

100

# Percentage

## Basics



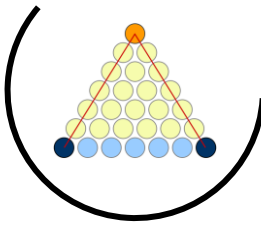
$$\frac{80}{100} \rightarrow 80\%$$

$$\frac{80}{100} \quad 2 \times \quad \frac{40}{50} \rightarrow \frac{21}{37.5}$$

$$2 \div \frac{160}{200} \rightarrow 80\%$$

$$2 \div 200$$

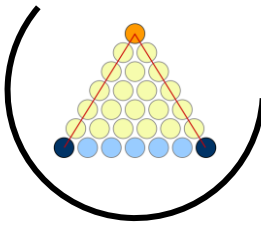
$$\frac{80}{100} \rightarrow 80\%$$



# Percentage

- ❑ **Percent means parts per hundred. The word comes from the Latin phrase *per centum*, which means per hundred.**
- ❑ **Numbers expressed as a fraction of 100, is known as percentage**





**1. 30% of X = 150**

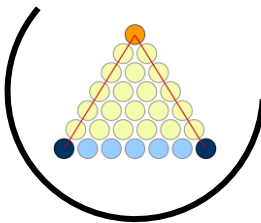
**3. 30% of 150 = X**

~~1.~~ **X% of 150 = 30**

$$\frac{30}{100} \times x = 150$$

$$= 500$$





## Basic Calculations

$$\textcircled{25.0} - \underline{100\%}$$

$$\underline{25} - 100\%$$

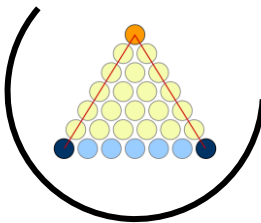
1. 30% of 250  $\rightarrow \underline{75}$
2. 49% of  $\textcircled{450}$   $\rightarrow 220.5$
3. 150% of 262  $\rightarrow \textcircled{393}$
4. 160% of 440  $\rightarrow$

$$\begin{array}{r} 440 \\ 220 \\ \hline 44 \\ \hline 704 \end{array}$$

$$\begin{array}{r} 100\% \\ \hline 262 \end{array} + 50\% \rightarrow \underline{131}$$

$$\begin{array}{r} 225 \\ - 4.5 \\ \hline \underline{220.5} \end{array}$$





## Observation

460

1. ✓ 50%

→ 230

1. ✓ 10%

→ 46

1. ✓ 5%

→ 23

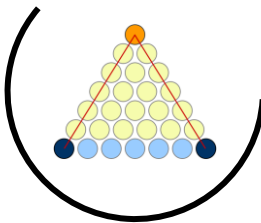
1. ✓ 1%

→ 4.6



100% of  $x$

$$\frac{\cancel{100}}{\cancel{100}} \times x = x$$

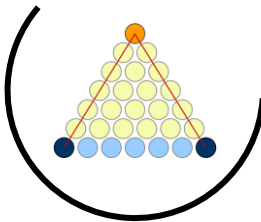


## Point No 1

$$\underline{X\%} = X/100$$

$$50\% = \frac{50}{100} = \frac{1}{2}$$



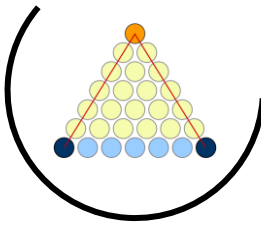


## Fraction to Percentage equivalent

- $1/2 = 50\%$
- $1/3 = 33.33\%$
- $1/4 = 25\%$
- $1/5 = 20\%$
- $1/6 = 16.67\%$
- $1/7 = 14.28\%$
- $1/8 = 12.5\%$
- $1/9 = 11.11\%$
- $1/10 = 10\%$
- $1/11 = 9.09\%$
- $1/12 = 8.33\%$
- $1/13 = 7.69\%$
- $1/14 = 7.14\%$
- $1/15 = 6.67\%$





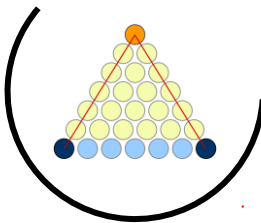


## Basic Calculations

1. 11.11% of 81  $\rightarrow$  9
2. 9.09% of 88  $\rightarrow$  8
3. 16.67% of 96  $\rightarrow$  16
4. 14.28% of 63  $\rightarrow$  9

