Percentage

How to change % into fraction

$20\% = \frac{20}{100} = \frac{1}{5}$

$25\% = \frac{}{} = \frac{1}{4}$

$40\% = \frac{40}{100} = \frac{2}{5}$

$70\% = \frac{70}{100} = \frac{7}{10}$

$16\frac{2}{3}\% = \frac{50}{3}\% = \frac{1}{6}$

$14\frac{2}{7}\% = \frac{100}{7}\% = \frac{1}{7}$

How to change the fraction into %

$\frac{1}{5} \Rightarrow \frac{1}{5} \times 100 = 20\%$

$\frac{1}{4} \Rightarrow \frac{1}{4} \times 100 = 25\%$

$\frac{1}{6} \Rightarrow \frac{1}{6} \times 100 = \frac{50}{3} = 16\frac{2}{3}\%$

$\frac{1}{9} \Rightarrow \frac{1}{9} \times 100 = \frac{100}{9}\% = 11\frac{1}{9}\%$

The following fractions are generally used in exams. So, I recommend you to remember these fractions. These fractions are very useful to solve the lengthy questions with in time.

$\frac{1}{2}=50\%$ $\frac{1}{11}=9\frac{1}{11}\%$ $\frac{1}{40}=2\frac{1}{2}\%$

$\frac{1}{3}=33\frac{1}{3}\%$ $\frac{1}{12}=8\frac{1}{3}\%$ $\frac{1}{50}=2\%$

$\frac{1}{4}=25\%$ $\frac{1}{13}=7\frac{9}{13}\%$ $\frac{3}{8}=37\frac{1}{2}\%$

$\frac{1}{5}=20\%$ $\frac{1}{14}=7\frac{1}{7}\%$ $\frac{5}{8}=62\frac{1}{2}\%$

$\frac{1}{6}=16\frac{2}{3}\%$ $\frac{1}{15}=6\frac{2}{3}\%$ $\frac{4}{7}=57\frac{1}{7}\%$

$\frac{1}{7}=14\frac{2}{7}\%$ $\frac{1}{16}=6\frac{1}{4}\%$ $\frac{5}{7}=71\frac{3}{7}\%$

$\frac{1}{8}=12\frac{1}{2}\%$ $\frac{1}{20}=5\%$ $\frac{1}{9}=11\frac{1}{9}\%$

$\frac{1}{24}=4\frac{1}{6}\%$ $\frac{1}{10}=10\%$ $\frac{1}{25}=4\%$

These are Basic Fraction.

