the picture

$$= 7\frac{3}{5} \text{ cm} = \frac{38}{5} \text{ cm}$$

The required width of the frame

$$= 7\frac{3}{10} \text{ cm} = \frac{73}{10} \text{ cm}$$

∴ The width of the picture to be trimmed of

$$= \frac{38}{5} \text{ cm} - \frac{73}{10} \text{ cm} = \left(\frac{38}{5} - \frac{73}{10}\right) \text{cm}$$

$$= \left(\frac{2 \times 38 - 73 \times 1}{10}\right) \text{ cm}$$

[LCM of 5 and 10 = 10]

$$= \left(\frac{76 - 73}{10}\right) \text{ cm} = \frac{3}{10} \text{ cm}$$

Ans : The width to be trimmed , $\dfrac{3}{10}$ cm

7 Ritu ate $=\dfrac{3}{5}$ part of an apple and the remaining apple was eaten by her brother Somu. How much part of the apple did Somu eat? Who had the larger share? By how much?

Solution

Let the whole part of the apple be 1

Part of the apple eaten by Ritu $= \dfrac{3}{5}$

∴ Part of the apple eaten by her brother Somu

$$= 1 - \frac{3}{5} = \frac{1}{1} - \frac{3}{5} = \frac{1 \times 5 - 3 \times 1}{5}$$

$$= \frac{5 - 3}{5} = \frac{2}{5}$$

Since $\dfrac{3}{5} > \dfrac{2}{5}$

Thus, the share of Ritu was larger.

Difference between the two parts

$$= \frac{3}{5} - \frac{2}{5} = \frac{1}{5} \text{ part.}$$

8 Michael finished colouring a picture in $\dfrac{7}{12}$ hour. Vaibhav finished colouring the same picture in $\dfrac{3}{4}$ hour. Who worked longer? By what fraction was it longer ?

Solution

Time taken by Michael = $\dfrac{7}{12}$ hour

Time taken by Vaibhav = $\dfrac{3}{4}$ hour

Comparing $\dfrac{7}{12}$ and $\dfrac{3}{4}$, we have

$\dfrac{7 \times 1}{12}$ and $\dfrac{3 \times 3}{12}$ $\Rightarrow$ $\dfrac{7}{12}$ and $\dfrac{9}{12}$

[LCM of 12 and 4 = 12]

Since $\dfrac{9}{12} > \dfrac{7}{12}$ $\Rightarrow$ $\dfrac{3}{4}$ hour $> \dfrac{7}{12}$ hour
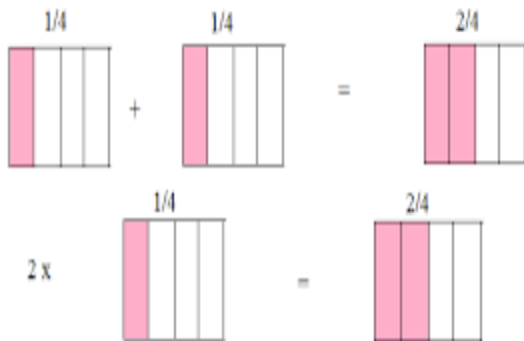
Hence, time taken by Vaibhav was longer.

Difference = $\dfrac{3}{4} - \dfrac{7}{12} = \dfrac{3 \times 3}{4 \times 3} - \dfrac{7 \times 1}{12}$

$= \dfrac{9}{12} - \dfrac{7}{12} = \dfrac{2}{12} = \dfrac{1}{6}$ hour longer.

Answer : Vaibhav worked longer by $\dfrac{1}{6}$ hour

Multiplication of a fraction by a whole number

Eg: $2 \times \dfrac{1}{4} = \dfrac{2}{4}$

Short answer questions:

1 Which of the drawings (a) to (d) show.

(i) $2 \times \dfrac{1}{5}$ (ii) $2 \times \dfrac{1}{2}$ (iii) $3 \times \dfrac{2}{3}$ (iv) $3 \times \dfrac{1}{4}$
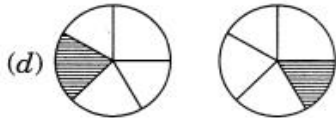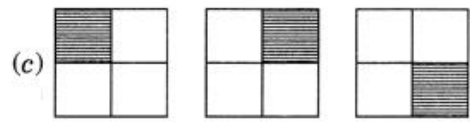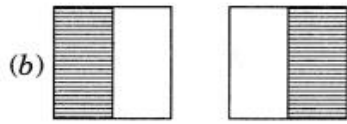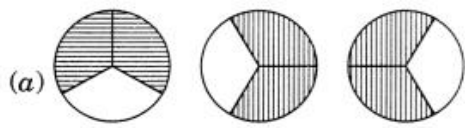
Solution

(a) $2 \times \dfrac{1}{5}$ **represent drawing (d)**

(b) $2 \times \dfrac{1}{2}$ **represent drawing (b)**

(c) $3 \times \dfrac{2}{3}$ **represent drawing (a)**

(d) $3 \times \dfrac{1}{4}$ **represent drawing (c)**

2 Some pictures (a) to (c) are given below. Tell which of them show

(i) $3 \times \dfrac{1}{5} = \dfrac{3}{5}$ (ii) $2 \times \dfrac{1}{3} = \dfrac{2}{3}$ (iii) $3 \times \dfrac{3}{4} = 2\dfrac{1}{4}$

Solution:

(i) $3 \times \dfrac{1}{5} = \dfrac{3}{5}$ represent figure (c)

(ii) $2 \times \dfrac{1}{3} = \dfrac{2}{3}$ represent figure (a)

(iii) $3 \times \dfrac{3}{4} = 2\dfrac{1}{4}$ represent figure (b)

3 Shade (i) $\dfrac{1}{2}$ of the circle in box (a)   (ii) $\dfrac{2}{3}$ of the triangles in box (b)

(c) $\dfrac{3}{5}$ of the squares in box (c)
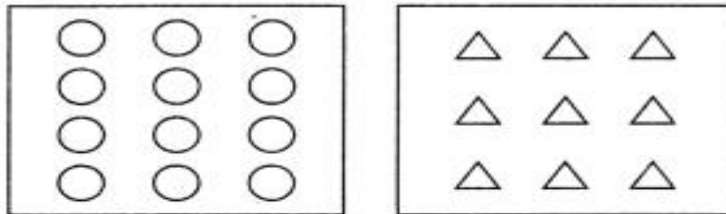
(a)

(b)
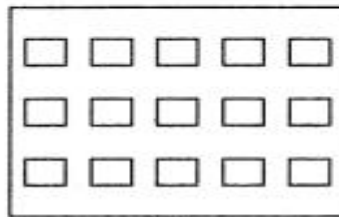
(c)

Solution

(i) $\dfrac{1}{2}$ of the circles

(a)
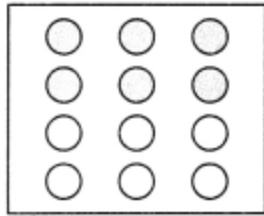
$$= \dfrac{1}{\cancel{2}} \times \cancel{12}^{6} = 6 \text{ circles are to be shaded.}$$

(ii) $\dfrac{2}{3}$ of the triangles $= \dfrac{2}{\cancel{3}} \times \cancel{9}^{3}$
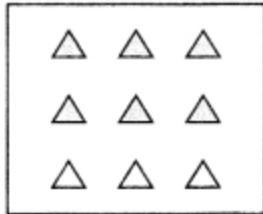
(b)

= 6 triangles are to be shaded

(iii) $\dfrac{3}{5}$ of the squares $= \dfrac{3}{\cancel{5}} \times \cancel{15}^{3}$
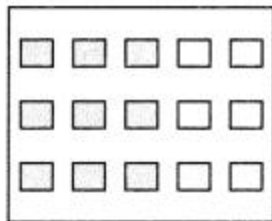
(c)

