GS FOUNDATION
BATCH FOR CSE 2023
Ace CSAT 2023 – Booklet 9
Quantitative aptitude - 3 Percentages

Contents

1) INTRODUCTION:

Percent means per hundred. So, it is one-hundredth part of something (cent is hundred).
So, 1% will mean 1/100
5% will mean 5/100
20% will mean 20/100
Percentage is a fraction whose denominator is 100 and numerator is called the rate

2) CONVERTING PERCENTAGE INTO FRACTION:

Here we simply divide given percent by 100 and delete % sign
For example:
Fraction form of 2% is 2/100 which is same as 1/50
Fraction form of 10% is 10/100 which is same as 1/10
Fraction form of 120% is 120/100 which is same as 6/5

3) CONVERTING FRACTION TO PERCENTAGE

Here we just multiply given fraction by 100 and add a percentage sign next to it
So, a/b is same as (a/b*100) %
Q. Express ¾ into percentage
Q. Express 3/8 into percentage
Q. Express ½ into percentage

4) PERCENTAGE OF A PARTICULAR NUMBER

P% of a number = result
P/100*number = result
Number = result/P*100

Q. 9% of what number is 36?
Q. 15% of what number is 150?
Q. 20% of what number is 50?
Q. If 30% of a number is 48, then what is 70% of that number?

CSE 2022: When 70% of a number x is added to another number y, the sum becomes 165% of the value of y. When 60% of the number x is added to another number z, then the sum becomes 165% of the value of z. which one of the following is correct?
(a) z < x < y
(b) x < y < z
(c) y < x < z
(d) z < y < x

5) TWO DIFFERENT PERCENTAGES OF A NUMBER

Two different percentages of a same number will lead to two different results.
Let, p% of N = x and q% of N = y
Then, (p + q) % of N = x + y and (p – q) % of N = x – y

Q. If 40% of a number exceeds the 25% of the same number by 54, find the number.
Q. If 50% of the number is 12 more than 40% of the number, find the number.

6) GIVEN QUANTITY AS A PERCENTAGE OF ANOTHER QUANTITY

Here, we're given two quantities x and y and have to find what percentage of x is y.
That is, we've to express y as a percentage of another quantity x.
So, y = p% of x
i.e. y = p/100* x
i.e. p = y/x*100
Q. Find 30 is what percentage of 150.
Q. What percentage of 200 is 25?
Q. What percentage of 100 is 37.5?

7) CONVERTING PERCENTAGE INTO DECIMALS:

Since, p% = p/100, we just shift decimal point by two places to the left
Q. What is 67% into decimal?
Q. Represent 4.7% into decimal.
Q. What is 345% into decimal?
Q. Represent 1234% into decimal.
Q. Covert ¾% into decimal.

8) CONVERTING DECIMAL INTO PERCENTAGE

In this case, above method is just reversed. We just shift decimal point to right by two places and % sign is put next to the number.
Q. Express 0.3 as a percentage
Q. What is 4.5 as a percentage
Q. Express 1234 as a percentage
Q. What is 0.046 as a percentage?

9) SOME IMPORTANT PERCENTAGE TO FRACTION CONVERSIONS TO DECIMAL CONVERSIONS:

Fraction	Decimal	Percentage
$\frac{1}{4}$	0.25	25%
$\frac{3}{4}$	0.75	75%
$\frac{1}{8}$	0.125	12.5%
$\frac{3}{8}$	0.375	37.5%
$\frac{1}{5}$	0.2	20%
$\frac{1}{7}$	0.142857	14.2857%
$\frac{1}{15}$	0.0667	6.67%
$\frac{1}{11}$	0.0909	9.09%
$\frac{1}{20}$	0.05	5%

10) EFFECT OF PERCENTAGE CHANGE ON ANY NUMBER

If number N is increased by x% then we want to find the resulting new number

New number = N + x% of N = N* (1 + x%) = N* ($\frac{100+x}{100}$)

Q. Salary of Balbir is 1000. It is increased by 10%. What is his new salary?

Q. What is the resulting number if 10 is increased by 150%.

If any number N is decreased by x%, find the resulting number:

New number = N – x% of N = N* (1 – x%) = N* ($\frac{100-x}{100}$)

Q. What is resulting number if 500 is decreased by 2.5%

Q. What is resulting number if 200 is decreased by 100%

11) NET CHANGE OF PERCENTAGE

In this type of questions, percentage is changed in subsequent stages.
In first step, number is changed (increased or decreased) by x% and in second step it is changed (increased or decreased) by y%. we're asked to find the net change in percentage.

