

# "PERCENTAGE"

Per hundred.

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

$$\text{SSC} \quad 80\% \text{ of } 500 = \frac{80}{100} \times \frac{500}{\cancel{100}} \quad \boxed{\cancel{400}}$$

Hindi	— 100 —	51.
P.C	— 100 —	93
B	— 100 —	84.
English	— 100 —	72.
Science	— 100 —	98
Math	— 100 —	
Civics	— 100 —	
S.Sci	— 100 —	
Geog	— 100 —	

2 Types of statement.

1. A % of B is  $\Rightarrow \frac{A}{100}B$ .

2. A is what % of B.  $\Rightarrow \frac{100A}{B}$ .

40% of 1000

$$\frac{40 \times 1000}{100} = 400.$$

40 is what % of 1000.

$$\frac{40 \times 100}{1000} = \underline{\underline{4\%}}$$

1. find 48% of 640.

2. 40 is what % of 640.

3. If 75% of a number is 48 find 90% of that number.

$$\begin{array}{r} 48 \\ 64 \\ \hline 3072 \end{array}$$

$$\frac{48 \times 640}{100}$$

$$\underline{\underline{307.2}}$$

$$\frac{40 \times 100}{1000} = \underline{\underline{4\%}}$$

$$6.25\%$$

$$75\% \rightarrow 48$$

$$\frac{18}{90} \times \frac{48}{40} = \frac{288}{5}$$

$$75\% \rightarrow 48$$

$$90\% \rightarrow ?$$

$$\frac{10}{90 \times 48} = \frac{288}{5} = \underline{\underline{57.6}}$$

$$175\% \text{ of } 1825$$

$$1825$$

$$\rightarrow \boxed{\frac{128}{100} \times 1825 = \frac{12775}{4}}$$

$$\underline{\underline{3193.75}}$$

$$100\% \rightarrow \underline{\underline{1825}}$$

$$70\% \rightarrow \underline{\underline{182.5 \times 7}} \rightarrow \underline{\underline{1277.5}}$$

$$5\% \rightarrow \underline{\underline{91.25}}$$

$$\begin{array}{r} 1825 \\ 1277.5 \\ 91.25 \\ \hline \underline{\underline{3193.75}} \end{array}$$

$$87.5\% \text{ of } 800.$$

$$\frac{7}{8} \times 800 = 700.$$

$$\frac{87.5}{100} \times 800$$

$$\underline{\underline{700.0}}$$

### Fraction into Percentage.

$$\frac{1}{1} = 100\%. \quad \frac{1}{2} = 50\%. \quad \frac{1}{3} = 33.33\%. \quad \frac{1}{4} = 25\%. \quad \frac{1}{5} = 20\%.$$

$$\frac{1}{6} = 16.66\%. \quad \frac{1}{7} = 14.28\%. \quad \frac{1}{8} = 12.5\%. \quad \frac{1}{9} = 11.11\%. \quad \frac{1}{10} = 10\%.$$

$$\frac{1}{11} = 9.09\%. \quad \frac{1}{12} = 8.33\%. \quad \frac{1}{13} = 7.69\%. \quad \frac{1}{14} = 7.14\%. \quad \frac{1}{15} = 6.66\%.$$

$$\frac{1}{16} = 6.25\%. \quad \frac{1}{17} = 5.88\%. \quad \frac{1}{18} = 5.56\%. \quad \frac{1}{19} = 5.26\%. \quad \frac{1}{20} = 5\%.$$

### Solving

Q1. A fruit seller had some fruits he sold 70% of the total fruits & he is left with 180 fruits find the no. of fruits sold by him?

$$30\% \rightarrow 180$$

$$70\% \rightarrow ?$$

$$\frac{70}{30} \times 180 = 420$$

Q1. A fruit seller had some fruits he sold 70% of the total fruits & he is left with 180 fruits find the no. of fruits sold by him?