= 9 squares are to be shaded

4 Find

(a) $\dfrac{1}{2}$　　of (i) 24　(ii)　46　　**(b)** $\dfrac{2}{3}$　　of (i)　18　(ii) 27

c) $\dfrac{3}{4}$　　of (i) 16　(ii)　36　　**(d)** $\dfrac{4}{5}$　　of (i)　20　(ii) 35

Solution

(a) (i) $\dfrac{1}{2}$ of 24 = $\dfrac{1}{\cancel{2}} \times \cancel{24}^{12}$ = 12

(ii) $\dfrac{1}{2}$ of 46 = $\dfrac{1}{\cancel{2}} \times \cancel{46}^{23}$ = 23

(b) (i) $\dfrac{2}{3}$ of 18 = $\dfrac{2}{\cancel{3}} \times \cancel{18}^{6}$ = 12

(ii) $\dfrac{2}{3}$ of 27 = $\dfrac{2}{\cancel{3}} \times \cancel{27}^{9}$ = 18

(c) (i) $\dfrac{3}{4}$ of 16 = $\dfrac{3}{\cancel{4}} \times \cancel{16}^{4}$ = 12

(ii) $\dfrac{3}{4}$ of 36 = $\dfrac{3}{\cancel{4}} \times \cancel{36}^{9}$ = 27

(d) (i) $\dfrac{4}{5}$ of 20 = $\dfrac{4}{\cancel{5}} \times \cancel{20}^{4}$ = 16

(ii) $\dfrac{4}{5}$ of 35 = $\dfrac{4}{\cancel{5}} \times \cancel{35}^{7}$ = 28

5 Multiply and express as a mixed fraction :

(a) $3 \times 5\dfrac{1}{5}$

(b) $5 \times 6\dfrac{3}{4}$

(c) $7 \times 2\dfrac{1}{4}$

(d) $4 \times 6\dfrac{1}{3}$

(e) $3\dfrac{1}{4} \times 6$

(f) $3\dfrac{2}{5} \times 8$

Solution

(a) $3 \times 5\dfrac{1}{5} = 3 \times \dfrac{26}{5}$

$= \dfrac{78}{5}$

$= 15\dfrac{3}{5}$

```
5)  7 8 (15
    −5
    2 8
    −2 5
      3
```

(b) $5 \times 6\dfrac{3}{4} = 5 \times \dfrac{27}{4}$

$= \dfrac{135}{4}$

$= 33\dfrac{3}{4}$

```
4) 1 3 5 (33
   −1 2
     1 5
    −1 2
       3
```

8. Vidya and Pratap went for a picnic. Their mother gave them a water bottle that contained 5 litres of water. Vidya consumed $\frac{2}{5}$ of the water. Pratap consumed the remaining water.

(i) How much water did Vidya drink?

(ii) What fraction of the total quantity of water did Pratap drink?

i) Water consumed by Vidya = $\frac{2}{5}$ of 5 litres

$= \frac{2}{5} \times 5$ litres = 2 litres

Water consumed by Patap

= 5 litres – 2 litres = 3 litres

(ii) Fraction of water consumed by Pratap

$= \frac{3}{5}$ litres

Multiplication of a fraction by a fraction

Eg $\frac{3}{5} \times \frac{1}{7} = \frac{3 \times 1}{5 \times 7} = \frac{3}{35}$

Multiplication of two fractions = $\dfrac{\textbf{product of numerators}}{\textbf{product of denominators}}$

1 Very short answers

Find :

(i) $\frac{1}{4}$ of   (a) $\frac{1}{4}$ (b) $\frac{3}{5}$ (c) $\frac{4}{3}$

(ii) $\frac{1}{7}$ of   (a) $\frac{2}{9}$ (b) $\frac{6}{5}$ (c) $\frac{3}{10}$

Solution

(i) (a) $\dfrac{1}{4}$ of $\dfrac{1}{4} = \dfrac{1}{4} \times \dfrac{1}{4} = \dfrac{1 \times 1}{4 \times 4} = \dfrac{1}{16}$

   (b) $\dfrac{1}{4}$ of $\dfrac{3}{5} = \dfrac{1}{4} \times \dfrac{3}{5} = \dfrac{1 \times 3}{4 \times 5} = \dfrac{3}{20}$

   (c) $\dfrac{1}{4}$ of $\dfrac{4}{3} = \dfrac{1}{\cancel{4}} \times \dfrac{\cancel{4}}{3} = \dfrac{1}{3}$

(ii) (a) $\dfrac{1}{7}$ of $\dfrac{2}{9} = \dfrac{1}{7} \times \dfrac{2}{9} = \dfrac{1 \times 2}{7 \times 9} = \dfrac{2}{63}$

   (b) $\dfrac{1}{7}$ of $\dfrac{6}{5} = \dfrac{1}{7} \times \dfrac{6}{5} = \dfrac{1 \times 6}{7 \times 5} = \dfrac{6}{35}$

   (c) $\dfrac{1}{7}$ of $\dfrac{3}{10} = \dfrac{1}{7} \times \dfrac{3}{10} = \dfrac{1 \times 3}{7 \times 10} = \dfrac{3}{70}$

2 Multiply and reduced to lowest form

(i) $\dfrac{2}{5} \times 2\dfrac{2}{3}$ (ii) $\dfrac{2}{7} \times \dfrac{7}{9}$ (iii) $\dfrac{3}{8} \times \dfrac{6}{4}$ (iv) $\dfrac{9}{5} \times \dfrac{3}{5}$

(v) $\dfrac{1}{3} \times \dfrac{15}{8}$ (vi) $\dfrac{11}{2} \times \dfrac{3}{10}$ (vii) $\dfrac{4}{5} \times \dfrac{12}{7}$

Solution

(i) $\dfrac{2}{3} \times 2\dfrac{2}{3} = \dfrac{2}{3} \times \dfrac{8}{3} = \dfrac{2 \times 8}{3 \times 3}$

$\qquad = \dfrac{16}{9} = 1\dfrac{7}{9}$

$$\begin{array}{r} 9\overline{)\,16\,}(1 \\ -9 \\ \hline 7 \end{array}$$

(ii) $\dfrac{2}{7} \times \dfrac{7}{9} = \dfrac{2 \times 7}{7 \times 9} = \dfrac{14}{63} = \dfrac{14 \div 7}{63 \div 7} = \dfrac{2}{9}$

(iii) $\dfrac{3}{8} \times \dfrac{6}{4} = \dfrac{3 \times 6}{8 \times 4} = \dfrac{18}{32} = \dfrac{18 \div 2}{32 \div 2} = \dfrac{9}{16}$

(iv) $\dfrac{9}{5} \times \dfrac{3}{5} = \dfrac{9 \times 3}{5 \times 5} = \dfrac{27}{25} = 1\dfrac{2}{25}$

$$\begin{array}{r} 25\overline{)\,27\,}(1 \\ -25 \\ \hline 2 \end{array}$$

(v) $\dfrac{1}{3} \times \dfrac{15}{8} = \dfrac{1 \times 15}{3 \times 8} = \dfrac{15}{24} = \dfrac{15 \div 3}{24 \div 3} = \dfrac{5}{8}$

(vi) $\dfrac{11}{2} \times \dfrac{3}{10} = \dfrac{11 \times 3}{2 \times 10} = \dfrac{33}{20} = 1\dfrac{13}{20}$

$$\begin{array}{r} 20\overline{)\,33\,}(1 \\ -20 \\ \hline 13 \end{array}$$

(vii) $\dfrac{4}{5} \times \dfrac{12}{7} = \dfrac{4 \times 12}{5 \times 7} = \dfrac{48}{35} = 1\dfrac{13}{35}$

$$\begin{array}{r} 35\overline{)\,48\,}(1 \\ -35 \\ \hline 13 \end{array}$$

3. Multiply the following fractions :

(i) $\dfrac{2}{5} \times 5\dfrac{1}{4}$ (ii) $6\dfrac{2}{5} \times \dfrac{7}{9}$ (iii) $\dfrac{3}{2} \times 5\dfrac{1}{3}$