$$\frac{11.11}{100} \times 81$$





## Basic Calculations

1. 28.56% of 77 = 22

2. 62.5% of 96 = 60

✓ 3. 27.27% of 176 =

✓ 4. 83.33% of 72 =

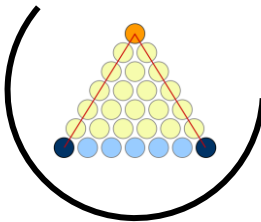
$$\frac{3}{11} \times 176 =$$

$$\underline{12.5} \cdot 10 = \frac{1}{8}$$

$$\underline{5(12.5)} \cdot 10 = \frac{5}{8} = \underline{62.5 \cdot 10}$$

$$\frac{5}{8} \times \cancel{96} 12 = 60$$

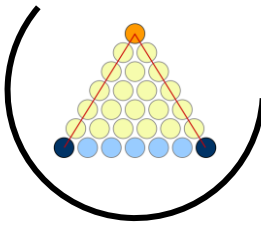




## Point No 2

**$X\% \text{ of } y = y\% \text{ of } x$**

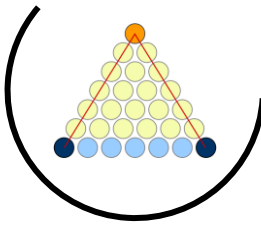




## Basic Calculations

1. **21.6% of 750 =**
2. **31.6% of 75 =**
3. **56.67% of 180 =**





## Point No 3

$$\text{Percent Change} = \frac{\text{Amount of Change}}{\text{Original Amount}} \times 100 \%$$







The price of sugar becomes ₹7.25 per kg after an increase of 45%. Find the original price of sugar.

₹7.25/kg

100%  $\rightarrow$  145%

$$1.45 \times 5$$

$$\frac{1.45 \times 10}{2}$$

$$145\% \text{ of O.P.} = 7.25$$

$$\text{OP} = \frac{7.25}{1.45} = 5$$

$$\frac{14.5}{2} = \underline{\underline{7.25}}$$







Ashok's salary increased by 25% this year. By what percentage was his last year salary less, when compared to this year's salary?

A

B

100

140

$\frac{40}{1}$

$\frac{2}{5}$

← B is 40% more than A

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

A is  $\frac{2}{7}$  less than B

28.56%

26.10

$$\frac{1}{4}$$

$$\frac{a}{b} \text{ more}$$

20.10

$$\frac{1}{1+4}$$

$$\frac{a}{a+b} \text{ less.}$$



A, B and C have certain number of mangoes with them. B has 10% less mangoes than A and C has 20% less than A. By what percentage is the number of mangoes with B more than those with C?

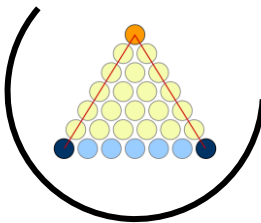
$$A \rightarrow 100$$

$$B \rightarrow 90$$

$$C \rightarrow 80$$

$$\frac{90 - 80}{80} \times 100$$
$$= \underline{\underline{12.5}}$$





## Point No 4

✓✓ If a number X is  $\frac{a}{b}$  more than Y then Y must  $\frac{a}{a+b}$  less than ~~0~~. ✗.





If A is having ₹80 and B is having ₹104

1. A is having what percent of B?
2. B is having what percent of A?
3. B is having what percent more than A?
4. A is having what percent less than B?

$$\frac{80}{104} \times 100$$

$$\frac{104 - 80}{80} \times 100$$

$$\frac{104}{80} \times 100$$

$$\rightarrow 30.1\%$$

$$\frac{300}{13}$$

$$\frac{3}{10}$$

$$\frac{3}{13} \times 100$$

$$\frac{104 - 80}{104} \times 100$$

$$\frac{243}{104} \times 100$$





**In an exam, Ram got 25% more marks than Laxman. By what percentage are the marks of Laxman less than that of Ram?**

100  
125

$\frac{1}{3}$

$\frac{1}{4}$

20.1.

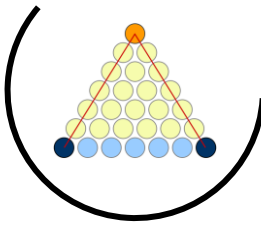


$$(23) \rightarrow 2,000,000$$

$$\left. \begin{array}{l} 24 \rightarrow 10\% \uparrow \\ 25 \rightarrow 10\% \uparrow = \end{array} \right\} \underline{\underline{21\%}}$$

Salary after 2<sup>nd</sup> hike ?

$$\left\{ \begin{array}{l} 1.21 \times 1,000,000 \\ = 1,21,000 \end{array} \right.$$



## Point No 5

$$\underline{10 + 10 + \frac{100}{100}}$$

**Successive Percentage Change =  $\underline{X + Y + \frac{XY}{100}}$**

$$10 + 10 + \frac{100}{100}$$

$$= \underline{21\%}$$





In 2017, your salary was ₹10000. In 2018 your salary was increased by 10% and in 2019 increased by 20%. What was your salary after second increment?