(i) If I want to know the % value of $\frac{5}{9}$ then go to $\frac{1}{9}$

$\frac{1}{9} = 11\frac{1}{9}\% = 11 + \frac{1}{9}\%$

$\frac{5}{9} = 55\frac{5}{9}\%$

(ii) Find the % value of $\frac{3}{8}$

$\frac{1}{8} = 12\frac{1}{2}\% = 12 + \frac{1}{2}\%$

$\frac{3}{8} = 36 + \frac{3}{2} = 36 + 1\frac{1}{2} = 37\frac{1}{2}\%$

(iii) Find the % value of $\frac{5}{6}$

$\frac{1}{6} = 16\frac{2}{3}\% = 16 + \frac{2}{3}$

$\frac{5}{6} = 80 + \frac{}{3}$

$= 80 + 3\frac{1}{3}\% = 83\frac{1}{3}\%$

(iv) Find the % value of $\frac{2}{3}$

$\frac{1}{3} = 33\frac{1}{3}\% = 33 + \frac{1}{3}\%$

$\frac{2}{3} = 66 + \frac{2}{3} = 66\frac{2}{3}\%$

(v) Find the % value of $\frac{5}{8}$

$\frac{1}{8} = 12\frac{1}{2}\% = 12 + \frac{1}{2}$

$\frac{5}{8} = 60 + \frac{5}{2} = 60 + 2\frac{1}{2} = 62\frac{1}{2}\%$

(vi) Find the % value of $\frac{4}{7}$

$\frac{1}{7} = 14\frac{2}{7}\% = 14 + \frac{2}{7}\%$

$\frac{4}{7} = 56 + \frac{8}{7}\% = 56 + 1\frac{1}{7} = 57\frac{1}{7}\%$

(vii) Find the % value of $\frac{7}{12}$

$\frac{1}{12} = 8\frac{1}{3}\% = 8 + \frac{1}{3}\%$

$\frac{7}{12} = 56 + \frac{7}{3} = 56 + 2\frac{1}{3} = 58\frac{1}{3}\%$

(viii) Find the % value of $\frac{11}{15}$

$\frac{1}{15} = 6\frac{2}{3}\% = 6 + \frac{2}{3}\%$

$\frac{11}{15} = 66 + \frac{22}{3}\%$

$= 66 + 7\frac{1}{3}\% = 73\frac{1}{3}\%$

(ix) Find the % value of $\frac{9}{16}$

$\frac{1}{16} = 6\frac{1}{4}\% = 6 + \frac{1}{4}\%$

$\frac{9}{16} = 54 + \frac{9}{4} = 54 + 2\frac{1}{4}\%$

$= 56\frac{1}{4}\%$

(x) Find the % value of $\frac{7}{40}$

$\frac{1}{40} = 2\frac{1}{2}\% = 2 + \frac{1}{2}\%$

$\frac{7}{40} = \text{æ}14 + \frac{7\ddot{o}}{2\div\emptyset}\% = 17\frac{1}{2}\%$

How to change the fraction whose % value is more than 100%

(i) Find the % value of $\frac{7}{5}$

$\frac{7}{5} \Rightarrow \frac{5}{5} + \frac{2}{5}$

$\Rightarrow 100\% + 40\%$

$\Rightarrow 140\%$

(ii) Find the % value of $\frac{35}{8}$

$\frac{35}{8} = \frac{32}{8} + \frac{3}{8}$

$= 400\% + 37\frac{1}{2}\% = 437\frac{1}{2}\%$

(iii) Find the % value of $\frac{33}{7}$

$\frac{33}{7} = \frac{28}{7} + \frac{5}{7}$

$= 400\ \% + 71\frac{3}{7}\% = 471\frac{3}{7}\%$

(iv) Find the % value of $\frac{23}{12}$

$\frac{23}{12} = \frac{12}{12} + \frac{11}{12}$

$= 100\% + 91\frac{2}{3}\% = 191\frac{2}{3}\%$

Alternatively:

$\frac{23}{12} = \frac{24}{12} - \frac{1}{12}$

$= 200\% - 8\frac{1}{3}\% = 191\frac{2}{3}\%$

(v) Find the % value of $\frac{41}{6}$

$\frac{41}{6} = \frac{42}{6} - \frac{1}{6}$

$= 700\% - 16\frac{2}{3}\% = 683\frac{1}{3}\%$

How to change % into fraction whose % value is more than 100%

(i) Find the fraction value of $157\frac{1}{7}\%$

$157\frac{1}{7}\% = 100\% + 57\frac{1}{7}\%$

$= 1 + \frac{4}{7} = \frac{11}{7}$

(ii) Find the fraction value of $616\frac{2}{3}\%$

$616\frac{2}{3}\% = 600\% + 16\frac{2}{3}\%$

$= 6 + \frac{1}{6} = \frac{37}{6}$

(iii) Find the fraction value of $366\frac{2}{3}\%$

$366\frac{2}{3}\% = 300\% + 66\frac{2}{3}\%$

$= 3 + \frac{2}{3} = \frac{11}{3}$

(iv) Find the fraction value of $208\frac{1}{3}\%$

$208\frac{1}{3}\% = 200\% + 8\frac{1}{3}\%$

$= 2 + \frac{1}{12} = \frac{25}{12}$

How to understand the actual meaning of fraction.

$16\frac{2}{3}\% = \frac{1}{6}$ → 1 represents its % result; → 6 represent original number/value

$\rightarrow 14\frac{2}{7}\% = \frac{1}{7}$

means $7 \times 14\frac{2}{7}\% = 1$

$\rightarrow 62\frac{1}{2}\% = \frac{5}{8}$

means $8 \times 62\frac{1}{2}\% = 5$

$\rightarrow 37\frac{1}{2}\% = \frac{3}{8}$

means $8 \times 37\frac{1}{2}\% = 3$

QUESTIONS BASED ON FRACTION

1. If $37\frac{1}{2}\%$ of a number is added with itself then result becomes 1320. Find the original number.

Detailed Method :

Let the original number be x

According to the question,

$x + x \times 37\frac{1}{2}\% = 1320$

$x + x \times \frac{3}{8} = 1320$

$\frac{8x + 3x}{8} = 1320$

$\frac{11x}{8} = 1320$

$x = 1320 \times \frac{8}{11} = 960$

Fraction Method:

$37\frac{1}{2}\% = \frac{3}{8}$ ⇒ % result; ⇒ Orignal Number

Original number = 8 unit

Result formed = 8 unit + 3 unit

$\left[8 \times 37\frac{1}{2}\% = 3\right]$

11 unit → 1320

1 unit → 120

So, the original number = 8 × 120 = 960

2. If $62\frac{1}{2}\%$ of a number is subtracted from itself then result becomes 6321. Find the original number.

Detailed Solution,

Let the original number = x

A.T.Q,

$$x - x \times 62\frac{1}{2}\% = 6321$$

$$x - x \times \frac{5}{8} = 6321$$

$$\frac{3x}{8} = 6321$$

$$x = 16856$$

Fraction method :

$$62\frac{1}{2}\% = \frac{5}{8}$$

$$\left[8 \times 62\frac{1}{2}\% = 5\right]$$

Original number = 8 unit

Result formed = 8 unit – 5 unit

3 units $\rightarrow$ 6321

1 unit $\rightarrow$ 2107

So, original number

= 8 × 2107 = 16,856

3. If $16\frac{2}{3}\%$ of a number is added with itself then result becomes 4956. Find the original number.

Sol. Let the original no. = x

According to the question

$$x + x \times 16\frac{2}{3}\% = 4956$$

$$x + \frac{x}{6} = 4956$$

$$\frac{7x}{6} = 4956$$

x = 708 × 6 = 4248

Alternate:

$16\frac{2}{3}\% = \frac{1}{6}$ → % result

$\frac{1}{6}$ → Original number

Now,

New No = 6 + 1 = 7 unit = 4956

1unit = 708

Original no. = 6 unit = 6 × 708

= 4248

4. If $6\frac{2}{3}\%$ of a number is subtracted from itself then result becomes 5670. Find the original number.

Sol.

$-6\frac{2}{3}\% = \frac{1}{15}$ → Substract value

→ Original number

New Value = 15 – 1 = 14 unit

= 5670

1 unit = 405

Original value = 405 × 16

= 6480

5. If $11\frac{1}{9}\%$ of a number is added with itself then result becomes 900 find the original number.

Sol. $+11\frac{1}{9}\% = \frac{1}{9}$ → Added value

→ Original number

New value = 9 + 1 = 10 unit

= 900

1 unit = 90

Original no. = 90 × 9 = 810

6. What is 20% of 50% of 75% of 70?

Sol. Value = $70 \times \frac{1}{5} \times \frac{1}{2} \times \frac{3}{4}$

$$= \frac{21}{4} = 5.25$$

7. If 20% of (P + Q) = 40% of (P – Q) then find P : Q

Sol. $\frac{20}{100}$ (P + Q) = $\frac{40}{100}$ (P – Q)

P + Q = 2P – 2Q

P – Q = 4P – Q

3Q = 1P

P : Q = 3 : 1

8. What is 20% of 25% of 300 ?

Sol. $300 \times \frac{20}{100} \times \frac{25}{100} = 15$

9. 25% of what number is 36 ?

Sol. Let the number be x

then $x \times \frac{25}{100} = 36$

$x = 36 \times 4 = 144$

10. If 240 is 20% of a number, then 120% of that numbe will be ?

sol. Let the number be = x

20% of x = 240

$$x \times \frac{1}{5} = 240$$

x = 1200

Now,

$$1200 \times 120\% = 1200 \times \frac{120}{100}$$

$$= 1440$$

11. If we express $41\frac{3}{17}\%$ as a fraction, then it is equal to :

Sol. $41\frac{3}{17}\% = \frac{700}{17} \times \frac{1}{100} = \frac{7}{17}$

12. If 125% of x is 100, then x is:

Sol. $x \times \frac{125}{100} = 100$

$$x = \frac{100 \times 100}{125} = 80$$

13. If 50% of (x - y) = 30% of (x + y) then what percent is y of x ?

Sol. $\frac{50}{100}$ (x - y) = $\frac{30}{100}$ (x + y)

50x – 50y = 30x + 30y

50x – 30x = 30 y + 50 y

20x = 80 y

x = 4

y = 1

So, y is $\frac{1}{4}$ = 25%

14. If 64 is added in a number then number becomes $157\frac{1}{7}\%$ of itself. Find the number.

Sol. $157\frac{1}{7}\% = \frac{11}{7}$

$$\left[7 \times 157\frac{1}{7}\% = 11\right]$$

7 unit 11 unit

4 unit → 64

1 unit → 16

So, the original number = 7 × 16 = 112

15. If 930 is added in a number then number becomes $444\frac{4}{9}\%$ of itself. Find the original number.

Sol. $444\frac{4}{9}\% = \frac{40}{9}$

$$444\frac{4}{9} = 400\% + 44\frac{4}{9}\%$$
$$= 4 + \frac{4}{9} = \frac{40}{9}$$
$$\text{and } 9 \times 444\frac{4}{9}\% = 40$$