(iv) $\dfrac{5}{6} \times 2\dfrac{3}{7}$ (v) $3\dfrac{2}{5} \times \dfrac{4}{7}$ (vi) $2\dfrac{3}{5} \times 3$

(vii) $3\dfrac{4}{7} \times \dfrac{3}{5}$

Solution

(i) $\dfrac{2}{5} \times 5\dfrac{1}{4} = \dfrac{\cancel{2}}{5} \times \dfrac{21}{\cancel{4}_2} = \dfrac{1 \times 21}{5 \times 2}$

$\qquad = \dfrac{21}{10} = 2\dfrac{1}{10}$

$$10\overline{)\,21\,}(2$$
$$\underline{-20}$$
$$\qquad 1$$

(ii) $6\dfrac{2}{5} \times \dfrac{7}{9} = \dfrac{32}{5} \times \dfrac{7}{9} = \dfrac{32 \times 7}{5 \times 9}$

$\qquad = \dfrac{224}{45} = 4\dfrac{44}{45}$

$$45\overline{)\,224\,}(4$$
$$\underline{-180}$$
$$\qquad -44$$

(iii) $\dfrac{3}{2} \times 5\dfrac{1}{3} = \dfrac{\cancel{3}}{\cancel{2}} \times \dfrac{\cancel{16}^{8}}{\cancel{3}} = 8$

(iv) $\dfrac{5}{6} \times 2\dfrac{3}{7} = \dfrac{5}{6} \times \dfrac{17}{7} = \dfrac{85}{42} = 2\dfrac{1}{42}$

$$42\overline{)\,85\,}(2$$
$$\underline{-84}$$
$$\qquad 1$$

(v) $3\dfrac{2}{5} \times \dfrac{4}{7} = \dfrac{17}{5} \times \dfrac{4}{7} = \dfrac{68}{35} = 1\dfrac{33}{35}$

$$35\overline{)\,68\,}(1$$
$$\underline{-35}$$
$$\qquad 33$$

(vi) $2\dfrac{3}{5} \times 3 = \dfrac{13}{5} \times 3 = \dfrac{39}{5} = 7\dfrac{4}{5}$

$$5\overline{)\,39\,}(7$$
$$\underline{-35}$$
$$\qquad 4$$

(vii) $3\dfrac{4}{7} \times \dfrac{3}{5} = \dfrac{\cancel{25}^{5}}{7} \times \dfrac{3}{\cancel{5}} = \dfrac{5 \times 3}{7}$

$\qquad = \dfrac{15}{7} = 2\dfrac{1}{7}$

$$7\overline{)\,15\,}(2$$
$$\underline{-14}$$
$$\qquad 1$$

Exercise 2.3:

4 Which is greater

(i) $\dfrac{2}{7}$ of $\dfrac{3}{4}$ or $\dfrac{3}{5}$ of $\dfrac{5}{8}$ (ii) $\dfrac{1}{2}$ of $\dfrac{6}{7}$ or $\dfrac{2}{3}$ of $\dfrac{3}{7}$

Solution :

(i) $\dfrac{2}{7}$ of $\dfrac{3}{4} = \dfrac{2}{7} \times \dfrac{3}{4_2} = \dfrac{1 \times 3}{7 \times 2} = \dfrac{3}{14}$

$\dfrac{3}{5}$ of $\dfrac{5}{8} = \dfrac{3}{5} \times \dfrac{5}{8} = \dfrac{3}{8}$

Since in $\dfrac{3}{14}$ and $\dfrac{3}{8}$, their numerators are same and $14 > 8$.

$\therefore \quad \dfrac{3}{14} < \dfrac{3}{8}$ or $\dfrac{3}{8} > \dfrac{3}{14}$

Hence, $\dfrac{3}{5}$ of $\dfrac{5}{8} > \dfrac{2}{7}$ of $\dfrac{3}{4}$

(ii) $\dfrac{1}{2}$ of $\dfrac{6}{7}$ or $\dfrac{2}{3}$ of $\dfrac{3}{7}$

$\dfrac{1}{2}$ of $\dfrac{6}{7} = \dfrac{1}{2} \times \dfrac{6}{7} = \dfrac{1 \times 6}{2 \times 7} = \dfrac{6^3}{14_7} = \dfrac{3}{7}$

$\dfrac{2}{3}$ of $\dfrac{3}{7} = \dfrac{2}{3} \times \dfrac{3}{7} = \dfrac{2}{7}$

Here, denominators are same.

$\therefore \quad \dfrac{2}{7} < \dfrac{3}{7}$ or $\dfrac{3}{7} > \dfrac{2}{7}$

Hence, $\dfrac{1}{2}$ of $\dfrac{6}{7} > \dfrac{2}{3}$ of $\dfrac{3}{7}$
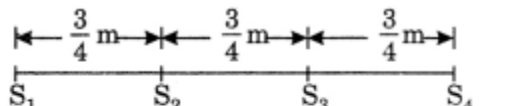
5 Saili plants 4 saplings, in a row, in her garden. The distance between two adjacent saplings is $\dfrac{3}{4}$ m. Find the distance between the first and the last sapling.

Solution :

Number of saplings = 4

Distance between two adjacent saplings = $\dfrac{3}{4}$ m

$\therefore$ Distance between the first and the last sapling

$= \dfrac{3}{4}$ m $+ \dfrac{3}{4}$ m $+ \dfrac{3}{4}$ m $= 3 \times \dfrac{3}{4}$ m

$= \dfrac{9}{4}$ m $= 2\dfrac{1}{4}$ m

6 Lipika reads a book for $1\frac{3}{4}$ hours everyday. She reads the entire book in 6 days. How many hours in all were required by her to read the book?

Solution;

In 1 day Lipika needs $1\frac{3}{4}$ hours

In 6 days Lipika will need $6 \times 1\frac{3}{4}$ hours

$= {}^{3}\cancel{6} \times \dfrac{7}{\cancel{4}_2}$ hours $= \dfrac{3 \times 7}{2}$ hours

$= \dfrac{21}{2}$ hours $= 10\frac{1}{2}$ hours

Ans : Lipika needed $10\frac{1}{2}$ hours to read the book.

7 A car runs 16 km using 1 litre of petrol. How much distance will it cover using $2\frac{3}{4}$ litres of petrol

Solution :

In 1 litre of petrol, the car covers 16 km distance In $2\frac{3}{4}$ litres of petrol, the car will cover

$2\frac{3}{4} \times 16$ km distance

$= 2\frac{3}{4} \times 16$ km $= \dfrac{11}{\cancel{4}} \times \cancel{16}^4$ km

$= 11 \times 4$ km $= 44$ km

8 (*a*) (*i*) Provide the number in the box $\boxed{}$, such that $\dfrac{2}{3} \times \boxed{} = \dfrac{10}{30}$.

(*ii*) The simplest form of the number obtained in $\boxed{}$ is _____ .

(*b*) (*i*) Provide the number in the box $\boxed{}$, such that $\dfrac{3}{5} \times \boxed{} = \dfrac{24}{75}$.

(*ii*) The simplest form of the number obtained in $\boxed{}$ is _____ .

Solution :

(a) (i) $\frac{2}{3} \times \boxed{} = \frac{10}{30}$ $\Rightarrow$ $\frac{2}{3} \times \frac{5}{10} = \frac{10}{30}$

Hence, the required number in $\boxed{}$ is $\frac{5}{10}$.

(ii) The simplest form of the number obtained

in $\boxed{}$ is $\frac{\cancel{5}}{\cancel{10}\,2} = \frac{1}{2}$.

(b) (i) $\frac{3}{5} \times \boxed{} = \frac{24}{75}$ $\Rightarrow$ $\frac{3}{5} \times \frac{8}{15} = \frac{24}{75}$

Hence, the required number in the box $\boxed{}$

is $\frac{24}{75}$.

Simplest form of $\frac{\cancel{24}\,8}{\cancel{75}\,25} = \frac{8}{25}$.

(ii) The simplest form of the number obtained

in $\boxed{}$ is $\frac{8}{25}$.

