# FRACTIONAL NUMBER AND FUNDAMENTAL OPERATIONS

Fraction

When a number quantity or an object is divided into equal parts, one or more of such equal parts is known as fraction. It is formed as $\dfrac{x}{y}$, where $y \neq 0$, which represents x number of parts out of y number of equal parts of a object. Every fraction has a numerator and a denominator.

Here, x is called numerator and y is called denominator. *Some figures are given below to understand the fraction in better way.*
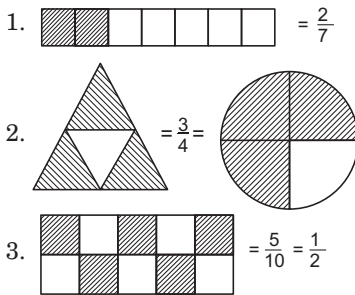
Types of Fraction
Proper Fraction

If numerator is less than the denominator of a fraction, then fraction is called proper fraction.

e.g. $\dfrac{8}{11}, \dfrac{4}{9}, \dfrac{19}{27}$ etc.

↗ *The value of proper fraction is always less than* 1.

Improper Fraction

A fraction whose numerator is equal to or greater than the denominator is called an improper fraction.

e.g. $\dfrac{17}{12}, \dfrac{12}{7}, \dfrac{18}{5}$ etc.

↗ *The value of an improper fraction is always more than or equal to* 1.

Mixed Fraction

A fraction combined with whole number part and a fractional part is called mixed fraction.

e.g. $1\dfrac{7}{16}, 2\dfrac{9}{4}, 3\dfrac{4}{11}$ etc.

Equivalent Fractions

Equivalent fractions can be defined as fractions with different numerators and denominators that represent the same value or proportion of the whole.

e.g. $\dfrac{3}{5}, \dfrac{6}{10}, \dfrac{30}{50}$ etc are equal

↗ *The representation of the same ratio as multiplying or dividing numerator and denominator by common factor does not alter the value of the fraction.*

Reciprocal Fraction

If numerator and denominator of a fraction are interchange to each other, then the new fraction is called a reciprocal fraction.

e.g. Reciprocal fraction of $\dfrac{4}{5}$ is $\dfrac{5}{4}$.

Addition of Fractions

When Denominators are Equal Here, we simply add the numerators and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\dfrac{1}{9} + \dfrac{8}{9} + \dfrac{5}{9} = \dfrac{1+8+5}{9} = \dfrac{14}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we add all the whole part and simply add the numerator and keep and denominator same as all the denominators of the fraction are given same. And lastly we sum up these two parts and get the final result.

e.g. $7\dfrac{2}{8} + 4\dfrac{1}{8} + 3\dfrac{3}{8} = (7 + 4 + 3) + \dfrac{2 + 1 + 3}{8}$

$$= 14 + \dfrac{6}{8} = 14\dfrac{6}{8}$$

When Denominators are Unequal

If denominators are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator further sum up numerator.

e.g. $\dfrac{5}{3} + \dfrac{2}{5} + \dfrac{3}{10}$

Here, LCM (3, 5, 10) = 30

$\therefore \qquad \dfrac{5}{3} = \dfrac{5}{3} \times \dfrac{10}{10} = \dfrac{50}{30}, \dfrac{2}{5} = \dfrac{2}{5} \times \dfrac{6}{6} = \dfrac{12}{30}$

and $\qquad \dfrac{3}{10} = \dfrac{3}{10} \times \dfrac{3}{3} = \dfrac{9}{30}$

$\therefore \qquad \dfrac{5}{3} + \dfrac{2}{5} + \dfrac{3}{10} = \dfrac{50 + 12 + 9}{30} = \dfrac{71}{30}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we add all the whole part and fraction part make equivalent fraction having same denominator and further sum up numerator.

e.g., $5\dfrac{2}{3} + 4\dfrac{1}{2} + 3\dfrac{1}{6} = (5 + 4 + 3) + \left(\dfrac{2}{3} + \dfrac{1}{2} + \dfrac{1}{6}\right)$

$$= 12 + \left(\dfrac{2 \times 2 + 3 \times 1 + 1 \times 1}{6}\right)$$

$$= 12 + \dfrac{8}{6} = 12 + \dfrac{4}{3} = 12 + 1\dfrac{1}{3}$$

$$= 12 + 1 + \dfrac{1}{3} = 13\dfrac{1}{3}$$

Subtraction of Fractions

The method of subtraction of fraction is same as that of their addition. Here, we have to take care regarding signs.