$$70\% \rightarrow ?$$

$$\frac{70 \times 180}{30} = 420$$

Q2. In a school a certain no. of students appeared an exam if 65% students passed the exam and 140 students failed, find the total students who appeared for exam? 400.

$$\begin{array}{r} 35\% \rightarrow 140 \\ 100\% \rightarrow ? \\ 20 \cancel{100 \times 140} \quad 20 \\ \cancel{35} \quad | \\ 400 \end{array}$$

Q3. If 60% of a number is added to number itself the result is 800 find the 50% of the number? 250

$$160\% \rightarrow 800$$

$$50\% \rightarrow ?$$

$$\cancel{\frac{50 \times 800}{160}} \quad 50$$

Q4. A person spends 20%, 30% & 40% of his income on Food, Daily needs & rent respectively, if he still saves rupees 2500 find his Salary?

$$\begin{array}{r} 10\% \rightarrow 2500 \\ 100\% \rightarrow ? \end{array}$$

$$\cancel{\frac{100 \times 2500}{10}} = 25000$$

Q5. A student who got 30% marks in exam is failed by 20 marks while another student who got 40% has 10 marks more than passing find the passing marks & passing percentages?

$$\underline{\underline{110.}}$$

$$\cancel{\frac{30 \times 30}{10}} = 90$$

$$\cancel{30\% \rightarrow 90} \quad ? \leftarrow 110$$

$$\cancel{\frac{110 \times 30}{90}} = \underline{\underline{36.66\%}}$$

$$\begin{array}{r} 90 + 20 \quad 110 \\ 30\% + 20 \quad \text{Pass} \\ 40\% - 10 = \text{Pass} \end{array}$$

$$40\% - 10 = 30\% + 20$$

$$\begin{array}{r} 10\% = 30 \\ 30\% \rightarrow ? \end{array}$$

Q6. In an election between two candidates, winning candidate got 58% of total votes & he won by the majority of 480 votes find the total

Q6. In an election between two candidates, winning candidate got 58% of total votes & he won by the majority of 480 votes find the total votes casted?

$$\begin{array}{ccc} w & L \\ \cancel{3000} & 58\% - 42\% = 480 \\ & 16\% \rightarrow 480 \\ & 100\% \rightarrow ? \end{array}$$

$$\frac{100 \times 480}{16} = 30$$

## Successive Percentage Change

$$\text{Successive \% change} = +A + B + \frac{AB}{100}\%$$

1. If the length of rectangle got increased by 20% & the breadth of rectangle got increased by 10% find the change in area  $+32\%$ .

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

2. The salary of a person got increased by 30% but due to recession in the market it got reduced by 20% find the overall % change in his salary

$$\begin{aligned} +30 - 20 - \frac{30 \times 20}{100} \\ +30 - 20 - 6 \\ +30 - 26 = +4\% \end{aligned}$$

3. If the length of the square got decreased by 10% then find the %change in area of the square

$$\begin{aligned} -10 - 10 + \frac{10 \times 10}{100} \\ -20 + 1 = -19\% \end{aligned}$$

4. A person gets 3 discounts of 10%, 20% & 50% on an article find the equivalent single discount

$$\begin{aligned} -10 - 20 + \frac{10 \times 20}{100} \\ -30 + 2 = -28 \end{aligned}$$

$$\begin{aligned} -28 - 50 + \frac{28 \times 50}{100} \\ -78 + 14 = -64\% \end{aligned}$$

5. The population of a village got increased by 20% in first year but due to non-harvest it went

$$x \times \frac{120}{100} \times \frac{60}{100} = 21600$$

5. The population of a village got increased by 20% in first year but, due to earthquake, it got reduced by 40% in the second year if the population after second year is 21600 then find the initial population 30000

$$x \times \frac{120}{100} \times \frac{60}{100} = 21600$$

$$\frac{120}{100} \times \frac{3600}{5 \times 5}$$

$$x = \frac{21600 \times 5 \times 5}{6 \times 3}$$

$$x = \underline{\underline{30000}}$$

6. The price of a machine get depreciate every year by 10% if its initial price is 1000000 then find its price after 3 years

$$1000000 \times \frac{90}{100} \times \frac{90}{100} \times \frac{90}{100}$$

$$= \underline{\underline{729000}}$$

7. A person spends 10% of his income on food 20% of remaining income on household & 50% of remaining income on rent if he is still left with 3600 find his total salary 10000.

