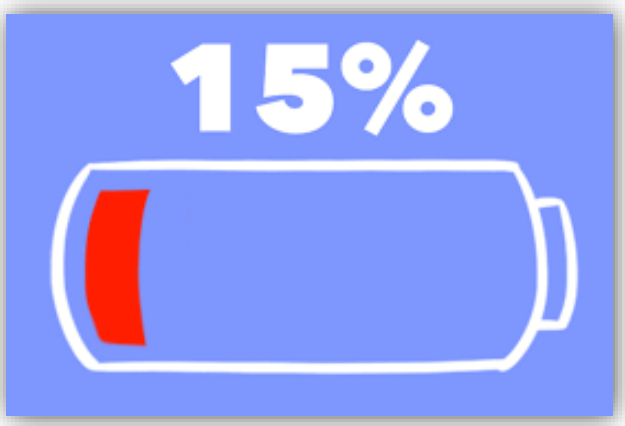
PERCENTAGE

`When first time you heard this word percentage??



May be your parents asked you how much percent you got in your exams or may be recently in news time you heard that the sale of Maruti is increased by 35%.

So in this study note we have to discuss the chapter which is the pillar of banking maths i.e. percentage.

BASIC DEFINITION:

Percent implies “for every hundred” and the sign % is read as percentage and x % is read as x per cent. In other words, a fraction with denominator 100 is called a per cent. For example, 20 % means 20/100 (i.e. 20 parts from 100). This can also be written as 0.2.

Percentage is a fraction whose denominator is always 100. x percentage is represented by x%.
Percentage means per hundred when we say 50% of a number it means half of the number. Similarly, 25% of a number is one fourth of the number; 20% means one fifth of the number, 16.67% means one sixth of a number etc. Hence percentage indicates the part or fraction of a number.

PERCENTAGE CHANGE FORMULA

$$\frac{\text{NEW VALUE - OLD VALUE}}{\text{OLD VALUE}} \times 100$$

BASIC FORMULA:

In order to calculate p % of q, use the formula:

$$\frac{p}{100} \times q = \frac{pq}{100}$$

Also remember: p % of q = q % of p

Example:

100% of 60 =60% of 100= 60 x (100/100) =

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

BASIC CONCEPTS OF PERCENTAGES

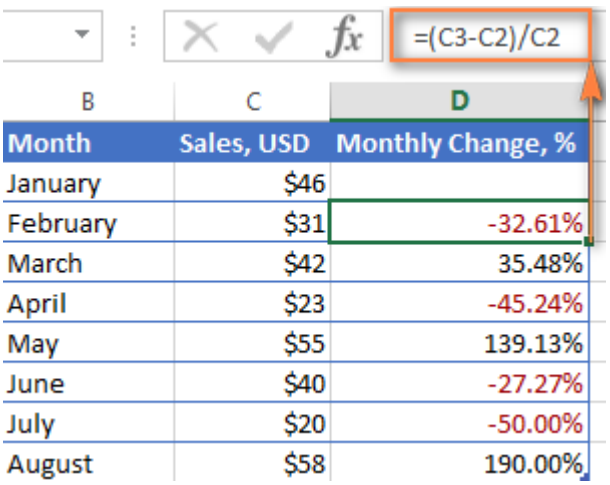
Expressing One Quantity as a Per Cent with respect to the other:

To express a quantity as a per cent with respect to other quantity, the following formula is used:

$$= [\frac{\text{The quantity to be expressed in per cent}}{\text{2nd quantity (in respect of which the per cent has to be obtained)}} \times 100]\%$$

PERCENTAGE AS COMPARISON:

Percentage helps us to compare between different fractions when the denominator or the total number is different in each case. It is one of the simplest tools for the comparison of data.



Take, for example, this table below which shows the marks obtained by a student in 3 different subjects

Subject	Marks Obtained
History	75
Math	33
English	64

From this data alone, we cannot compare the marks obtained for the various subjects.