When Denominators are Equal

Here, we simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\qquad \dfrac{8}{9} - \dfrac{4}{9} - \dfrac{2}{9} = \dfrac{8 - 4 - 2}{9} = \dfrac{2}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we subtract all the whole part and simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same as. And lastly we sum up there two parts and get the final result.

e.g. $\quad 8\dfrac{7}{4} - 4\dfrac{5}{4} = (8 - 4) + \dfrac{7 - 5}{4} = 4 + \dfrac{2}{4} = 4\dfrac{2}{4}$

When Denominators are Unequal

If denominator are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator. Further subtract the numerator

e.g. $\quad \dfrac{2}{3} - \dfrac{1}{2} = \dfrac{2 \times 2 - 1 \times 3}{6} = \dfrac{4 - 3}{6} = \dfrac{1}{6}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we subtract all the whole part and fraction part make equivalent fraction having same denominators and further subtract the numerator.

e.g. $\quad 9\dfrac{1}{3} - 8\dfrac{1}{4} = (9 - 8) + \dfrac{1}{3} - \dfrac{1}{4} = 1 + \dfrac{1 \times 4 - 1 \times 3}{3 \times 4}$

$$= 1 + \dfrac{1}{12} = 1\dfrac{1}{12}$$

Multiplication of Fractions

- Convert the mixed fraction, if any into improper fraction.
- Multiply the numerators which gives the numerator of the product and multiply the denominators to get the denominator of the product.

(i) $\dfrac{1}{3} \times \dfrac{2}{3} = \dfrac{1 \times 2}{3 \times 3} = \dfrac{2}{9}$

(ii) $1\dfrac{2}{3} \times 2\dfrac{3}{1} = \dfrac{5}{3} \times \dfrac{5}{1} = \dfrac{5 \times 5}{3 \times 1} = \dfrac{25}{3}$

Division of Fractions

- First convert mixed fraction into improper fraction, if any is given.
- In division of fraction first of all interchange the position of numerator and denominator of the second fraction.

Now, multiply of first fractioni and interchange second fraction.

e.g. $\dfrac{1}{4} \div \dfrac{1}{2} = \dfrac{1}{4} \times \dfrac{2}{1} = \dfrac{2}{4} = \dfrac{1}{2}$

LCM and HCF of Fractions

Suppose we have fractional number of the form $\frac{a}{b}, \frac{c}{d}$ and $\frac{e}{f}$, then

$$\text{LCM of fractions} = \frac{\text{LCM of numerators } (a, c, e)}{\text{HCF of denominators } (b, d, f)}$$

and $\text{HCF of fractions} = \dfrac{\text{HCF of numerators } (a, c, e)}{\text{LCM of denominators}(b, d, f)}$

Example Find the LCM and HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$.

    (1) $\frac{45}{4}, \frac{1}{48}$ (2) $\frac{35}{4}, \frac{1}{24}$ (3) $\frac{25}{4}, \frac{1}{12}$ (4) $\frac{1}{12}, \frac{25}{4}$

Sol.   **(1)** LCM of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{LCM of 3, 5, 9}}{\text{HCF of 8, 12, 16}} = \frac{45}{4}$$

HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{HCF of 3, 5, 9}}{\text{LCM of 8, 12, 16}} = \frac{1}{48}$$

Comparison of Fraction

Firstly, we change the given fraction in decimal fraction and compare them from compare, we can write of fractions in ascending and descending orders.

e.g.

(i) greater fraction in $\frac{1}{2}, \frac{3}{4}$ and $\frac{5}{6}$

$$\frac{1}{2} = 0.5; \frac{3}{4} = 0.75; \frac{5}{6} = 0.833\ldots$$

So, $\frac{5}{6}$ is greater fraction.

(ii) Descending order of $\frac{7}{12}, \frac{5}{8}$ and $\frac{11}{15}$ can be determined as the following way.

$$\frac{7}{12} = 0.59, \frac{5}{8} = 0.63, \quad \frac{11}{15} = 0.74$$

Clearly, $0.74 > 0.63 > 0.59$

$\therefore$ $\dfrac{11}{15} > \dfrac{5}{8} > \dfrac{7}{12}$

Important Facts

- In two or more fractions, if denominators are same, then fraction with greater numerator is greater and fraction with lesser numerator is lesser.
- In two or more fractions, if numerators are same, then fraction with greater denominator is lesser and fraction with lesser denominator is greater.
- If difference between numerator and denominator of given fractions are same then the fraction having the greatest numerator is greatest and the fraction having the lowest numerator is lowest.

Entrance Corner

1. There are 500 eggs in a box. $\frac{3}{25}$ got broken, $\frac{4}{5}$ of the remaining eggs were sold. The number of eggs left is

  (1) 80   (2) 88   **[JNV 2019]**
  (3) 40   (4) 36

2. A drum is $\frac{2}{3}$ full, if 50 L more required to fill it up, how much is the capacity of the drum?   **[JNV 2019]**

  (1) 150 L   (2) 120 L
  (3) 100 L   (4) 90 L

3. $\frac{3}{4}$th of 144 is how much greater than $\frac{2}{3}$rd of 96?   **[JNV 2015]**

  (1) 20   (2) 44
  (3) 54   (4) 64

4. 1/5th part of a drum is filled with milk. What is the capacity of drum if it require 28 L more to fall the drum completely?   **[JNV 2014]**

  (1) 30 L   (2) 32 L
  (3) 35 L   (4) 140 L

5. $\frac{1}{3}$rd of a drum is filled with water. If need another 60 L water to filled whole drum, then what is the capacity of drum?   **[JNV 2013]**