DIVISION OF FRACTIONS

1) To divide two fractions, multiply the first fraction by the reciprocal of the second fraction.

$$e.g. \ \frac{2}{3} \div \frac{4}{6} = \frac{2}{3} \times \frac{6}{4} = \frac{12}{12} = 1$$

2) The non – zero numbers whose product with each other is 1, are called the reciprocals of that number.

e.g. Reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$

3) While dividing a whole number by a mixed fraction, first convert the mixed fraction into an improper fraction and then solve.

$$e.g. \ 4 \div 2\frac{2}{5} = 4 \div \frac{12}{5} = 4 \times \frac{5}{12} = \frac{20}{12}$$

Short answers :

1. Find:

(i) $12 \div \frac{3}{4}$　　　(ii) $14 \div \frac{5}{6}$　　　(iii) $8 \div \frac{7}{3}$

(iv) $4 \div \frac{8}{3}$　　　(v) $3 \div 2\frac{1}{3}$　　　(vi) $5 \div 3\frac{4}{7}$

Solution

(i) $12 \div \dfrac{3}{4} = \cancel{12}^4 \times \dfrac{4}{\cancel{3}} = 4 \times 4 = 16$

(ii) $14 \div \dfrac{5}{6} = 14 \times \dfrac{6}{5}$

$\qquad = \dfrac{84}{5} = 16\dfrac{4}{5}$

$$\begin{array}{r} 5)\,\overline{84}\,(16 \\ -5 \\ \hline 34 \\ -30 \\ \hline 4 \end{array}$$

(iii) $8 \div \dfrac{7}{3} = 8 \times \dfrac{3}{7} = \dfrac{24}{7} = 3\dfrac{3}{7}$

$$\begin{array}{r} 7)\,\overline{24}\,(3 \\ -21 \\ \hline 3 \end{array}$$

(iv) $4 \div \dfrac{8}{3} = \cancel{4} \times \dfrac{3}{\cancel{8}_2} = \dfrac{3}{2} = 1\dfrac{1}{2}$

$$\begin{array}{r} 2)\,\overline{3}\,(1 \\ -2 \\ \hline 1 \end{array}$$

(v) $3 \div 2\dfrac{1}{3} = 3 \div \dfrac{7}{3} = 3 \times \dfrac{3}{7}$

$\qquad = \dfrac{9}{7} = 1\dfrac{2}{7}$

$$\begin{array}{r} 7)\,\overline{9}\,(1 \\ -7 \\ \hline 2 \end{array}$$

(vi) $5 \div 3\dfrac{4}{7} = 5 \div \dfrac{25}{7} = \cancel{5}^1 \times \dfrac{7}{\cancel{25}_5}$

$\qquad = \dfrac{7}{5} = 1\dfrac{2}{5}$

$$\begin{array}{r} 5)\,\overline{7}\,(1 \\ -5 \\ \hline 2 \end{array}$$

2 Find the reciprocal of each of the following fractions. Classify the reciprocals as proper fractions, improper fractions and whole numbers.

(i) $\dfrac{3}{7}$ ·   (ii) $\dfrac{5}{8}$ (iii) $\dfrac{9}{7}$ (iv) $\dfrac{6}{5}$

(v) $\dfrac{12}{7}$ (vi) $\dfrac{1}{8}$ (vii) $\dfrac{1}{11}$

Solution :

(i) Reciprocal of $\dfrac{3}{7}, = \dfrac{7}{3}$ which is improper fraction.

(ii) Reciprocal of $\dfrac{5}{8}, = \dfrac{8}{5},$ which is improper fraction.

(iii) Reciprocal of $\dfrac{9}{7}, = \dfrac{7}{9},$ which is proper fraction.

(iv) Reciprocal of $\dfrac{6}{5}, = \dfrac{5}{6}$ which is proper fraction.

(vi) Reciprocal of $\dfrac{12}{7} = \dfrac{7}{12}$ which is proper fraction.

(vi) Reciprocal of $\dfrac{1}{8} = 8,$ which is whole number.

(vii) Reciprocal of $\dfrac{1}{11} = 11,$ which is whole number.

3. Find

(i) $\dfrac{7}{3} \div 2$ (ii) $\dfrac{4}{9} \div 5$ (iii) $\dfrac{6}{13} \div 7$

(iv) $4\dfrac{1}{3} \div 3$ (v) $3\dfrac{1}{2} \div 4$ (vi) $4\dfrac{3}{7} \div 7$

Solution:

(i) $\dfrac{7}{3} \div 2 = \dfrac{7}{3} \times \dfrac{1}{2} = \dfrac{7}{6} = 1\dfrac{1}{6}$

$$\begin{array}{r} 6\,)\,\overline{7}\,(1 \\ -6 \\ \hline 1 \end{array}$$

(ii) $\dfrac{4}{9} \div 5 = \dfrac{4}{9} \times \dfrac{1}{5} = \dfrac{4}{45}$

(iii) $\dfrac{6}{13} \div 7 = \dfrac{6}{13} \times \dfrac{1}{7} = \dfrac{6}{91}$

(iv) $4\dfrac{1}{3} \div 3 = \dfrac{13}{3} \div 3 = \dfrac{13}{3} \times \dfrac{1}{3}$

$$\begin{array}{r} 9\,)\,\overline{13}\,(1 \\ -9 \\ \hline 4 \end{array}$$

$= \dfrac{13}{9} = 1\dfrac{4}{9}$

(v) $3\dfrac{1}{2} \div 4 = \dfrac{7}{2} \div 4 = \dfrac{7}{2} \times \dfrac{1}{4} = \dfrac{7}{8}$

(vi) $4\dfrac{3}{7} \div 7 = \dfrac{31}{7} \div 7 = \dfrac{31}{7} \times \dfrac{1}{7} = \dfrac{31}{49}$

4 Find ;

(i) $\dfrac{2}{5} \div \dfrac{1}{2}$ (ii) $\dfrac{4}{9} \div \dfrac{2}{3}$ (iii) $\dfrac{3}{7} \div \dfrac{8}{7}$

(iv) $2\dfrac{1}{3} \div \dfrac{3}{5}$ (v) $3\dfrac{1}{2} \div \dfrac{8}{3}$ (vi) $\dfrac{2}{5} \div 1\dfrac{1}{2}$

Solution

(i) $\dfrac{2}{5} \div \dfrac{1}{2} = \dfrac{2}{5} \times \dfrac{2}{1} = \dfrac{4}{5}$

(ii) $\dfrac{4}{9} \div \dfrac{2}{3} = \dfrac{\cancel{4}^{2}}{\cancel{9}_{3}} \times \dfrac{\cancel{3}^{1}}{\cancel{2}_{1}} = \dfrac{2}{3}$

(iii) $\dfrac{3}{7} \div \dfrac{8}{7} = \dfrac{3}{\cancel{7}} \times \dfrac{\cancel{7}}{8} = \dfrac{3}{8}$

(iv) $2\dfrac{1}{3} \div \dfrac{3}{5} = \dfrac{7}{3} \div \dfrac{3}{5} = \dfrac{7}{3} \times \dfrac{5}{3}$

$$\begin{array}{r} 9\,)\,\overline{35}\,(3 \\ -27 \\ \hline 8 \end{array}$$

$= \dfrac{35}{9} = 3\dfrac{8}{9}$

(v) $3\dfrac{1}{2} \div \dfrac{8}{3} = \dfrac{7}{2} \div \dfrac{8}{3} = \dfrac{7}{2} \times \dfrac{3}{8}$

$$\begin{array}{r} 16\,)\,\overline{21}\,(1 \\ -16 \\ \hline 5 \end{array}$$

$= \dfrac{21}{16} = 1\dfrac{5}{16}$

(vi) $\dfrac{2}{5} \div 1\dfrac{1}{2} = \dfrac{2}{5} \div \dfrac{3}{2} = \dfrac{2}{5} \times \dfrac{2}{3} = \dfrac{4}{15}$