Now suppose we have the data of the total marks obtained as follows

Subject	Marks Obtained	Total Marks	Marks Obtained/total marks × 100
History	75	100	75%
Math	33	50	66%
English	64	80	80%

Now as all the three subjects are represented on a scale of 100, it is easy to compare the marks for the three subjects and decide which subject has the student scored the maximum in.

Example: 60 % of a number is 360. What is 99 % of the same number?

Solution: Let the number be n.

Given (60/100) ×n = 360 => n = 600

99 % of 600 = (99/100) × 600 = 594

Or we can calculate directly

$$\frac{360}{60} \times 99 = 594$$

Example: 40 % of a number is 240. What is 112 % of the same number?

Solution: $\frac{240}{40} \times 112 = 672$

Example: What percent is 60 of 240?

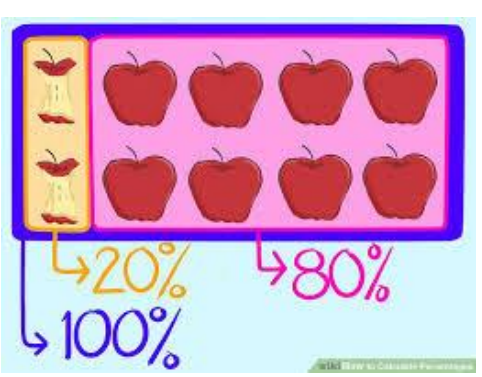
Solution: First write the given numbers in the fraction form:

60/240 = ¼

Multiply the numerator and denominator with 25 to make the denominator equal to 100

(1×25)/(4×25) = 25/100

CALCULATION OF PERCENTAGE



1. To express x% as a fraction :
   We know
   x% = x/100
   Thus 10% = 10/100 (means 10 parts out of 100 parts)
   = 1/10 (means 1 part out of 10 parts)
2. To express x/y as a percentage :
   We know that $^{x}/_{y} = (^{x}/_{y} \times 100)$
   Thus 1/4= (1/4 ×100)% = 25%
   and 0.8 = (8/10 ×100)% = 80%
3. To increase a number by a given percentage(x%):
   Multiply the number by the following factor
   $$= \left[\frac{100 + x}{100}\right]$$
4. To decrease a number by a given percentage(x%):
   Multiply the number by the following factor
   $$= \left[\frac{100 - x}{100}\right]$$
5. To find the % increase of a number:
   $$Percent\ increament = \left[\frac{Final\ Value - Initial\ Value}{Initial\ Value} * 100\right]$$
6. To find the % decrease of a number:
   $$Percent\ decreament = \left[\frac{Initial\ Value - Final\ Value}{Initial\ Value} * 100\right]$$

PERCENTAGE AND RATIO

Decimal	Percentage	Fraction
0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$
0.75	75%	$\frac{3}{4}$
0.2	20%	$\frac{1}{5}$
0.1	10%	$\frac{1}{10}$
$0.\dot{3}$	$33.\dot{3}\%$	$\frac{1}{3}$

1/3 × 100 = 33.33%	1/10 × 100 = 10%
1/4× 100 = 25%	1/11 × 100 = 9.09%
1/5 × 100 = 20%	1/12 × 100 = 8.33%
1/6 × 100 = 16.66%	1/3 × 100 = 7.69%
1/7 × 100 = 14.28%	1/14 × 100 = 7.14%
1/9 ×100 = 11.11%	1/16 × 100 = 6.25%