  (1) 120 L   (2) 90 L   (3) 60 L   (4) 30 L

6. What should be taken out of $\frac{3}{7}$ to get $\frac{2}{7}$?   **[JNV 2012]**

  (1) $\frac{5}{7}$ (2) 1   (3) $\frac{1}{7}$ (4) $\frac{3}{7}$

7. $\frac{1}{3}$rd of a property is worth ₹ 1500.Find $\frac{1}{5}$th of the property. **[JNV 2012]**

(1) ₹ 600   (2) ₹ 900   (3) ₹ 1200   (4) ₹ 1000

8. The sum of the fraction $\frac{2}{9}$, $\frac{4}{3}$ and $\frac{6}{18}$ is **[JNV 2011]**

(1) $\frac{17}{9}$ (2) $\frac{16}{9}$

(3) $\frac{2}{5}$ (4) $\frac{11}{18}$

9. The value of $5-\left(2\frac{1}{2}-\frac{3}{4}\right)+\left(3\frac{1}{2}-1\frac{1}{4}\right)$ is **[JNV 2007]**

(1) $4\frac{1}{2}$ (2) $5\frac{1}{2}$

(3) $5\frac{1}{4}$ (4) $3\frac{1}{2}$

10. Which of the following numbers are in ascending order? **[JNV 2004]**

(1) $\frac{1}{3}, \frac{1}{2}, 0.25$ (2) $0.25, \frac{1}{2}, \frac{1}{3}$

(3) $0.25, \frac{1}{3}, \frac{1}{2}$ (4) $\frac{1}{2}, \frac{1}{3}, 0.25$

11. The sum of the fractions $\frac{4}{3}$, $\frac{5}{9}$ and $\frac{6}{18}$ is **[JNV 2003]**

(1) $\frac{2}{5}$ (2) $\frac{11}{18}$

(3) $\frac{19}{9}$ (4) $\frac{20}{9}$

12. The product of two numbers is $\frac{5}{4}$. If one number is $\frac{5}{6}$, what is the other number? **[JNV 2002]**

(1) 2   (2) $\frac{1}{2}$ (3) $\frac{3}{2}$ (4) $\frac{2}{3}$

13. The correct arrangement of the fractional numbers $\frac{17}{25}$, $\frac{17}{13}$, $\frac{17}{19}$ and $\frac{17}{27}$ in ascending order is **[JNV 2001]**

(1) $\frac{17}{19}, \frac{17}{13}, \frac{17}{27}, \frac{17}{25}$ (2) $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$

(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$ (4) $\frac{17}{13}, \frac{17}{25}, \frac{17}{19}, \frac{17}{27}$

14. Which of the following is the largest fraction? **[JNV 2000]**

(1) $\frac{5}{6}$ (2) $\frac{9}{10}$ (3) $\frac{7}{9}$ (4) $\frac{10}{11}$

15. Which of the following is the smallest fraction? **[JNV 1999]**

(1) $\frac{1}{10}$ (2) $\frac{2}{15}$ (3) $\frac{3}{8}$ (4) $\frac{4}{9}$

16. $\frac{5}{6}$ of an hour is equal to **[JNV 1999]**

(1) $\frac{1}{2}$ h   (2) 40 min

(3) 50 min   (4) 55 min

17. $\frac{4}{5}$ of 0.025 is equal to **[JNV 1999]**

(1) 0.0002   (2) 0.002   (3) 0.02   (4) 0.2

18. Find the product of $0.4 \times 0.04 \times 0.004$. **[JNV 1998]**

(1) 0.00064   (2) 0.0064

(3) 64   (4) 0.000064

19. $\frac{1}{3}$rd part of a certain amount was given to Sita and rest to Gita. If Gita got ₹ 524, what did Sita get? **[JNV 1998]**

(1) ₹ 262   (2) ₹ 412   (3) ₹ 200   (4) ₹ 400

20. Simplify $\frac{8 \times 21 \times 24}{48 \times 7 \times 15}$. **[JNV 1998]**

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{1}{7}$ (4) $\frac{1}{2}$

21. Which fraction should be added to the sum of $5\frac{3}{4}$, $4\frac{4}{5}$ and $7\frac{3}{8}$ to make the result a whole number? **[JNV 1998]**

(1) $\frac{1}{40}$ (2) $\frac{2}{40}$ (3) $\frac{3}{40}$ (4) $\frac{4}{40}$

22. $2.205 \div 0.15$ is equal to **[JNV 1997]**

(1) 1.47   (2) 14.7

(3) 147   (4) 0.147

23. Which is the smallest fraction? **[JNV 1997]**

(1) $\frac{2}{5}$ (2) $\frac{7}{5}$ (3) $\frac{6}{5}$ (4) $\frac{7}{8}$

24. The product of two fractions is 6. If one fraction is $\frac{5}{3}$. Find the other. **[JNV 1997]**

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{18}{5}$ (4) $\frac{12}{5}$

25. In a class of 30 students the number of girls is $\frac{1}{5}$th of the number of the boys. How many boys are there in the class? **[JNV 1997]**