(vii) $3\dfrac{1}{5} \div 1\dfrac{2}{3} = \dfrac{16}{5} \div \dfrac{5}{3} = \dfrac{16}{5} \times \dfrac{3}{5}$

$$\begin{array}{r} 25\,)\,\overline{48}\,(1 \\ -25 \\ \hline 23 \end{array}$$

$= \dfrac{48}{25} = 1\dfrac{23}{25}$

(viii) $2\dfrac{1}{5} \div 1\dfrac{1}{5} = \dfrac{11}{5} \div \dfrac{6}{5} = \dfrac{11}{\cancel{5}} \times \dfrac{\cancel{5}}{6}$

$$\begin{array}{r} 6\,)\,\overline{11}\,(1 \\ -6 \\ \hline 5 \end{array}$$

$= \dfrac{11}{6} = 1\dfrac{5}{6}$

DECIMAL NUMBRS AND PLAC VALUES

1) To divide a whole number by a mixed fraction

To divide a whole number by a mixed fraction, we first convert the mixed fraction into an improper fraction and then perform the division. Thus,

$$4 \div 2\frac{2}{5} = 4 \div \frac{12}{5} = 4 \times \frac{5}{12} = \frac{4 \times 5}{12} = \frac{20}{12} = \frac{20 \div 4}{12 \div 4} = \frac{5}{3}.$$

2) Division of a Fraction by a Whole Number

To divide a fraction by a whole number, we multiply that fraction by the reciprocal of that whole number. Thus,

$$\frac{3}{4} \div 3 = \frac{3}{4} \div \frac{3}{1} = \frac{3}{4} \times \frac{1}{3} = \frac{3 \times 1}{4 \times 3}$$

$$= \frac{3}{12} = \frac{3 \div 3}{12 \div 3} = \frac{1}{4}$$

$$\frac{2}{3} \div 7 = \frac{2}{3} \div \frac{7}{1} = \frac{2}{3} \times \frac{1}{7}$$

$$= \frac{2 \times 1}{3 \times 7} = \frac{2}{21}$$

$$\frac{5}{7} \div 6 = \frac{5}{7} \div \frac{6}{1} = \frac{5}{7} \times \frac{1}{6}$$

$$= \frac{5 \times 1}{7 \times 6} = \frac{5}{42}$$

$$\frac{2}{7} \div 8 = \frac{2}{7} \div \frac{8}{1} = \frac{2}{7} \times \frac{1}{8} = \frac{2 \times 1}{7 \times 8}$$

$$= \frac{2}{56} = \frac{2 \div 2}{56 \div 2} = \frac{1}{28}$$

3) To divide a mixed fraction by a whole number

While dividing mixed fractions by whole numbers, we convert the mixed fractions into improper fractions. Thus,

$$2\frac{3}{2} \div 5 = \frac{7}{2} \div 5 = \frac{7}{2} \div \frac{5}{1}$$

$$= \frac{7}{2} \times \frac{1}{5} = \frac{7 \times 1}{2 \times 5} = \frac{7}{10}$$

$$4\frac{2}{5} \div 3 = \frac{22}{5} \div 3 = \frac{22}{5} \div \frac{3}{1} = \frac{22}{5} \times \frac{1}{3}$$

$$= \frac{22 \times 1}{5 \times 3} = \frac{22}{15} = 1\frac{7}{15}$$

$$2\frac{3}{5} \div 2 = \frac{13}{5} \div 2 = \frac{13}{5} \div \frac{2}{1} = \frac{13}{5} \times \frac{1}{2}$$

$$= \frac{13 \times 1}{5 \times 2} = \frac{13}{10} = 1\frac{3}{10}$$

5) Division of a Fraction by Another Fraction

$$\frac{1}{3} \div \frac{5}{6} = \frac{1}{3} \times \text{reciprocal of } \frac{5}{6} = \frac{1}{3} \times \frac{6}{5} = \frac{1 \times 6}{3 \times 5} = \frac{6}{15} = \frac{6 \div 3}{15 \div 3} = \frac{2}{5}$$

$$\frac{1}{2} \div \frac{3}{4} = \frac{1}{2} \times \text{reciprocal of } \frac{3}{4} = \frac{1}{2} \times \frac{4}{3} = \frac{1 \times 4}{2 \times 3} = \frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$$

So, to divide a fraction (dividend) by a fraction (divisor), we multiply the fraction (dividend) by the reciprocal of the fraction (divisor).

Decimal number and its expanded form

Hundreds (100)	Tens (10)	Ones (1)	Tenths $\left(\frac{1}{10}\right)$	Hundredths $\left(\frac{1}{100}\right)$	Thousandths $\left(\frac{1}{1000}\right)$	Number
2	5	3	1	4	7	253.147
6	2	9	3	2	1	**629.321**
0	4	3	1	9	2	**43.192**
5	1	4	2	5	1	514.251
2	3	6	5	1	2	236.512
7	2	4	5	0	3	724.503
6	1	4	3	2	6	614.326
0	1	0	5	3	0	**10.53**

Using this table, we can write a decimal number in its expanded form also. For example:

$$253.147 = 2 \times 100 + 5 \times 10 + 3 \times 1 + 1 \times \left(\frac{1}{10}\right) + 4 \times \left(\frac{1}{100}\right) + 7 \times \left(\frac{1}{1000}\right)$$

$$629.321 = 6 \times 100 + 2 \times 10 + 9 \times 1 + 3 \times \left(\frac{1}{10}\right) + 2 \times \left(\frac{1}{100}\right) + 1 \times \left(\frac{1}{1000}\right)$$

$$43.192 = 4 \times 10 + 3 \times 1 + 1 \times \left(\frac{1}{10}\right) + 9 \times \left(\frac{1}{100}\right) + 2 \times \left(\frac{1}{1000}\right)$$

$$514.251 = 5 \times 100 + 1 \times 10 + 4 \times 1 + 2 \times \left(\frac{1}{10}\right) + 5 \times \left(\frac{1}{100}\right) + 1 \times \left(\frac{1}{1000}\right)$$

$$236.512 = 2 \times 100 + 3 \times 10 + 6 \times 1 + 5 \times \left(\frac{1}{10}\right) + 1 \times \left(\frac{1}{100}\right) + 2 \times \left(\frac{1}{1000}\right)$$

$$724.503 = 7 \times 100 + 2 \times 10 + 4 \times 1 + 5 \times \left(\frac{1}{10}\right) + 0 \times \left(\frac{1}{100}\right) + 3 \times \left(\frac{1}{1000}\right)$$

$$614.326 = 6 \times 100 + 1 \times 10 + 4 \times 1 + 3 \times \left(\frac{1}{10}\right) + 2 \times \left(\frac{1}{100}\right) + 6 \times \left(\frac{1}{1000}\right)$$

$$10.53 = 1 \times 10 + 0 \times 1 + 5 \times \left(\frac{1}{10}\right) + 3 \times \left(\frac{1}{100}\right)$$

Very short answers

1. **(i) 0.5 or 0.05**
(ii) 0.7 or 0.5
(iii) 7 or 0.7
(iv) 1.37 or 1.49
(v) 2.03 or 2.30
(vi) 0.8 or 0.88

Solutions:

i) 0.5 or 0.05
Comparing the tenths place, we get 5 > 0
∴ 0.5 > 0.05

ii) 0.7 or 0.5
Comparing the tenths place, we get 7 > 5
∴ 0.7 > 0.5

ii) 7 or 0.7
Comparing the one's place, we get 7 > 0
∴ 7 > 0.7

(iv) 1.37 or 1.49
Comparing the tenths place, we get 3 < 4
∴ 1.37 < 1.49 or 1.49 > 1.37

(v) 2.03 or 2.30
Comparing the tenths place, we get 0 < 3
∴ 2.03 < 2.30 or 2.30 > 2.03

(vi) 0.8 or 0.88 ⇒ 0.80 or 0.88
Since tenths place is same.
Comparing the hundredth place, we get 0 < 8
∴ 0.80 < 0.88 or 0.88 > 0.80

2. Express as rupees using decimals:

i) 7 paise
(ii) 7 rupees 7 paise
(iii) 77 rupees 77 paise
(iv) 50 paise
(v) 235 paise

Solution

(i) Since 1 rupee = 100 paise and 1 paise = $\dfrac{1}{100}$ rupees

7 paise = $\dfrac{7}{100}$ rupees = 0.07 rupees

(ii) 7 rupees 7 paise = 7 rupees + $\dfrac{7}{100}$ rupees

= 7.07 rupees

(iii) 77 rupees 77 paise = 77 rupees + $\dfrac{77}{100}$ rupees

= 77.77 rupees

(iv) 50 paise = $\dfrac{50}{100}$ rupees = 0.50 rupees

v) 235 paise = $\dfrac{235}{100}$ rupees = 2.35 rupees

3(i) Express 5 cm in metre and kilometre
(ii) Express 35 mm in cm, m and km..