And its extended form is here

D/N	1	2	3	4	5	6	7	8	9	10
1	100	200	300	400	500	600	700	800	900	1000
2	50	100	150	200	250	300	350	400	450	500
3	33.33	66.66	100							
4	25	50	75	100						
5	20	40	60	80	100					
6	16.66	33.33	50	66.66	83.33	100				
7	14.28	28.56	42.85	57.14	71.42	85.71	100			
8	12.5	25	37.5	50	62.5	75	87.5	100		
9	11.11	22.22	33.33	44.44	55.55	66.66	77.7	88.8	100	
10	10	20	30	40	50	60	70	80	90	100
11	9.09	18.18	27.27	36.36	45.45	54.54	63.6	72.7	81.8	90.9
12	8.33	16.66	25	33.33	41.66	50	58.3	66.6	75	83.3
13	7.69	15.38	23.07	30.76	38.45	46.14	53.83	61.52	69.21	76.9
14	7.14	14.28	21.42	28.57	35.71	42.85	49.98	57.12	64.26	71.4
15	6.66	13.33	20	26.66	33.33	40	46.6	53.3	60	66.6
16	6.25	12.5	18.75	25	31.25	37.5	43.7	50	56.2	62.5

D stands for Denominator
N stands for Numerator

Most of the times using fractions is better than using actual percentage.

For example to calculate 14.28% of 343, we should not directly use multiplication, we can use equivalent fractions of 14.28% i.e. 1/7 hence the required answer

$$= \frac{1}{7} \times 343 = 49.$$

Other Method :-

In this method we will learn a different approach.

Any number is always 100% of itself

So the 100% of 710 is = 710

10% of 710 is = 71.0

1% of 710 is = 7.10

0.1% of 710 is = 0.710

We require 30% of 710, which is = 3 × 10% of 710

= 3 ×71 = 213

Example:

A reduction of 21% in the price of an item enables a person to buy 3 kg more for 100. Thereduced price of item per kg is:

(a) Rs. 5.50 (b) Rs. 7.50

(c) Rs. 10.50 (d) Rs. 7.00

Reduced price will be:

Rp/100y per kg

In our case R= Rs. 100 , x=21% , y=3kg

{(100 x 21)/(100 x 3)} = Rs. 7

Alternate method:

Expenditure = price per quantity × consumption

E = P × Q =100……. (1)

Now, as per the question,

$$E = P(\frac{100-21}{100})(Q+3) = 100.....(2)$$

$$P \times Q = P(\frac{100-21}{100})(Q+3)$$

$$Q = (\frac{100-21}{100})(Q+3)$$

$$Q = \frac{79}{7} kg$$

$$\text{Price}(p) = \frac{100}{79} \times 7 = \frac{700}{79} rs$$

$$\text{reduced price will be} = \frac{700}{79}(\frac{100-21}{100}) = 7rs$$

Multiplying factor: - (MF)

∴ Initial value × M.F. = final value

MF corresponding x% increase is $1+\frac{x}{100}$ and for x% decrease is $1-\frac{x}{100}$

For example

Percentage change	M.F.
For 75% increase	1.75
For 30% decrease	0.70

Application of M.F. in D.I. is very vast which we will study in upcoming study notes.

Net percentage change-

Assume your pocket money is Rs 500 oer month. If it is increased by 20 % then what will be your new pocket money?

Of course your new pocket money will be 600. But what if it is further decreased by 20% ?

Will your pocket money will become same as before??

No.Why??

This is because of successive process.

So next we are going to study is net percentage change.

$$x+y+\frac{xy}{100}$$

But always remember one thing x and y always come with sign. Means if quantity is increased we will take + and if it is decreased we will take -.

So the answer of the question asked will be-

$$20-20-\frac{20\times 20}{100}=-4\%$$

But what if there are three changes??

We also have formula for that

$$x+y+z+\frac{xy}{100}+\frac{yz}{100}+\frac{zx}{100}-\frac{xyz}{10000}$$

But using this formula is not a great idea instead this we can apply first formula thrice Like

Example:

Find the net percentage change of 40% increase.25% decrease and 10% increase?

Solution:

Very important point it doesn't matter which change is applied first final change will be always same.

$$40-25-\frac{25\times 40}{100}=5$$

Again $5+10+\frac{5\times 10}{100}=15.5$

So final change will be decrease of 17.5%.