Original number 9 unit → Formed number 40 unit

+ 31unit → 930

1 unit → 30

So, the original number = 9 × 30 = 270

16. The price of a commodity rise from ` 6 per kg to ` 7.50 per kg. If the expenditure cannot increase the percentage of reduction in consumption is

Sol. Percentage increase

$$= \frac{7.50 - 6}{6} \times 100 = 25\%$$

$100 \xrightarrow{+25\%} 125$, $125 \xrightarrow{-25} 100$

\ Percentage decrease in consumption

$$= \frac{25}{125} \times 100 = 20\%$$

17. If the length of a rectangle is increased by $37\frac{1}{2}\%$ and its breadth is decreased by 20%. Find the % change in the area.

Sol.

Length	×	Breadth	=	Area	
8	×	5	=	40	+4
11	×	4	=	44	

$\left[37\frac{1}{2}\% = \frac{3}{8}\right]$ $\left[20\% = \frac{1}{5}\right]$

% change in Area = $\frac{4}{40} \times 100$

= 10%

18. If the sides of a square is increased by 40%. Find the % change in its area.

Sol.

Side	Area $(\text{Side})^2$	
5	25	+24
7	49	

$\left[40\% = \frac{2}{5}\right]$

% change in Area = $\frac{24}{25} \times 100 = 96\%$

19. The price of sugar is increased by $16\frac{2}{3}\%$ and; the consumption of a family is decreased by 20%. Find the % change in his expenditure.

Sol.

	Price		Consumption	=	Expenditure	
$\left[16\frac{2}{3}\% = \frac{1}{6}\right]$	6	×	5	=	30	−2
	7	×	4	=	28	

% change in his expenditure

$$= \frac{2}{30} \times 100 = 6\frac{2}{3}\%$$

20. The sale of a cinema ticket is increased by $57\frac{1}{7}\%$ and the price of ticket is increased by $16\frac{2}{3}\%$. Find the % change in his revenue.

Sol.

Sale		Price	=		
7	×	6	=	42	+35
11	×	7	=	77	

$57\frac{1}{7}\% = \frac{4}{7}$, $16\frac{2}{3}\% = \frac{1}{6}$

% Change in his revenue

$$\Rightarrow \frac{35}{42} \times 100 \Rightarrow 83\frac{1}{3}\%$$

21. If one of the sides of a rectangle is increased by 20% and the other is increased by 5%. Find the percent value by which the area changes.

Sol. Area of rectangle = Length × Breadth

Length +20% = $\frac{1}{5}$

Breadth +5% = $\frac{1}{20}$

L		B		Area	
5	×	20	=	100	26
6	×	21	=	126	

Required% = $\frac{26}{100} \times 100$

= 26% ↑ (Increase)

22. If one of the sides of rectangle increased by $37\frac{1}{2}\%$ and the other is decreased by 20% find the percent value by which area changes.

Sol. Area = Length × Breadth

Length = $+37\frac{1}{2}\% = \frac{3}{8}$

Breadth = $-20\% = \frac{1}{5}$

L		B		Area	
8	×	5	=	40	4
11	×	4	=	44	

Required % = $\frac{4}{40} \times 100 = 10\%$ ↑ (Increase)

23. A number is first reduced by 20% and then it is increased by 80%. What was the net effect?

Sol. $-20\% = \frac{-1}{5}$, 5 4

$+80\% = \frac{+4}{5}$, $\frac{5}{25}$ $\frac{9}{36}$, +11

Required % = $\frac{11}{25} \times 100$

= 44% (Increase)

24. The tax imposed on an article

is increased by 10% and its consumption decreased by 10%. Find the percentage change in revenue from it.

Sol. I $+10\% = \frac{1}{10}$, 10 11

II $-10\% = \frac{1}{10}$, $\frac{10}{100}$ $\frac{9}{99}$

-1

Required % = $\frac{1}{100} \times 100$

= 1% (decrease)

25. Two numbers are respectively 20% and 50% more than a third. Now what percentage is the first of the second?

Sol. Let the third number be = 100

I	II	III
120	150	100

Then, $\frac{120}{150} \times 100 = 80\%$