Solution

i) 1 metre = 100 cm

1 kilometre = 1000 metre = 100 × 1000 cm

= 100000 cm

∴ 5 cm = $\dfrac{5}{100}$ metre = 0.05 metre

5 cm = $\dfrac{5}{100000}$ km = 0.00005 km

Hence, 5 cm = 0.05 m and 0.00005 km

ii) 1 cm = 10 mm and 1 km = 100000 cm

∴ 35 mm = $\dfrac{35}{10}$ cm = 3.5 cm,

35 mm = $\dfrac{35}{1000}$ m = 0.035 m

35 mm = $\dfrac{35}{1000000}$ km = 0.000035 km

Hence, 35 mm = 3.5 cm, 0.035 m and 0.000035 km.

4. Express in kg:
   (i) 200 g
   (ii) 3470 g
   (iii) 4 kg 8 g

Solution:

i) 200g = $\frac{200}{1000}$ kg [∵ 1 kg = 1000g]
   = 0.2 kg

(ii) 3470 g = $\frac{3470}{10000}$ = 3.47 kg [∵ 1 kg = 1000 g]

(iii) 4 kg 8 g = 4 kg + $\frac{8}{10000}$ kg [∵ 1 kg = 1000 g]
   = 4 kg + 0.008 kg = 4.008 kg

5. Write the following decimal numbers in the expanded form:

  (i) 20.03
 (ii) 2.03
 (iii) 200.03
 (iv) 2.034

Solution:
(i) 20.03 = 2 × 10 + 0 × 1 + 0 × $\frac{1}{10}$ + 3 × $\frac{1}{100}$
(ii) 2.03 = 2 × 1 + 0 × $\frac{1}{10}$ + 3 × $\frac{1}{100}$
(iii) 200.03 = 2 × 100 + 0 × 10 + 0 × 1 + 0 × $\frac{1}{10}$ +3 × $\frac{1}{100}$
(iv) 2.034 = 2 × 1 + 0 × $\frac{1}{10}$+ 3 × $\frac{1}{100}$ + 4 × $\frac{1}{1000}$

6 Write the place value of 2 in the following decimal numbers:

  (i) 2.56
 (ii) 21.37
 (iii) 10.25
 (iv) 9.42
 (v) 63.352

Solution:

(i) Place value of 2 in 2.56 = 2 × 1 = 2 i.e. ones

(ii) Place value of 2 in 21.37 = 2 × 10 = 20 i.e. tens

(iii) Place value of 2 in 10.25 = $\dfrac{2}{10}$ = 0.2 i.e. tenths

(iv) Place value of 2 in 9.42 = $\dfrac{2}{100}$ = 0.02 i.e. hundredths

(v) Place value of 2 in 63.352 = $\dfrac{2}{1000}$ = 0.002 i.e. thousandths.

Long Answers

7 Dinesh went from place A to place B and from there to place C. A is 7.5 km from B and B is 12.7 km from C. Ayub went from place A to place D and from there to place C. D is 9.3 km from A and C is 11.8 km from D. Who travelled more and by how much?

Solution

Distance travelled by Dinesh from A to C
= AB + BC
= 7.5 km +- 12.7 km
= 20.2 km
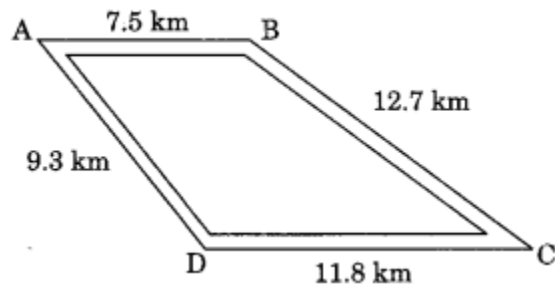
Distance travelled by Ayub from A to C
= AD + DC
= 9.3 km + 11.8 km = 21.1 km
Since 21.1 km > 20.2 km.
Hence, Ayub travelled more distance.

Answer : Ayub travelled more distance.

8. Shyama bought 5 kg 300 g apples and 3 kg 250 g mangoes. Sarala bought 4 kg 800 g oranges and 4 kg 150 g bananas. Who bought more fruits?

Solution

Fruits bought by Shyama
= 5 kg 300 g apples + 3 kg 250 g mangoes
= 5.300 kg apples + 3.250 kg mangoes
= 8.550 kg of fruits
Fruits bought by Sarala
= 4 kg 800 g oranges +- 4 kg 150 g bananas
= 4.800 kg oranges + 4.150 kg bananas
= 8.950 kg of fruits
Since 8.950 kg > 8.550 kg
Hence, Sarala bought more fruits.

9. **How much less is 28 km than 42.6 km?**
Solution
Since 28 km < 42.6 km

$$
\begin{array}{r}
42.6 \text{ km} \\
- \ 28.0 \text{ km} \\
\hline
14.6 \text{ km} \\
\hline
\end{array}
$$

Hence, 28 km is less than 42.6 km by 14.6 km.

MULTIPLICATION OF DCIMAL NUMBERS

1) Place – value expansion of decimal number.
   e.g. 253.417

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths	Number
2	5	3	4	1	7	253.417

2). When a decimal number is multiplied by 10, 100 or 1000, the digits in the product are same as in the decimal number but the decimal point in the product is shifted to the right by as, many of places as there are zeroes over one.
e.g. $0.07 \times 10 = 0.7$
$0.07 \times 100 = 7$
$0.07 \times 1000 = 70$

3) To multiply two decimal numbers, first, multiply them as whole numbers. Count the number of digits to the right of the decimal point in both the numbers. Add the number of digits counted. Put the decimal point in the product by counting the number of digits equal to the sum obtained from its rightmost place.
e.g. $1.2 \times 2.43 = 2.916$.

3) While dividing a number by 10,100 or 1000, the digits of the number and the quotient are same but the decimal point in the quotient shifts to the loft by as many places as there are zeroes over 1.

e.g. $2.38 \div 10 = 0.238$

$2.38 \div 100 = 0.0238$

$2.38 \div 1000 = 0.00238$

4) While dividing one decimal number by another, first shift the decimal points to the right by equal number of places in both, to convert the divisor to a natural number and then divide.

e.g. $\dfrac{1.44}{1.2} = \dfrac{14.4}{12} = 1.2$

5) **To divide a decimal number by a whole number,** we first divide them as whole numbers. Then place the decimal point in the quotient as in the decimal number.

e.g. $\dfrac{8.4}{4} = 2.1$

6) **Product of two proper fractions:** When two proper fractions are multiplied, the product is less than both the fractions or, we say the size of the product of two proper fractions is smaller than the size of each of the two fractions.