(1) 25   (2) 18   (3) 20   (4) 19

26. $\frac{1}{3}$rd of a number is 15. Find $\frac{1}{5}$th of the number. **[JNV 1997]**

(1) 9   (2) 6   (3) 4   (4) 5

27. If $\frac{4}{5}$ of an estate be worth ₹ 1680, find the value of half of the estate. **[JNV 1996]**

(1) ₹ 1080   (2) ₹ 1200   (3) ₹ 1000   (4) ₹ 1050

28. By how much does $\frac{6}{7/8}$ exceed $\frac{6/7}{8}$? **[JNV 1996]**

(1) $6\frac{2}{3}$ (2) $6\frac{3}{4}$ (3) $7\frac{1}{2}$ (4) $8\frac{3}{4}$

29. Arrange there fractions in ascending order $\frac{3}{4}, \frac{1}{6}, \frac{9}{8}, \frac{10}{13}$. **[JNV 1995]**

(1) $\frac{9}{8}, \frac{1}{6}, \frac{3}{4}, \frac{10}{13}$ (2) $\frac{10}{13}, \frac{9}{8}, \frac{1}{6}, \frac{3}{4}$

(3) $\frac{3}{4}, \frac{9}{8}, \frac{1}{6}, \frac{10}{13}$ (4) $\frac{1}{6}, \frac{3}{4}, \frac{10}{13}, \frac{9}{8}$

30. Arrange these fractions in descending order $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$. **[JNV 1995]**

(1) $\frac{7}{8}, \frac{5}{6}, \frac{2}{3}, \frac{1}{7}$ (2) $\frac{5}{6}, \frac{1}{7}, \frac{2}{3}, \frac{7}{8}$

(3) $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$ (4) $\frac{1}{7}, \frac{2}{3}, \frac{5}{6}, \frac{7}{8}$

Answers

1. (2)	**2.** (1)	**3.** (2)	**4.** (3)	**5.** (2)	**6.** (3)	**7.** (2)	**8.** (1)	**9.** (2)	**10.** (3)
11. (4)	**12.** (3)	**13.** (2)	**14.** (4)	**15.** (1)	**16.** (3)	**17.** (3)	**18.** (4)	**19.** (1)	**20.** (2)
21. (3)	**22.** (2)	**23.** (1)	**24.** (3)	**25.** (1)	**26.** (1)	**27.** (4)	**28.** (2)	**29.** (4)	**30.** (1)

Hints and Solutions

1. According to the question,
Total eggs $= 500$

$\frac{3}{25}$ got broken i.e. broken eggs $= \frac{3}{25} \times 500 = 60$

∴ Remaining eggs $= 500 - 60 = 440$

Now, $\frac{4}{5}$ of the remaining eggs were sold i.e.

$$= \frac{4}{5} \times 440 = 88 \times 4 = 352$$

Hence, number of eggs left $= 500 - (60 + 352)$
$$= 500 - 412 = 88$$

2. ∵ Empty part of the drum $= 1 - \frac{2}{3} = \frac{1}{3}$

If $\frac{1}{3}$ part requires $= 50$ L

Then, 1 part requires $= 50 \div \frac{1}{3} = 50 \times 3 = 150$ L

3. According to the question, $\frac{3}{4}$th of 144

$= 144 \times \frac{3}{4} = 108$ and $\frac{2}{3}$rd of 96 $= 96 \times \frac{2}{3} = 64$

∴ Required difference $= 108 - 64 = 44$

4. Fraction of drum filled with $= \frac{1}{5}$

Remaining part $= 1 - \frac{1}{5} = \frac{4}{5}$

According to the question, $\frac{4}{5}$ part $= 28$ L

$$4 \text{ part} = 28 \times 5 = 140 \text{ L}$$

$$1 \text{ part} = \frac{140}{4} = 35 \text{ L}$$

5. Suppose capacity of the drum $= x$ L

Water in drum $= \frac{x}{3}$ L

Then, $x - \frac{x}{3} = 60 \Rightarrow \frac{3x - x}{3} = 60$

$$\Rightarrow \frac{2x}{3} = 60 \Rightarrow 2x = 180$$

$$\therefore x = 90 \text{ L}$$

6. Let x be taken out.

Then, $\frac{3}{7} - x = \frac{2}{7} \Rightarrow x = \frac{3}{7} - \frac{2}{7} \Rightarrow x = \frac{1}{7}$

7. Suppose total property $= ₹ x$

Then, $x \times \frac{1}{3} = 1500 \Rightarrow x = 1500 \times 3$

$$\Rightarrow x = ₹ 4500$$

∴ $\frac{1}{5}$th of the property $= 4500 \times \frac{1}{5} = ₹ 900$

8. Sum of the fraction

$$= \frac{2}{9} + \frac{4}{3} + \frac{6}{18} = \frac{4 + 24 + 6}{18} = \frac{34}{18} = \frac{17}{9}$$

