



BANK NAUKRI



PERCENTAGES

Concept and Sample Questions for

SSC CGL

PERCENTAGE:

The word percent can be understood as: Per cent \Rightarrow for every 100.

So, when percentage is calculated for any value, it means that you calculate the value for every 100 of the reference value. When you see the word "percent" or the symbol %, remember it means $1/100$

Example:

$$20 \text{ percent} = 20\% = 20 * (1/100) = 15$$

WHY PERCENTAGES?

Percentage is a concept evolved so that there can be a uniform platform for comparison of various things. (Since each value is taken to a common platform of 100)

Example:

To compare three different students depending on the marks they scored we cannot directly compare their marks until we know the maximum marks for which they took the test. But by calculating percentages they can directly be compared with one another.

PERCENTAGES CONCEPT:

By a certain percent, we mean that many hundredths. Thus x percent means x hundredths, written as x%.

To express x% as a fraction: We have, $x\% = x/100$.

$$\text{Thus, } 20\% = 20/100 = 15;$$

$$48\% = 48/100 = 12/25 \text{ etc.}$$

To express a/b as a percent: We have, $a/b = (a/b) * 100\%$

$$\text{Thus, } \frac{1}{4} = [1/4 * 100] = 25\%;$$

$$0.6 = 6/10 = 3/5 = [3/5 * 100]\% = 60\%.$$

COMMODITY PRICE INCREASE OR DECREASE:

If the price of a commodity increases by R%, then the reduction in consumption so as not to increase the expenditure is:

$$= [(R/(100+R)) * 100]\%$$

If the price of the commodity decreases by R%, then to maintain the same expenditure by increasing the consumption is:

$$= [(R/(100-R)) * 100]\%$$

RESULT ON POPULATION:

Let the population of the town be P now and suppose it increases at the rate of R% per annum, then:

1. Population after n years = $P[1+(R/100)]^n$

2. Population n years ago = $P[1+(R/100)]^n$

RESULTS ON DEPRECIATION:

Let the present value of a machine be P. Suppose it depreciates at the rate R% per annum. Then:

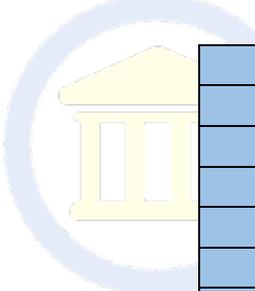
1. Value of the machine after n years = $P[1-(R/100)]^n$

2. Value of the machine n years ago = $P/[1-(R/100)]^n$

3. If A is R% more than B, then B is less than A by = $[(R/(100+R)) * 100]\%$

4. If A is R% less than B, then B is more than A by = $[(R/(100-R)) * 100]\%$

PERCENTAGES – FRACTIONS CONVERSION:



Percentages	Decimal	Fraction
10%	0.1	1/10
12.5%	0.125	1/8
16.66%	0.1666	1/6
20%	0.2	1/5
25%	0.25	1/4
30%	0.3	3/10
33.33%	0.3333	1/3
40%	0.4	2/5
50%	0.5	1/2
60%	0.6	3/5
62.5%	0.625	5/8
66.66%	0.6666	2/3
70%	0.7	7/10
75%	0.75	3/4
80%	0.8	4/5
83.33%	0.8333	5/6
90%	0.9	9/10
100%	1.0	1

CONVERTING DECIMALS:

We know that $12.5\% = 0.125 = 1/8$

Then, $1.125 = [8(1)+1]/8 = 9/8$ (i.e., the denominator will add to numerator once, denominator remaining the same. Also, $2.125=[8(2)+1]/8=17/8$ (here the denominator is added to numerator twice) $3.125=[8(3)+1]/8=25/8$ and so on.

Thus we can derive the fractions for decimals more than 1 by using those less than 1.

Let's see how the use of fractions will reduce the time for calculations:

Example:

What is 62.5% of 320?

Solution:

Value = $(5/8) * 320$ (since $62.5\%=5/8$) = 200.

IMPORTANT POINTS TO NOTE:

When any value increases by:

10%, it becomes 1.1 times of itself. (since $100+10 = 110\% = 1.1$)

20%, it becomes 1.2 times of itself.

36%, it becomes 1.36 times of itself.

4%, it becomes 1.04 times of itself.

When any value decreases by

10%, it becomes 0.9 times of itself. (Since $100-10 = 90\% = 0.9$)

20%, it becomes 0.8 times of itself

36%, it becomes 0.64 times of itself

4%, it becomes 0.96 times of itself.

NOTE:

1. When a value is multiplied by a decimal more than 1 it will be increased and when multiplied by less than 1 it will be decreased.
2. The percentage increase or decrease depends on the decimal multiplied.

TYPES OF QUESTIONS ASKED IN EXAM:

1. In an acoustics class, 120 students are male and 100 students are female. 25% of the male students and 20% of the female students are engineering students. 20% of the male engineering students and 25% of the female engineering students passed the final exam. What percentage of engineering students passed the exam?

- a. 5%
- b. 10%
- c. 15%
- d. 22%

Solution:

There are 100 female students in the class, and 20% of them are Engineering students.
Now, 20% of 100 equals $(20/100) * 100 = 20$.

Hence, the number of female engineering students in the class is 20.

Now, 25% of the female engineering students passed the final exam: 25.

Hence, the number of female engineering students who passed is 5.

There are 120 male students in the class. And 25% of them are engineering students.

Now, 25% of 120 equals $(25/100) * 120 = (1/4) * 120 = 30$.

Hence, the number of male engineering students is 30.

Now, 20% of the male engineering students passed the final exam: 20.

Hence, the number of male engineering students who passed is 6.

Hence, the total number of engineering students who passed is:

$(\text{Female Engineering students who passed}) + (\text{Male Engineering students who passed}) = 5 + 6 = 11$

The total number of engineering students in the class is: $(\text{Number of female engineering students}) + (\text{Number of male engineering students}) = 30 + 20 = 50$

Hence, the percentage of engineering students who passed is $(\text{Total number of engineering students who passed} / \text{Total number of engineering students}) * 100 = (11/50) * 100 = 22\%$

2. A vendor sells 60 percent of apples he had and throws away 15 percent of the remainder. Next day he sells 50 percent of the remainder and throws away the rest. What percent of his apples does the vendor throw?
- a. 17
 - b. 23
 - c. 77
 - d. None of These

Solution:

Let the number of apples be 100.

On the first day he sells 60% apples i.e., 60 apples. Remaining apples = 40.

He throws 15% of the remaining i.e., 15% of 40 = 6. Now he has $40 - 6 = 34$ apples

The next day he throws 50% of the remaining 34 apples i.e., 17.

Therefore, in total he throws $6 + 17 = 23$ apples.

3. A candidate who gets 20% marks fails by 10 marks but another candidate who gets 42% marks gets 12% more than the passing marks. Find the maximum marks?

- a. 50
- b. 100
- c. 150
- d. 200

Solution:

From the given statement pass percentage is $42\% - 12\% = 30\%$

By hypothesis, 30% of $x - 20\%$ of $x = 10$ (marks)

i.e., 10% of $x = 10$

Therefore, $x = 100$ marks.