Examples:

$\dfrac{2}{3} \times \dfrac{4}{5} = \dfrac{8}{15}$	$\dfrac{8}{15} < \dfrac{2}{3},$	$\dfrac{8}{15} < \dfrac{4}{5}$	Product is less than both the fractions
$\dfrac{1}{5} \times \dfrac{2}{7} = \dfrac{2}{35}$	$\dfrac{2}{35} < \dfrac{1}{5},$	$\dfrac{2}{35} < \dfrac{2}{7}$	Product is less than both the fractions
$\dfrac{3}{5} \times \dfrac{7}{8} = \dfrac{21}{40}$	$\dfrac{21}{40} < \dfrac{3}{5},$	$\dfrac{21}{40} < \dfrac{7}{8}$	Product is less than both the fractions
$\dfrac{2}{5} \times \dfrac{4}{9} = \dfrac{8}{45}$	$\dfrac{8}{45} < \dfrac{2}{5},$	$\dfrac{8}{45} < \dfrac{4}{9}$	Product is less than both the fractions

7) **Product of two Improper Fractions:** The product of two improper fractions is greater than each of the two fractions. In this case, the size of the product is more than the size of each of the two fractions.

Examples

$\dfrac{7}{3} \times \dfrac{5}{2} = \dfrac{35}{6}$	$\dfrac{35}{6} > \dfrac{7}{3}, \quad \dfrac{35}{6} > \dfrac{5}{2}$	Product is greater than both the fractions
$\dfrac{6}{5} \times \dfrac{4}{3} = \dfrac{24}{15}$	$\dfrac{24}{15} > \dfrac{6}{5}, \quad \dfrac{24}{15} > \dfrac{4}{3}$	Product is greater than both the fractions
$\dfrac{9}{2} \times \dfrac{7}{4} = \dfrac{63}{8}$	$\dfrac{63}{8} > \dfrac{9}{2}, \quad \dfrac{63}{8} > \dfrac{7}{4}$	Product is greater than both the fractions
$\dfrac{3}{2} \times \dfrac{8}{7} = \dfrac{24}{14}$	$\dfrac{24}{14} > \dfrac{3}{2}, \quad \dfrac{24}{14} > \dfrac{8}{7}$	Product is greater than both the fractions
$\dfrac{7}{4} \times \dfrac{5}{3} = \dfrac{35}{12}$	$\dfrac{35}{12} > \dfrac{7}{4}, \quad \dfrac{35}{12} > \dfrac{5}{3}$	Product is greater than both the fractions
$\dfrac{6}{5} \times \dfrac{7}{3} = \dfrac{42}{15}$	$\dfrac{42}{15} > \dfrac{6}{5}, \quad \dfrac{42}{15} > \dfrac{7}{3}$	Product is greater than both the fractions
$\dfrac{9}{5} \times \dfrac{7}{4} = \dfrac{63}{20}$	$\dfrac{63}{20} > \dfrac{9}{5}, \quad \dfrac{63}{20} > \dfrac{7}{4}$	Product is greater than both the fractions
$\dfrac{3}{2} \times \dfrac{9}{5} = \dfrac{27}{10}$	$\dfrac{27}{10} > \dfrac{3}{2}, \quad \dfrac{27}{10} > \dfrac{9}{5}$	Product is greater than both the fractions
$\dfrac{5}{4} \times \dfrac{9}{2} = \dfrac{45}{8}$	$\dfrac{45}{8} > \dfrac{5}{4}, \quad \dfrac{45}{8} > \dfrac{9}{2}$	Product is greater than both the fractions

8) Division of the Whole Number by a Fraction

   Reciprocal of a fraction

   Observe these products:

$$7 \times \frac{1}{7} = 1 \qquad\qquad \frac{5}{4} \times \frac{4}{5} = 1$$

$$\frac{1}{9} \times 9 = 1 \qquad\qquad \frac{2}{7} \times \frac{7}{2} = 1$$

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

9) To divide a whole number by a fraction

To divide a whole number by any fraction, we multiply that whole number by the reciprocal of that fraction. Thus,

$$1 \div \frac{1}{2} \;=\; 1 \times \frac{2}{1} \;=\; 1 \times \text{reciprocal of } \frac{1}{2}$$

$$3 \div \frac{1}{2} \;=\; \mathbf{3 \times 2} = 3 \times \textbf{reciprocal of } \frac{1}{2}$$

So, $\quad 2 \div \dfrac{3}{4} = 2 \times \text{reciprocal of } \dfrac{3}{4} = 2 \times \dfrac{4}{3}$

1.Short answers

Q1 : Find:

(i) 0.2 x 6 (ii) 8 x 4.6 (iii) 2.71 x 5

(iv) 20.1 x 4 (v) 0.05 x 7 (vi) 211.02 x 4

(vii) 2 x 0.86

Answer :

(i) $0.2 \times 6 = \dfrac{2}{10} \times 6 = \dfrac{12}{10} = 1.2$

(ii) $8 \times 4.6 = 8 \times \dfrac{46}{10} = \dfrac{368}{10} = 36.8$

(iii) $2.71 \times 5 = \dfrac{271}{100} \times 5 = \dfrac{1355}{100} = 13.55$

(iv) $20.1 \times 4 = \dfrac{201}{10} \times 4 = \dfrac{804}{10} = 80.4$

(v) $0.05 \times 7 = \dfrac{5}{100} \times 7 = \dfrac{35}{100} = 0.35$

(vi) $211.02 \times 4 = \dfrac{21102}{100} \times 4 = \dfrac{84408}{100} = 844.08$

(vii) $2 \times 0.86 = 2 \times \dfrac{86}{100} = \dfrac{172}{100} = 1.72$

2. Find the area of rectangle whose length is 5.7cm and breadth is 3 cm.

Answer :

Length = 5.7 cm

Breadth = 3 cm

Area = Length x Breadth

= 5.7 x 3 = 17.1 cm²

3 Find

(i) 1.3 x 10 (ii) 36.8 x 10 (iii) 153.7 x 10

(iv) 168.07 x 10 (v) 31.1 x 100 (vi) 156.1 x 100

(vii) 3.62 x 100 (viii) 43.07 x 100 (ix) 0.5 x 10

(x) 0.08 x 10 (xi) 0.9 x 100 (xii) 0.03 x 1000

Answer

When a decimal number is multiplied with 10, 100, 1000 the decimal point is shifted to to the right by as many places as zeros are there. Therefore, these products can be calculated as

(i) 1.3 x 10 = 13

(ii) 36.8 x 10 = 368

(iii) 153.7 x 10 = 1537

(vi) 168.07 x 10 = 1680.7

(v) 31.1 x 100 = 3110

(vi) 156.1 x 100 = 15610

(vii) 3.62 x 100 = 362

(viii) 43.07 x 100 = 4307

(ix) 0.5 x 10 = 5

(x) 0.08 x 10 = 0.8

(xi) 0.9 x 100 = 90

(xiii) 0.03 x 1000 = 30

4. A two-wheeler cover s a distance of 55.3 km in one litre of petrol. How much distance will it cover I 10 litres of petrol ?

Distance covered in 1 litre of petrol = 55.3 km

Distance covered in 10litre of petrol = 10 x 55.3 = 553 km

Therefore, it will cover 553 km distance in 10 litre petrol.