$$x \times \frac{90}{100} \times \frac{80}{100} \times \frac{50}{100} = 3600$$

$$\frac{400}{25}$$

$$x = \frac{3600 \times 25}{400}$$

8. In an election between 2 candidates 20% of votes casted were declared invalid, winning candidate got 55% of valid votes and he won by the majority of 6400 votes find the total number of votes casted

$$x \times \frac{80}{100} \times \frac{55}{100} = 6400 \quad \cancel{3200} \quad 800$$

$$x = \frac{800 \times 100}{55} = \underline{\underline{80000}}$$

## Restoring the Previous Value

1. If the price of petrol got increased by 25% by what percentage the consumption should be

<b>Old Price</b>	<b>New Price</b>	
100	125	100

by what percentage the consumption should be reduced so that the expenditure remains the same?

20% Less Petrol.

Old Price

100

New Price

125

100

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

How much less / more  
Current rate  $\times 100$ .

2. If the price of petrol got decreased by 30% by what percentage the consumption should be increased so that the expenditure remains the same?

$$100 \longrightarrow 70 \longrightarrow 100$$

$$\frac{30}{70} \times 100 = \frac{300}{7} = 42.86\%$$

$$100 \longrightarrow 80 \longrightarrow 100$$

$$\frac{20}{80} \times 100 = 25\%$$

$$100 \longrightarrow 140 \longrightarrow 100$$

$$2 \frac{40}{140} \times 100 = 28.57\%$$

$$\frac{x \times 80}{100} = .8x$$

5. Due to reduction in price of mangoes by 20% a person gets 3 mangoes more for 120 rupees; find the initial price of the each mango

Price of each Mango =  $x$ .

New Price =  $.8x$

$$\text{No. of mangoes in } 120\text{Rs} = \frac{120}{x}$$

$$\frac{120}{.8x} - \frac{150}{x} = 3$$

$$\frac{150}{x} - \frac{120}{x} = 3$$

$$\frac{30}{x} = 3$$

$$x = \underline{\underline{10}}$$

6. Due to increment in price of eggs by 30% a person gets 3 eggs less for 91 rupees; find the new price of each egg

person gets 3 eggs less for 91 rupees; find the new price of each egg

$$\text{Price per egg} = x$$

$$\text{New Price} = 1.3x$$

$$\frac{91}{x} -$$

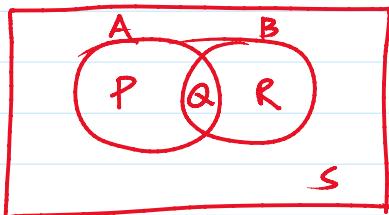
$$\frac{91}{1.3x} = 3$$

$$\frac{91}{x} - \frac{910}{1.3x} = 3$$

$$\frac{21}{x} = 3$$

$$x = 7$$

$$1.3 \times 7 = \underline{\underline{9.1}}$$



$$U = P + Q + R + S = 100\%$$

A = Tea drinkers  
B = Coffee drinkers.

$$\text{Tea drinkers} = P + Q$$

$$\text{Coffee drinkers} = R + Q$$

$$\text{neither Tea nor coffee} = S$$

$$\text{Both Tea \& Coffee} = Q$$

$$\text{does not like Tea} = R + S$$

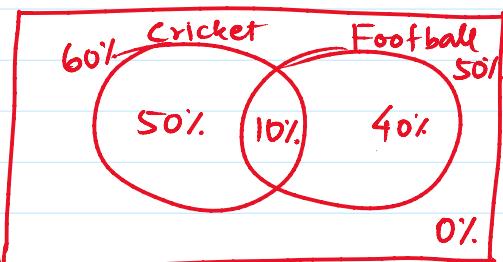
$$\text{does not like Coffee} = P + S$$

## Venn Diagrams & Set Theory

1. In a sports club 60% students plays cricket while 50% plays football & 10% plays both if 120 players only plays football