9. $5 - \left[\dfrac{5}{2} - \dfrac{3}{4}\right] + \left[\dfrac{7}{2} - \dfrac{5}{4}\right] = 5 - \left[\dfrac{10-3}{4}\right] + \left[\dfrac{14-5}{4}\right]$

$= 5 - \dfrac{7}{4} + \dfrac{9}{4} = \dfrac{20-7+9}{4} = \dfrac{22}{4} = \dfrac{11}{2} = 5\dfrac{1}{2}$

10. $\because \quad \dfrac{1}{3} = 0.33, \dfrac{1}{2} = 0.50$

$\therefore$ In ascending order the numbers will be

written as $0.25 < 0.33 < 0.50$ or $0.25, \dfrac{1}{3}, \dfrac{1}{2}$

11. $\dfrac{4}{3} + \dfrac{5}{9} + \dfrac{6}{18} = \dfrac{6 \times 4 + 2 \times 5 + 1 \times 6}{18}$

$= \dfrac{24 + 10 + 6}{18} = \dfrac{40}{18} = \dfrac{20}{9}$

12. $\because$ Product of two numbers $= \dfrac{5}{4}$

One number $= \dfrac{5}{6}$

Other number $= \dfrac{5}{4} \div \dfrac{5}{6} = \dfrac{5}{4} \times \dfrac{6}{5} = \dfrac{3}{2}$

13. $\dfrac{17}{27}, \dfrac{17}{25}, \dfrac{17}{19}, \dfrac{17}{13}$ are in ascending order.

(In like fractions with equal numerators, the fraction with greatest denominators is the smallest.)

14. $\dfrac{5}{6} = 0.833, \dfrac{9}{10} = 0.900, \dfrac{7}{9} = 0.777, \dfrac{10}{11} = 0.090$

$\therefore$ Largest fraction $= \dfrac{10}{11}$

15. $\dfrac{1}{10} = 0.1, \dfrac{2}{15} = 0.13, \dfrac{3}{8} = 0.375, \dfrac{4}{9} = 0.444$

$\therefore$ Smallest fraction $= \dfrac{1}{10}$

16. $\dfrac{5}{6}$ of 1 h $= \dfrac{5}{6} \times 60$ min $= 50$ min

17. $\dfrac{4}{5} \times 0.025 = \dfrac{4}{5} \times \dfrac{25}{1000} = \dfrac{1}{50} = 0.02$

18. $0.4 \times 0.04 \times 0.004 = 0.000064$

19. Let the total amount be ₹ x.

$\therefore$ Gita get $= x - \dfrac{x}{3} = \dfrac{3x - x}{3} = ₹ \dfrac{2x}{3}$

According to the question,

$\dfrac{2x}{3} = 524 \Rightarrow 2x = 3 \times 524 \Rightarrow x = \dfrac{3 \times 524}{2} = ₹ 786$

Sita get $= 786 \times \dfrac{1}{3} = ₹ 262$

20. $\dfrac{8 \times 21 \times 24}{48 \times 7 \times 15} = \dfrac{4032}{5040} = \dfrac{4}{5}$

21. $5\dfrac{3}{4} + 4\dfrac{4}{5} + 7\dfrac{3}{8} = \dfrac{23}{4} + \dfrac{24}{5} + \dfrac{59}{8} = \dfrac{717}{40}$

$\dfrac{717}{40}$ becomes whole number when $\dfrac{3}{40}$ is added to it.

$\dfrac{717}{40} + \dfrac{3}{40} = \dfrac{720}{40} = 18$

Which is a whole number.

22. $2.205 \div 0.15 = \dfrac{2.205}{0.15} = \dfrac{2205}{1000} \times \dfrac{100}{15} = \dfrac{2205}{150}$

$= 14.7$

23. $\dfrac{2}{5} = 0.4, \dfrac{7}{5} = 1.4, \dfrac{6}{5} = 1.2, \dfrac{7}{8} = 0.875$

$\therefore \dfrac{2}{5}$ is the smallest fraction.

24. Let the other fraction be x.

Then, $\quad x \times \dfrac{5}{3} = 6 \Rightarrow \dfrac{5x}{3} = 6$

$\therefore \quad\quad x = \dfrac{6 \times 3}{5} = \dfrac{18}{5}$

25. Let the number of boys be x.

Then, number of girls is $\dfrac{x}{5}$.