5. Find

(i) 2.5 x 0.3 (ii) 0.1 x 51.7 (iii) 0.2 x 316.8

(iv) 1.3 x 3.1 (v) 0.5 x 0.05 (vi) 11.2 x 0.15

(vii) 1.07 x 0.02 (viii) 10.05 x 1.05 (ix) 101.01 x 0.01

(x) 100.01 x 1.1

(i) $2.5 \times 0.3 = \dfrac{25}{10} \times \dfrac{3}{10} = \dfrac{75}{100} = 0.75$

(ii) $0.1 \times 51.7 = \dfrac{1}{10} \times \dfrac{517}{10} = \dfrac{517}{100} = 5.17$

(iii) $0.2 \times 316.8 = \dfrac{2}{10} \times \dfrac{3168}{10} = \dfrac{6336}{100} = 63.36$

(iv) $1.3 \times 3.1 = \dfrac{13}{10} \times \dfrac{31}{10} = \dfrac{403}{100} = 4.03$

(v) $0.5 \times 0.05 = \dfrac{5}{10} \times \dfrac{5}{100} = \dfrac{25}{1000} = 0.025$

(vi) $11.2 \times 0.15 = \dfrac{112}{10} \times \dfrac{15}{100} = \dfrac{1680}{1000} = 1.680 = 1.68$

(vii) $1.07 \times 0.02 = \dfrac{107}{100} \times \dfrac{2}{100} = \dfrac{214}{10000} = 0.0214$

EXERCISE 2.7

Short answers

1 Find :

(i) $0.4 \div 2$
(ii) $0.35 \div 5$
(iii) $2.48 \div 4$
(iv) $65.4 \div 6$
(v) $651.2 \div 4$
(vi) $14.49 \div 7$
(vii) $3.96 \div 4$
(viii) $0.80 \div 5$

SOLUTION

$(i)\ \mathbf{0.4 \div 2} = \dfrac{4}{10} \div 2 = \dfrac{4}{10} \times \dfrac{1}{2} = \dfrac{1}{10} \times \dfrac{4}{2}$

$= \dfrac{1}{10} \times 2 = 0.2$

$(ii)\ \mathbf{0.35 \div 5} = \dfrac{35}{100} \div 5 = \dfrac{35}{100} \times \dfrac{1}{5}$

$= \dfrac{1}{100} \times \dfrac{35}{5} = \dfrac{1}{100} \times 7 = 0.07$

$(iii)\ \mathbf{2.48 \div 4} = \dfrac{248}{100} \div 4 = \dfrac{248}{100} \times \dfrac{1}{4}$

$= \dfrac{1}{100} \times \dfrac{248}{4} = \dfrac{1}{100} \times 62 = 0.62$

(iv) $65.4 \div 6 = \dfrac{654}{10} \div 6 = \dfrac{654}{10} \times \dfrac{1}{6}$

$\quad\quad\quad = \dfrac{1}{10} \times \dfrac{654}{6} = \dfrac{1}{10} \times 109 = 10.9$

(v) $651.2 \div 4 = \dfrac{6512}{10} \div 4 = \dfrac{6512}{10} \times \dfrac{1}{4}$

$\quad\quad\quad = \dfrac{1}{10} \times \dfrac{6512}{4} = \dfrac{1}{10} \times 1628 = 162.8$

(vi) $14.49 \div 7 = \dfrac{1449}{100} \div 7 = \dfrac{1449}{100} \times \dfrac{1}{7}$

$\quad\quad\quad = \dfrac{1}{100} \times \dfrac{1449}{7} = \dfrac{1}{100} \times 207 = 2.07$

(vii) $3.96 \div 4 = \dfrac{396}{100} \div 4 = \dfrac{396}{100} \times \dfrac{1}{4}$

$\quad\quad\quad = \dfrac{1}{100} \times \dfrac{396}{4} = \dfrac{1}{100} \times 99 = 0.99$

(viii) $0.80 \div 5 = \dfrac{80}{100} \div 5 = \dfrac{80}{100} \times \dfrac{1}{5}$

$\quad\quad\quad = \dfrac{1}{100} \times \dfrac{80}{5} = \dfrac{1}{100} \times 16 = 0.16$

2 Find

(i) $4.8 \div 10$

(ii) $52.5 \div 10$

(iii) $0.7 \div 10$

(iv) $33.1 \div 10$

(v) $272.23 \div 10$

(vi) $0.56 \div 10$

(vii) $3.97 \div 10$

Solution

(i) $4.8 \div 10 = 0.48$ (Shifting the decimal point to the left by 1 place)

(ii) $52.5 \div 10 = 5.25$ (Shifting the decimal point to the left by 1 place)

(iii) $0.7 \div 10 = 0.07$ (Shifting the decimal point to the left by 1 place)

(iv) $33.1 \div 10 = 3.31$ (Shifting the decimal point to the left by 1 place)

(v) $272.23 \div 10 = 27.223$ (Shifting the decimal point to the left by 1 place)

(vi) 0.56 4- $10 = 0.056$ (Shifting the decimal point to the left by 1 place)

(vii) $3.97 \div 10 = 0.397$ (Shifting the decimal point to the left by 1 place)

3 Find

(i) $2.7 \div 100$

(ii) $0.3 \div 100$

(iii) $0.78 \div 100$

(iv) $432.6 \div 100$

(v) $23.6 \div 100$

(vi) $98.53 \div 100$

Solution

(i) 2.7 ÷ 100 = 0.027   (Shifting the decimal point to the left by 2 places)
(ii) 0.3 ÷ 100 = 0.003 (Shifting the decimal point to the left by 2 places)
(iii) 0.78 ÷ 100 = 0.0078 (Shifting the decimal point to the left by 2 places)
(iv) 432.6 ÷ 100 = 4.326 (Shifting the decimal point to the left by 2 places)
(v) 23.6 ÷ 100 = 0.236   (Shifting the decimal point to the left by 2 places)
(vi) 98.53 ÷ 100 = 0.9853 (Shifting the decimal point to the left by 2 places)

4 Find

i) 7.9 ÷ 1000
(ii) 26.3 ÷ 1000
(iii) 38.53 ÷ 1000
(iv) 128.9 ÷ 1000
(v) 0.5 ÷ 1000

(i) 7.9 ÷ 1000 = 0.0079 (Shifting the decimal point to the left by 3 places)
(ii) 26.3 ÷ 1000 = 0.0263 (Shifting the decimal point to the left by 3 places)
(iii) 38.53 ÷ 1000 = 0.03853 (Shifting the decimal point to the left by 3 places)
(iv) 128.9 ÷ 1000 = 0.1289 (Shifting the decimal point to the left by 3 places)
(v) 0.5 ÷ 1000 = 0.0005   (Shifting the decimal point to the left by 3 places)

5 Find

(i) 7 ÷ 3.5
(ii) 36 ÷ 0 .2
(iii) 3.25 ÷ 0.5
(iv) 30.94 ÷ 0.7
(v) 0.5 ÷ 0.25
(vi) 7.75 ÷ 0.25
(vii) 76.5 ÷ 0.15
(viii) 37.8 ÷ 1.4
(ix) 2.73 ÷ 1.3

Solution

$$(i)\ 7 \div 3.5 = \frac{7}{3.5} = \frac{70}{35} = 2$$

$$(ii)\ 36 \div 0.2 = \frac{36}{0.2} = \frac{360}{2} = 180$$

$$(iii)\ 3.25 \div 0.5 = \frac{3.25}{0.5} = \frac{325}{50} = \frac{1}{10} \times \frac{325}{5}$$

$$= \frac{1}{10} \times 65 = 6.5$$

$$(iv)\ 30.94 \div 0.7 = \frac{30.94}{0.7} = \frac{3094}{70} = \frac{1}{10} \times \frac{3094}{7}$$

$$= \frac{1}{10} \times 442 = 44.2$$

(v) $0.5 \div 0.25 = \dfrac{0.5}{0.25} = \dfrac{50}{25} = 2$

(vi) $7.75 \div 0.25 = \dfrac{7.75}{0.25} = \dfrac{775}{25} = 31$

(vii) $76.5 \div 0.15 = \dfrac{76.5}{0.15} = \dfrac{7650}{15} = 510$

(viii) $37.8 \div 1.4 = \dfrac{37.8}{1.4} = \dfrac{378}{14} = 27$

(ix) $2.73 \div 1.3 = \dfrac{2.73}{1.3} = \dfrac{2.73}{1.30} = \dfrac{273}{130}$

$= \dfrac{1}{10} \times \dfrac{273}{13} = \dfrac{1}{10} \times 21 = 2.1$

6 A vehicle covers a distance of 43.2 km in 2.4 litres of Petrol. How much distance will it cover in one litre of petrol?

Solution

.4 litres of petrol is required to cover 43.2 km distance

$\therefore$ 1 litre of petrol will be required to cover 43.2

$= \dfrac{43.2}{2.4}$ km distance

$= \dfrac{432}{24}$ km $= 18$ km

Hence, the required distance = 18 km