- i. Find how many players are there in the club 300

- ii. Find how many plays only cricket 150



$$40\% \rightarrow 120$$

$$100\% \rightarrow ?$$

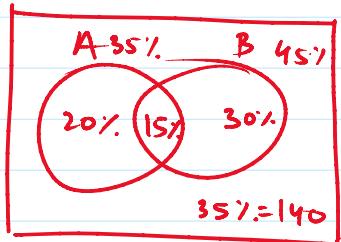
$$\frac{100 \times 120}{40}$$

$$\frac{300 \times 50}{100}$$

2. In a colony 35% people read newspaper A

n ....

2. In a colony 35% people read newspaper A while 45% people read newspaper B & 15% reads both if 140 people reads none of the news paper



i. Find how many people read both the news paper 60.

$$\begin{array}{r} 35\% \xrightarrow{-} 140 \\ 15\% \xrightarrow{-} ? \\ \hline 15 \times 140 / 30 \end{array}$$

ii. Find how many reads exactly one news paper 200

$$\begin{array}{r} 35\% \rightarrow 140 \\ 50\% \rightarrow ? \\ \hline 50 \times 140 / 35 \end{array}$$

1. The price of a foreign book in 1981 was Rs. 300 but due to devaluation of the rupee it has risen to Rs. 400. What is the percentage increase in its price?

- A) 33.33%    B) 50%    C) 150%    D) 133.33%

300 — 400

$$\frac{100}{300} \times 100$$

33.33 %

2. The ratio of the salary of a worker for October to that of February was 2:1.33. By what percent was the salary of the worker for October greater than that for February?

- A) 50%    B) 133%    C) 33.33%    D) 10%

$$\frac{67}{1.33} \quad \frac{1}{2}$$

O      F  
2      1.33

3. The length of a rectangle increases by 12% and the breadth by 10%. What is the consequent increase in area?

- A) 22%    B) 2%     C) 23.2%    D) 123.2%

$$\% \text{ change} = +A + B + \frac{AB}{100} \%$$

$$+12 +10 + \frac{12 \times 10}{100}$$

$$12 + 10 + 1.2 = 23.2 \%$$

4. What percentage of 840 is 180?

$$\frac{3}{840} \times 100 = 3.5 \%$$

4. What percentage of 840 is 180?

- A)  $22\frac{5}{7}\%$     B)  $23\frac{4}{7}\%$     C)  $24\frac{2}{7}\%$     D)  ~~$21\frac{3}{7}\%$~~

$$\frac{\frac{3}{180} \times 100}{840} = \frac{150}{7}$$

5. The price of the article is increased by 10%. It then is decreased by 30% and then increased by 20%. If its final price is 1848, find its original price (in Rs.).

- A) 1500    B) 1800    C) 2000    D) 2500

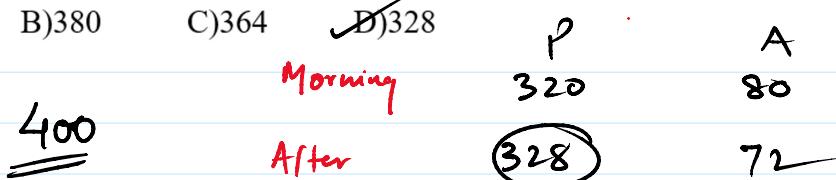
$$x \cdot \frac{110}{100} \times \frac{70}{100} \times \frac{120}{100} = 1848$$