According to the question, $x + \dfrac{x}{5} = 30$

$\Rightarrow \dfrac{6x}{5} = 30 \Rightarrow 6x = 5 \times 30 \Rightarrow x = \dfrac{5 \times 30}{6} = 25$

$\therefore$ Number of boys $= 25$

26. Let the number be x. Then, $\dfrac{1}{3}x = 15 \Rightarrow x = 45$

Then, $\dfrac{x}{5}$ of $45 = 45 \times \dfrac{1}{5} = 9$

27. Let the value of estate be ₹ x.

According to the question, $\dfrac{4x}{5} = 1680$

$\therefore \quad\quad x = \dfrac{1680 \times 5}{4} = ₹ 2100$

Value of half of the estate $= \dfrac{1}{2} \times 2100 = ₹ 1050$

28. $6 \div \dfrac{7}{8} = 6 \times \dfrac{8}{7} = \dfrac{48}{7}, \quad \dfrac{6}{7} \div 8 = \dfrac{6}{7} \times \dfrac{1}{8} = \dfrac{3}{28}$

$\dfrac{48}{7} - \dfrac{3}{28} = \dfrac{192 - 3}{28} = \dfrac{189}{28} = 6\dfrac{21}{28} = 6\dfrac{3}{4}$

29. $\dfrac{3}{4} = 0.75, \dfrac{1}{6} = 0.166, \dfrac{9}{8} = 1.125, \dfrac{10}{13} = 0.769$

Ascending order, $0.16, 0.75, 0.76, 1.125$

i.e., $\dfrac{1}{6}, \dfrac{3}{4}, \dfrac{10}{13}, \dfrac{9}{8}$

30. $\dfrac{5}{6} = 0.833, \dfrac{7}{8} = 0.875, \dfrac{2}{3} = 0.66, \dfrac{1}{7} = 0.142$

Descending order, $0.875, 0.833, 0.66, 0.142$

i.e., $\dfrac{7}{8}, \dfrac{5}{6}, \dfrac{2}{3}, \dfrac{1}{7}$

Practice Exercise

1. $12 + \dfrac{\square}{6} = 13\dfrac{1}{6}$, which number should be written $\square$ to prove statement true?

   (1) 1   (2) 7   (3) 13   (4) 25

2. Which of the following fractions is not equal to the other three?

   (1) 4/5   (2) 9/15   (3) $\dfrac{3}{5}$ (4) $\dfrac{6}{10}$

3. Which of the following numbers are in ascending order?

   (1) $\dfrac{12}{19}, \dfrac{12}{25}, \dfrac{12}{29}, \dfrac{12}{37}$ (2) $\dfrac{12}{29}, \dfrac{12}{37}, \dfrac{12}{19}, \dfrac{12}{25}$

   (3) $\dfrac{12}{37}, \dfrac{12}{29}, \dfrac{12}{19}, \dfrac{12}{25}$ (4) $\dfrac{12}{37}, \dfrac{12}{29}, \dfrac{12}{25}, \dfrac{12}{19}$

4. $\dfrac{2}{3} + \dfrac{5}{7}$ is equal to

   (1) $\dfrac{2+5}{3+7}$ (2) $\dfrac{2+5}{3\times 7}$

   (3) $\dfrac{2\times 7 + 3\times 5}{3+7}$ (4) $\dfrac{2\times 7 + 3\times 5}{3\times 7}$
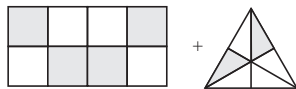
5. The product of $3\dfrac{1}{2}$ and $3\dfrac{1}{2}$ is

   (1) 7   (2) $9\dfrac{1}{2}$ (3) $9\dfrac{1}{4}$ (4) $12\dfrac{1}{4}$

6. $1\dfrac{2}{3} \times 1\dfrac{3}{5}$ is equal to

   (1) $2\dfrac{2}{3}$ (2) $1\dfrac{2}{5}$ (3) $2\dfrac{2}{5}$ (4) $1\dfrac{5}{8}$

7. Find the value of

   (1) $\dfrac{1}{2}$ (2) $\dfrac{1}{3}$ (3) $\dfrac{1}{6}$ (4) $\dfrac{5}{6}$

8. $2\dfrac{1}{2} \times 3\dfrac{1}{3} \times 4\dfrac{1}{4}$ is equal to

   (1) $9\dfrac{1}{24}$ (2) $24\dfrac{1}{24}$ (3) $29\dfrac{1}{24}$ (4) $35\dfrac{5}{12}$

9. Write in ascending order of the following fractional numbers $\dfrac{5}{17}, \dfrac{9}{17}, \dfrac{8}{17}$ and $\dfrac{10}{17}$.

   (1) $\dfrac{10}{17}, \dfrac{9}{17}, \dfrac{8}{17}, \dfrac{5}{17}$ (2) $\dfrac{8}{17}, \dfrac{5}{17}, \dfrac{10}{17}, \dfrac{9}{17}$

   (3) $\dfrac{5}{17}, \dfrac{9}{17}, \dfrac{10}{17}, \dfrac{8}{17}$ (4) $\dfrac{5}{17}, \dfrac{8}{17}, \dfrac{9}{17}, \dfrac{10}{17}$

10. Which one of the following fractions are expressed in descending order?

    (1) $\dfrac{17}{25}, \dfrac{17}{27}, \dfrac{17}{13}, \dfrac{17}{19}$ (2) $\dfrac{17}{13}, \dfrac{17}{19}, \dfrac{17}{25}, \dfrac{17}{27}$

    (3) $\dfrac{17}{27}, \dfrac{17}{19}, \dfrac{17}{13}, \dfrac{17}{25}$ (4) $\dfrac{17}{27}, \dfrac{17}{19}, \dfrac{17}{25}, \dfrac{17}{13}$