If N is a given number,
New number after step I is: N* $(\frac{100+x}{100})$; Let's call it M

Thus, the new number after step 2 is: M* $(\frac{100+y}{100})$ which is same as N* $(\frac{100+x}{100})$ $(\frac{100+y}{100})$

Thus, change is N* $(\frac{100+x}{100})$ $(\frac{100+y}{100})$ – N = N ((1+x%) (1+y%) – 1)
= N (x% + y% + x% y%)
Thus, percentage change is = $\frac{\text{N (x\% + y\% + x\% y\%)}}{N} \times 100$ = x + y + $\frac{xy}{100}$

Q. If a number is increased by 12% and then decreased by 18%, find the net change in percentage.
Q. If Salary of Virat is increased by 10% and then again by 20%, find the net increase in the salary.
Q. If length of a rectangle is increased by 30% and breadth is decreased by 20%, find the net change in the area of rectangle.

CSE 2022:
The increase in the price of a certain item was 25%. Then the price was decreased by 20% then again increased by 10%. What is the resultant increase in the price?
(a) 5%
(b) 10%
(c) 12.5%
(d) 15%

CSE 2021: If the price of an article is decreased by 20% and then the new price is increased by 25%, then what is the net change in the price?
(a) 0%
(b) 5% increase
(c) 5% decrease
(d) Cannot be determined due to insufficient data

12) KEEPING EXPENDITURE FIXED

Expenditure = consumption * rate of item
So, to keep expenditure fixed, in case rate increases, we've to reduce consumption and if the rate falls, we've to increase consumption

If rate is changed by r%, we've to change consumption by say p%
According to formula above, new rate and new consumption are
Old rate* $(\frac{100+r}{100})$ **and** old consumption* $(\frac{100+p}{100})$**.**
And since new and old expenditure are same

Old rate*old consumption = new rate* new consumption
Old rate*old consumption = Old rate* $(\frac{100+r}{100})$*old consumption* $(\frac{100+p}{100})$**.**
Here, we want to find 'p' as 'r' is known
p = $(\frac{r}{100+r}) \times 100$

% Change in consumption (p) = $(\frac{\boldsymbol{percentage\ change\ in\ rate(r)}}{100+\%change\ in\ rate(r)}) \times 100$

Observe that expenditure = consumption * rate and consumption is being kept constant
Similarly, for area of rectangle = length * breadth
Distance = speed * time; same formula can be used if we keep area or distance as constant

Q. If price of watch is increased by 10%, by how much percentage must a shopkeeper reduce his consumption to have no extra expenditure

Q. If price is reduced by 5%, and then increased by 20%, by how much percentage must consumption change to have same expenditure?

13) % EXCESS OR % SHORTNESS

Here we're given 2 numbers A and B. we've to tell by how much percentage, A is more than B and by how much B is less than A.

If A exceeds B by x%, then, by our formula
A = B* $(\frac{100+x}{100})$
And if B is short of A by y%,
B = A* $(\frac{100+y}{100})$**;** putting the value of B from above,
A* $(\frac{100}{100+x})$ **=** A* $(\frac{100+y}{100})$, solving for y,
Percentage shortness of B (y) = $(\frac{x}{100+x}) \times 100$
Similarly, if y or shortness of B is given, then,

A is more than B by $(\frac{y}{100-y}) \times 100$

Q. If income of Amar is 20% more than Samar, by what percentage is Samar's income is less than that of Amar?

Q. If A is 20% less than B, then by how much percentage, B is more than A?

14) INCREASING POPULATION OF A CITY: INCREASE AT A CONSTANT RATE

If there's a city whose population is increasing at a constant rate R every year, we are asked to find population after certain number of years.
This calculation is much similar to compound interest calculation where capital or base amount on which interest is given keeps on increasing every year/period.

If a population of city is X and it is increasing at the rate of R% per year.

Population after N years = $X \times \left\{1 + \frac{R}{100}\right\}^N$

If a population of city is X and we are to find out population before N years or N years ago.
If P is the population N years ago.

Population after N years = P× $\left\{1 + \frac{R}{100}\right\}^N$ = X (given)

So, P = $\frac{X}{\left\{1+\frac{R}{100}\right\}^N}$

15) PYQS

CSE 2022: Two candidates X and Y contested an election. 80% of voters cast their vote and there were no invalid votes. There was no NOTA (None of the above) option. X got 56% of the votes cast and won by 1440 votes. What is the total number of voters in the voters list?
(a) 15000
(b) 12000
(c) 9600
(d) 5000

CSE 2022: A pie chart gives the expenditure on five different items A, B, C, D and E in a household. If B, C, D and E correspond to $90^0, 50^0, 45^0 and\ 75^0$ respectively, then what is the percentage of expenditure on item A?
(a) 112/9
(b) 125/6
(c) 155/9
(d) 250/9

CSE 2021: In a class, 60% of students are from India and 50% of the students are girls. If 30% of the Indian students are girls, then what percentage of foreign students are boys?
(a) 45%
(b) 40%
(c) 30%
(d) 20%
CSE 2021: P scored 40 marks more than Q in an examination. If Q scored 10% less marks than P, then how much did Q score.
(a) 360
(b) 380
(c) 400
(d) 420