$$x = \frac{308444}{1848 \times 100 \times 5}$$

$$= \underline{\underline{2000}}$$

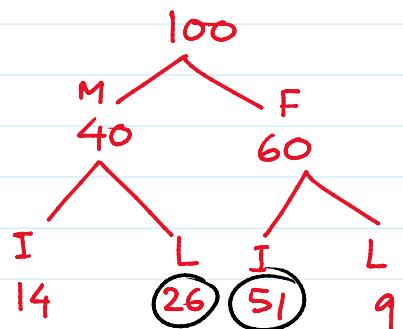
6. In an office, one day, 20% of the staff members were on leave in the morning session. The same day, 10% of the staff, who were on leave came for the afternoon session. If the total strength of the office is 400, then how many were present for the evening session? (The persons who were present in the morning session also present in the afternoon session).

- A) 360    B) 380    C) 364    D) ~~328~~



7. In a constituency, 40% of the voters are males, 35% of the males are illiterates and 15% of females are literates. By what percentage is the male literacy less than the female illiteracy?

- A) 55%    B) 96%    C) ~~49%~~    D) 36%



8. If the height of a triangle is increased by 5% and base is reduced by 15%, then what is the change in the area of the triangle?

- A) 89.25%    B) ~~10.75%~~    C) 12.05%    D) No change

$$+5 - 15 - \frac{5 \times 15}{100}$$

$$-10.75$$

$$\frac{25}{51} \times 100$$

~~-10.75~~

9. The number of portals released in the year 2000 is 20% more than that released in 1999. There is a decrease of 25% in the number of portals released from 2000 to 2001. If the number of portals released in 2001 is 1080, how many portals were released in 1999?

- A) 1200    B) 800    C) 1440    D) 2400

10. Alok spends 35% of his monthly income on rent, 20% of his remaining monthly income on medicines, 30% of his remaining monthly income on education and saves his remaining monthly income. His monthly saving is 1820. Find his monthly income (in Rs).

- A) 4000    B) 5000    C) 3500    D) 4200

$$x \times \frac{65}{100} \times \frac{80}{100} \times \frac{70}{100} = 1820$$

$$x = \frac{1820 \times 100 \times 100 \times 100}{65 \times 80 \times 70}$$

11. The ratio of two numbers is  $5/6 : 2/3$ . By what percentage is the second number more/less than the first number?

- A) 20% less B) 25% more    C) 25% less D) 20% more

12. The price per litre of petrol increases by 20%. By what percentage should the consumption be reduced such that the expenditure remains the same?

- A) 25%    B) 20%    C) 16.66%    D) 15%

$$100 - 120 - 100$$

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

13. Ashok secured 70% of the votes in an election and was elected by a majority of 168 votes. All the votes polled were valid. Find the number of votes polled if there were only two contestants.

- A) 490    B) 420    C) 350    D) 560

14. Amar, Bhuvan and Chetan had some marbles among them. 40% of the number of marbles with Amar equals 50% of those with Bhuvan and 60% of those with Chetan. Bhuvan had 60 marbles. Find the number of marbles with the other two.

$$x \times \frac{120}{100} \times \frac{75}{100} = 1080$$

$$x = \frac{1080 \times 100 \times 100}{120 \times 75}$$

$$300 \times 4 = 1200$$

$$\frac{5}{6} : \frac{2}{3}$$

$$\underline{15 : 12}$$

$$\underline{5 : 4}$$

$$\frac{1}{5} \times 100$$

$$70\% - 30\% = 40\% - 168$$

$$40\% \rightarrow 168$$

$$100\% ?$$

$$\frac{100 \times 168}{40} = 42$$

those with Chetan. Bhuvan had 60 marbles. Find the number of marbles with the other two.

- A)105      B)115      C)125      D)135

A            B            C  
75            60            50

$$40\% \text{ of } A = 50\% \text{ of } 60$$

$$\frac{2}{5} \times 60 = 30$$

$$A = 75$$

$$30 = \frac{60}{100} \times 50$$