11. The product of two numbers is 5/4. If one number is 5/6, what is the other number?

    (1) 2   (2) $\dfrac{1}{2}$ (3) $\dfrac{3}{2}$ (4) $\dfrac{2}{3}$

12. There is 500 eggs in a box. 4/25 eggs were broken, 2/5 of remaining eggs were sold. The number of eggs left is

    (1) 80   (2) 252   (3) 100   (4) 120

13. Mohan Lal gives 1/4th part of his total money to his son, 1/3rd part to his wife and 1/8th part to his daughter. Then, remaining part of his money is

    (1) $\dfrac{7}{24}$ (2) $\dfrac{5}{24}$ (3) $\dfrac{11}{24}$ (4) $\dfrac{1}{8}$

14. Which of the following fractions is greatest?
    $$\dfrac{7}{12}, \dfrac{11}{16}, \dfrac{12}{17}, \dfrac{13}{18}, \dfrac{31}{36}$$

    (1) $\dfrac{13}{18}$ (2) $\dfrac{12}{17}$ (3) $\dfrac{31}{36}$ (4) $\dfrac{7}{12}$

15. If one-fifth of one-fourth of a number is $\dfrac{5}{80}$, find the number.

    (1) $\dfrac{4}{5}$ (2) $\dfrac{5}{4}$ (3) $\dfrac{2}{3}$ (4) $\dfrac{3}{2}$

16. What is the $\dfrac{3}{4}$th of $\dfrac{1}{5}$ of given figure?

    (1) $\dfrac{1}{30}$ (2) $\dfrac{3}{40}$ (3) $\dfrac{3}{20}$ (4) $\dfrac{5}{24}$

17. If $\dfrac{2}{3}, \dfrac{23}{30}, \dfrac{9}{10}, \dfrac{11}{15}$ and $\dfrac{4}{5}$ are written in ascending order, then the fraction in the middle most will be

    (1) $\dfrac{23}{30}$ (2) $\dfrac{4}{5}$ (3) $\dfrac{2}{3}$ (4) $\dfrac{11}{15}$

Answers

1. (2)	**2.** (1)	**3.** (4)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (4)	**8.** (4)	**9.** (4)	**10.** (2)
11. (3)	**12.** (2)	**13.** (1)	**14.** (3)	**15.** (2)	**16.** (2)	**17.** (1)			

Hints and Solutions

1. $12 + \dfrac{\square}{6} = 13\dfrac{1}{6} \Rightarrow \dfrac{72 + \square}{6} = \dfrac{79}{6}$

$\square = 79 - 72 = 7$

2. (1) $\dfrac{4}{5} = \dfrac{4}{5}$ (2) $\dfrac{9}{15} = \dfrac{3}{5}$ (in its lowest term)

(3) $\dfrac{3}{5} = \dfrac{3}{5}$ (4) $\dfrac{6}{10} = \dfrac{3}{5}$ (in its lowest term)

As, (2), (3) and (4) are equal.

Hence, only $\dfrac{4}{5}$, i.e., (1) is not equal to other

three fractions.

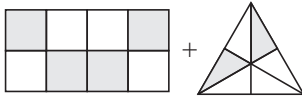**3.** When the numerators are the same, the ascending order is determined by the descending order of the denominators.

4. $\because \dfrac{2}{3} + \dfrac{5}{7} = \dfrac{2 \times 7 + 3 \times 5}{3 \times 7}$

5. $3\dfrac{1}{2} \times 3\dfrac{1}{2} = \dfrac{7}{2} \times \dfrac{7}{2} = \dfrac{49}{4} = 12\dfrac{1}{4}$

6. $1\dfrac{2}{3} \times 1\dfrac{3}{5} = \dfrac{5}{3} \times \dfrac{8}{5} = \dfrac{8}{3} = 2\dfrac{2}{3}$

7.

$= \dfrac{4}{8} + \dfrac{2}{6} = \dfrac{1}{2} + \dfrac{1}{3} = \dfrac{3 + 2}{6} = \dfrac{5}{6}$

8. $2\dfrac{1}{2} \times 3\dfrac{1}{3} \times 4\dfrac{1}{4} = \dfrac{5}{2} \times \dfrac{10}{3} \times \dfrac{17}{4}$

$= \dfrac{850}{24} = \dfrac{425}{12} = 35\dfrac{5}{12}$

9. When the denominators are the same, the ascending order is determined by the ascending order of numerators.

i.e. $\dfrac{5}{17}, \dfrac{8}{17}, \dfrac{9}{17}, \dfrac{10}{17}$

10. Since, numerators are same.

So, descending order,

$\dfrac{17}{13}, \dfrac{17}{19}, \dfrac{17}{25}, \dfrac{17}{27}$

11. The product of two numbers $= \dfrac{5}{4}$

One number $= \dfrac{5}{6}$

Other number $= \dfrac{5}{4} \div \dfrac{5}{6} = \dfrac{5}{4} \times \dfrac{6}{5} = \dfrac{3}{2}$