$$\underline{\underline{10\%}}$$

$$\underline{\underline{20\%}}$$

$$10 + 20 + \frac{200}{100}$$

$$= \underline{\underline{32\%}}$$

$$\boxed{13200}$$

$$(22) \rightarrow 210,000$$

$$23 \quad 10\% \uparrow \rightarrow 11,000$$

$$24 \quad 10\% \downarrow \rightarrow \begin{array}{r} 11000 \\ - 1100 \\ \hline 9900 \end{array}$$

$$10 - 10 - \frac{100}{100}$$

$$= - \frac{1.1}{\underline{\underline{\quad}}} \quad \text{or } \frac{1.1}{\underline{\underline{\quad}}}$$

$$1\% \downarrow$$

$$\underline{\underline{9900}}$$



**In 2017, your salary was ₹10000. In 2018 your salary was increased by 10% and in 2019 decreased by 20%. What was your salary after second change?**

- 8800





If length of a rectangle is increased by 20% and breadth is increased by 30%. What will be the percentage change on area?

$$20 + 30 + \frac{600}{100}$$

$$= \underline{\underline{56\%}}$$







In 2017, your salary was ₹10000. In 2018, 2019 & 2020 your salary was increased by 10%, 20% and 30% respectively. What is your salary after third increment?

$$\begin{array}{ccccccc} & & \text{2018} & & \text{2019} & & \text{2020} \\ & & \underline{\hspace{1cm}} & & \underline{\hspace{1cm}} & & \\ 10000 & \rightarrow & 11000 & \rightarrow & 13200 & \rightarrow & \underline{\underline{17160}} \end{array}$$

$$10000 \times 71.6\%$$

$$\frac{71.6}{100} \times 10000$$

$$\underline{\underline{7160}}$$

$$\begin{array}{ccc} 10 & 20 & 30 \\ & \searrow & \swarrow \end{array}$$

$$10 + 20 + \frac{200}{100} = 32$$

$$30 + 32 + \frac{30 \times 32}{100}$$

$$62 + 9.6 = \underline{\underline{71.6\%}}$$



## Successive Percentage Change =

A colorful illustration featuring two stylized figures. On the left, a figure in a red shirt and blue overalls holds a large yellow pencil. On the right, a figure in a blue shirt and red overalls sits atop a large blue number 5. The background is white with various mathematical and geometric elements: a large blue number 2, a large blue number 5, a yellow bell curve on a coordinate system, a yellow circle with '3x', a blue circle with 'y=z', a blue circle with '6', a blue circle with '2', a blue circle with '3', a blue circle with '4', a blue circle with '5', a blue circle with '6', a blue circle with '7', a blue circle with '8', a blue circle with '9', a blue circle with '10', a blue circle with '11', a blue circle with '12', a blue circle with '13', a blue circle with '14', a blue circle with '15', a blue circle with '16', a blue circle with '17', a blue circle with '18', a blue circle with '19', a blue circle with '20', a blue circle with '21', a blue circle with '22', a blue circle with '23', a blue circle with '24', a blue circle with '25', a blue circle with '26', a blue circle with '27', a blue circle with '28', a blue circle with '29', a blue circle with '30', a blue circle with '31', a blue circle with '32', a blue circle with '33', a blue circle with '34', a blue circle with '35', a blue circle with '36', a blue circle with '37', a blue circle with '38', a blue circle with '39', a blue circle with '40', a blue circle with '41', a blue circle with '42', a blue circle with '43', a blue circle with '44', a blue circle with '45', a blue circle with '46', a blue circle with '47', a blue circle with '48', a blue circle with '49', a blue circle with '50', a blue circle with '51', a blue circle with '52', a blue circle with '53', a blue circle with '54', a blue circle with '55', a blue circle with '56', a blue circle with '57', a blue circle with '58', a blue circle with '59', a blue circle with '60', a blue circle with '61', a blue circle with '62', a blue circle with '63', a blue circle with '64', a blue circle with '65', a blue circle with '66', a blue circle with '67', a blue circle with '68', a blue circle with '69', a blue circle with '70', a blue circle with '71', a blue circle with '72', a blue circle with '73', a blue circle with '74', a blue circle with '75', a blue circle with '76', a blue circle with '77', a blue circle with '78', a blue circle with '79', a blue circle with '80', a blue circle with '81', a blue circle with '82', a blue circle with '83', a blue circle with '84', a blue circle with '85', a blue circle with '86', a blue circle with '87', a blue circle with '88', a blue circle with '89', a blue circle with '90', a blue circle with '91', a blue circle with '92', a blue circle with '93', a blue circle with '94', a blue circle with '95', a blue circle with '96', a blue circle with '97', a blue circle with '98', a blue circle with '99', a blue circle with '100'.

$$10 \cdot 10 \quad 20 \cdot 10$$



$$\underline{10 + 20} + \frac{200}{100}$$

$$= 32 \cdot 10$$

$$30 \cdot 10$$

$$40 \cdot 10$$



$$70 + \frac{1200}{100}$$

$$= 82 \cdot 10$$



$$114 + \frac{32 \times 82}{100}$$