CSE 2019: A and B are two heavy steel blocks. If B is placed on the top of A. the weight increases by 60% How much weight will reduce with respect to the total weight of A and B, if B is removed from the top of A?
(a) 60 %
(b) 45.5%
(c) 40%
(d) 37.5%

CSE 2019: In an examination. A has scored 20 marks more than 11. If has scored 3% less marks than A. how much has B scored
(a) 360
(b) 380
(c) 400
(d) 420

CSE 2018: A student has to get 40% marks to pass in an examination. Suppose he gets 30 marks and fails by 30 marks, then what are the maximum marks in the examination??
(a) 100
(b) 120
(c) 150
(d) 300

CSE 2017: P = (40% of A) + (65% of B) and Q = (50% of A) + (50% of B), where A is greater than B. In this context,
which of the following statements is correct?
(a) P is greater than Q.
(b) Q is greater than P.
(c) P is equal to Q.
(d) None of the above can be concluded with certainty

CSE 2017: In a city, 12% of households earn less than Rs. 30,000 per year, 6% households earn more than Rs. 2,00,000 per year, 22% households earn more than Rs. 1,00,000 per year and 990 households earn between Rs. 30,000 and Rs. 1,00,000 per year. How many households earn between Rs. 1,00,000 and Rs. 2,00,000 per year?

(a) 250

(b) 240

(c) 230

(d) 225

CSE 2016: Anita's mathematics test had 70 problems carrying equal marks i.e., 10 arithmetic, 30 algebra and 30 Geometry. Although she answered 70% of the arithmetic, 40% of the algebra and 60% of the geometry problems correctly, she did not pass the test because she got less than 60% marks. The number of more questions she would have to answer correctly to earn a 60% passing marks is:

(a) 1

(b) 5

(c) 7

(d) 9

CSE 2015: In a test, a candidate attempted only 8 questions and secured 50% marks in each of the questions. If he obtained a total of 40% in the test and all questions in the test carried equal marks, how many questions were there in the test?

(a) 8

(b) 10

(c) 15

(d) 16

CSE 2015: Candidates in a competitive examination consisted of 60% men and 40% women. 70% men and 75% women cleared the qualifying test and entered the final test where 80% men and 70% women were successful.

Which of the following statements is correct?

(a) Success rate is higher for women.

(b) Overall success rate is below 50%.

(c) More men cleared the examination than women.

(d) Both (a) and (b) above are correct

CSE 2015: A and B decide to travel from place X to place Y by bus. A has Rs. 10 with him and he finds that it is 80% of the bus fare for two persons. B finds that he has Rs. 3 with him and hands it over to A. In this context, which one of the following statements is correct?

(a) Now the money A has just enough to buy two tickets.

(b) A still needs Rs. 2 for buying the tickets

(c) After buying the two tickets A will be left with 50 paise.

(d) The money A now has is still not sufficient to buy two tickets.

CSE 2014: As per agreement with a bank, a businessman had to refund a loan in some equal instalments without interest. After paying 18 instalments he found that 60 percent of his loan was refunded. How many instalments were there in the agreement?
(a) 22
(b) 24
(c) 30
(d) 33

CSE 2014: A gardener increased the area of his rectangular garden by increasing its length by 40% and decreasing its width by 20%. The area of the new garden
(a) has increased by 20%.
(b) has increased by 12%.
(c) has increased by 8%.
(d) is exactly the same as the old area.

CSE 2011: In a group of persons, 70% of the persons are male and 30% of the persons are married. If two sevenths of males are married, what fraction of the females is single?
(a) 2/7
(b) 1/3
(c) 3/7
(d) 2/3

16) COMPREHENSION

There is a claim that organic farming is inherently safer and healthier. The reality is that because the organic farming industry is still young and not well-regulated in India, farmers and consumers, alike, are not only confused about what products are best for them, but sometimes use products in ways that could harm them as well. For example, since organic fertilizers are difficult to obtain on a large scale in India, farmers often use farmyard manure, which may contain toxic chemicals and heavy metals. Certain plant sprays, such as Datura flower and leaf spray, have an element called atropine. If it is not applied in the right dose, it can act on the nervous system of the consumer. Unfortunately, how much and when to use it are not well-researched or regulated issues.
Q. Based on the above passage, the following assumptions have been made:
1. Organic farming is inherently unsafe for both farmers and consumers.
2. Farmers and consumers need to be educated about eco-friendly food.
Which of the assumptions given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Q. Which one of the following statements best reflects the most logical, rational and practical message conveyed by the author of the passage?

(a) In India, organic farming should not be promoted as a substitute for conventional farming.

(b) There are no safe organic alternatives to chemical fertilizers.

(c) In India, farmers need to be guided and helped to make their organic farming sustainable.

(d) The aim of organic farming should not be to generate huge profits as there is still no global market for its products.