12. Total eggs $= 500$

Number of broken eggs $= 500 \times \dfrac{4}{25} = 80$

$\therefore$ Remaining eggs $= 500 - 80 = 420$

Number of sold eggs $= 420 \times \dfrac{2}{5} = 168$

Hence, required remaining eggs $= 420 - 168$

$= 252$

13. Remaining part of money $= 1 - \left(\dfrac{1}{4} + \dfrac{1}{3} + \dfrac{1}{8} \right)$

$= 1 - \left(\dfrac{6 + 8 + 3}{24} \right) = 1 - \dfrac{17}{24} = \dfrac{24 - 17}{24} = \dfrac{7}{24}$

14. Here, difference between numerator and denominator of all the fractions is 5. Therefore, the fraction with greatest numerator is the greatest.

Hence, $\dfrac{31}{36}$ is the greatest amongst the given fractions.

15. Let the required number be x.

Then, $\dfrac{1}{5} \times \dfrac{1}{4} \times x = \dfrac{5}{80}$, $x = \dfrac{5}{80} \times 5 \times 4 = \dfrac{5}{4}$

Hence, the required number is $\dfrac{5}{4}$.

16. It is clear from the figure that the fraction is

$\dfrac{3}{6} = \dfrac{1}{2}$

$\therefore$ Required value

$= \dfrac{3}{4} \times \dfrac{1}{5} \times \dfrac{1}{2} = \dfrac{3}{40}$
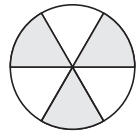
17. $\dfrac{2}{3}, \dfrac{23}{30}, \dfrac{9}{10}, \dfrac{11}{15}, \dfrac{4}{5} = \dfrac{20}{30}, \dfrac{23}{30}, \dfrac{27}{30}, \dfrac{22}{30}, \dfrac{24}{30}$

In ascending order, $\dfrac{20}{30}, \dfrac{22}{30}, \dfrac{23}{30}, \dfrac{24}{30}, \dfrac{27}{30}$

$\therefore$ Required fraction $= \dfrac{23}{30}$

Self Practice

1. Which is the greatest fraction in $\frac{2}{3}, \frac{2}{5}, \frac{1}{2}, \frac{1}{3}$?

   (1) $\frac{1}{2}$　　　　(2) $\frac{1}{3}$　　　　(3) $\frac{2}{5}$　　　　(4) $\frac{2}{3}$

2. $\frac{1}{8} - \frac{1}{9}$ is equal to

   (1) $\frac{1}{72}$　　　　(2) $\frac{1}{36}$　　　　(3) $\frac{3}{72}$　　　　(4) $\frac{7}{72}$

3. $\frac{1}{4} \times \frac{4}{5} \times \frac{5}{7} \times \frac{14}{25}$ is equal to

   (1) $\frac{2}{25}$　　　　(2) $\frac{1}{25}$　　　　(3) $\frac{3}{25}$　　　　(4) $\frac{4}{25}$

4. $\frac{2}{7}$th part of a certain sum was donated and $\frac{1}{4}$th was spent on education. The balance amount will be

   (1) $\frac{13}{28}$　　　　(2) $\frac{11}{28}$　　　　(3) $\frac{5}{28}$　　　　(4) $\frac{14}{28}$

5. If $\frac{3}{4} x = 48$, the value of x is

   (1) 16　　　　(2) 64　　　　(3) 40　　　　(4) 72

6. What is subtracted from 3/4 to get remainder 2/3?

   (1) $\frac{1}{2}$　　　　(2) $\frac{2}{12}$　　　　(3) $\frac{1}{3}$　　　　(4) $\frac{1}{12}$

7. Which is the smallest fraction?

   (1) $\frac{3}{5}$　　　　(2) $\frac{1}{2}$　　　　(3) $\frac{2}{3}$　　　　(4) $\frac{3}{4}$

8. $\frac{7 \times 7 \times 7}{21 \times 21 \times 21}$ is equal to

   (1) $\frac{21}{63}$　　　　(2) $\frac{1}{27}$　　　　(3) $\frac{21}{42}$　　　　(4) $\frac{1}{9}$

9. $3\frac{1}{5} \div 1\frac{2}{3}$ is equal to

   (1) $\frac{46}{25}$　　　　(2) $\frac{48}{25}$　　　　(3) $\frac{44}{25}$　　　　(4) $\frac{42}{25}$

10. On subtracting $\frac{1}{3}$ from 2, what will remain?

    (1) $1\frac{1}{3}$　　　　(2) $1\frac{2}{3}$　　　　(3) $\frac{4}{3}$　　　　(4) $1\frac{1}{2}$

11. $\frac{45 \times 36}{9}$ is equal to

    (1) 160　　　　(2) 170　　　　(3) 180　　　　(4) 190

Answers

1. (4)	2. (1)	3. (1)	4. (1)	5. (2)	6. (4)	7. (2)	8. (2)	9. (2)	10. (2)
11. (3)									