Example:

The capacity of a ground was 100000 at the end of 2012. In 2013, it increased by 10% and in 2014, it decreased by 18.18%. What was the ground's capacity at the end of 2014?

Solution:

When One percentage change is positive and the other is negative:

x is positive and y is negative, then net percentage change = (x-y-xy/100)%

Final Percentage Change over the original value

= 10-18.18 – (10 × 18.18/100)= -9.998

(the difference above is cause by using exact values).

So the capacity of the ground is decreased by 9.998%

Hence, net capacity = 90002

Example:

A's salary is increased by 10% and then decreased by 10%. The change in salary is

Solution:

$$10-10-\frac{10\times 10}{100}=-1$$

Example:

A number is first increased by 10% and then it is further increased by 20%. The original number is increased altogether by:

Answers:

Percentage change formula when both x and y are positive ={x + y + (xy/100)}%

Here, x = 10 and y = 20

Hence net percentage change == {10 + 20 + (10 x 20)/100} = 32%

What is the Product Constancy Ratio?

In this concept, we essentially refer to the practice wherein two or more quantities make up a third quantity. With the variation in the numbers of one quantity, the other quantities need to undergo change in order to maintain the same product.

Let's take an example.

Let there be two quantities A and B that multiply to form a quantity P. We can say:

A × B = P

Now if A is increased by a certain percentage, then B is required to be decreased by a certain percentage to keep the product P stable.

The following table illustrates the varying values of A and B that will maintain the same product P.

Change in A (INCREASE)	Change in B (DECREASE)	CHANGE IN P
100%	50%	0
50%	33.33%	0
33.33%	25%	0
25%	20%	0
20%	16.66%	0
16.66%	14.28%	0

The same table can also be expressed in the form of ratios:

Change in A (INCREASE)	Change in B (DECREASE)	Change in P
$\frac{1}{1}$	$\frac{1}{2}$	0
$\frac{1}{2}$	$\frac{1}{3}$	0
$\frac{1}{3}$	$\frac{1}{4}$	0
$\frac{1}{4}$	$\frac{1}{5}$	0

Application of Product Constancy: Expenditure Questions

If the price of a commodity increases or decreases by a%, then, the percentage decrease or increase in consumption, so as not to increase or decrease the expenditure is equal to: (a/100±a)×100%

Example:

Length of a rectangle is increased by 33.33%. By what percentage should the breadth be decreased so that area remains constant?

Solution: Using the table above:
Since length is increased by 33.33%, the breadth will decrease by 25% to keep area constant.
Let's make these calculations also.
Let original length= L
Original Breadth= B
Increase length= 4/3 L
Since the area remains same, we can say
L x B = Increased Breadth x 4/3L
Therefore,
Increased breadth = ¾ Original Breadth = 25% reduction in breadth.

Example:

When speed of a car is increased by 25%, time taken reduces by 40 minutes in covering a certain distance.What is the actual time taken to cover the same distance by actual speed?
Solution: We have Speed × Time = Distance
Since speed has been increased by 25%, time will reduce by 20%.
Now, 20% of actual time = 40 min
Actual time = 200 min

Example: Price of a commodity has increased by 60%. By what percent must a consumer reduce the consumption of the commodity so as not to increase the expenditure ?

(a) 37% (b) 37.5%
(c) 40.5% (d) 60%

Answers: (b)
If the reduction in consumption be x%, then,

$$60 - x - \frac{60x}{100} = 0$$

$$60 - x - \frac{60x}{100} = 0$$

$$60 - x - \frac{3x}{5} = 0$$

$$300 - 5x - 3x = 0$$

$$8x = 300$$

$$x = \frac{300}{8} = 37.5\%$$

SOME OBSERVATION

(1) If 20% candidate failed in an exam then observations are

- 80% represent passed in exam
- 100% represent total appeared in exam
- (80%-20%) = 60% represent difference between passed and failed candidate in exam

(2) If a number is increased by 25% then observations are

- 100% represent the old number
- 125% represent the new number.

(3) Remember that Base in the given sentence (Question) is always 100%

Eg. Income of Ram is increased by 20%
In this sentence
100% - represent the income of Ram
20% - represent increment
120% - represent new income of Ram.

(4) If of A is equal to y% of B then –

$$z\%\ of\ A = \left[\frac{yz}{x}\right]\%\ of\ B$$

Example:

If 10% of A is equal to 12% of B, then 15% of A is equal to what percent of B?

$$15\%\ of\ A = \left[\frac{12 * 15}{10}\right]\%\ of\ B$$

$$15\%\ of\ A = 18\%\ of\ B$$

(5) If A is more than B,
then B is $\left[\frac{x}{100+x} * 100\right]$% less than A.

Or

If A is x% less than B, then B is $\left[\frac{x}{100-x} * 100\right]$% more than A.

Example:

If income of Ravi is 20% more than that of Ram, then the income of Ram is how much percent less than that of Ravi?

$$Required\ Percentage = \left[\frac{20}{100 + 20} * 100\right] = \frac{50}{3}\% = 16\frac{2}{3}\%$$

(6) If the passing marks in an examination is P%. If a candidate scores S marks and fails by F marks then–

$$MM = \frac{100 \times (R+S)}{P}$$

(7) If a candidate scores marks and fails by a marks while an another candidate scores y% marks and gets b marks more than minimum passing marks, then –

$$\textbf{Maximum marks} = \frac{\textbf{sum of scores}}{\textbf{difference in \% marks}} * 100$$

Example:

Raj scores 30% and fails by 60 marks, while Rohan who scores 55% marks, gets 40 marks more than the minimum required marks to pass the examination. Find the maximum marks for the examination?

$$MM = \frac{(60+40)}{(55-30)} \times 100 = 400$$

(8) If due to decrement in the price of an item, a person can buy Kg more in y rupees, then actual price of that item –

$$= \frac{(Rate) * y}{(100 - Rate) * x}\ per\ Kg$$

Example:

Ram can buy 5 Kg more sugar in rupees 100 as the price of sugar has decreased by 10%. Find the actual price of the sugar?

$$\frac{10\times100}{(100-10)\times5}=\frac{20}{9}$$

(9) If in an election, a candidate got of total votes cast and still lose by y votes, the total number of votes cast –

$$\frac{100\times y}{100-2x}$$

Example:

In an election contested by two candidates, one candidate got 40% of total votes and still lost by 500 votes, find the total number of votes casted?

$$TV=\frac{100\times500}{100-(2\times40)}=2500$$

(10) If the population of a town is P and it increases or decreases at the rate of R% per annum then –

I. Population after 'n' years :

$$=\mathbf{P}*\left[1\pm\frac{\mathbf{R}}{\mathbf{100}}\right]^{\mathbf{n}}$$

II. Population 'n' years ago :

$$=\frac{\mathbf{P}}{\left[1\pm\frac{\mathbf{R}}{\mathbf{100}}\right]^{\mathbf{n}}}$$

(11) If the value of a number is first increased by and again decreased by the net effect is always decreased by $^{x^2}/_{100}\%$

Example: -The salary of a worker is first increased by 5% and then it is decreased by 5%. What is the change in his salary?

$$\text{Percent Decreanent}=\frac{(5)^2}{100}=0.25\%$$

15% of 80 = 12

85% of 620 =

PROBLEM TYPE-1: PROBLEMS BASED ON QUANTITY PURCHASED

Example:

A reduction of 21% in the price of an item enables a person to buy 3 kg more for 100. The reduced price of item per kg is:

(a) Rs. 5.50 (b) Rs. 7.50

(c) Rs. 10.50 (d) Rs. 7.00

Solution:(d)

Reduced price will be:

Rp/100y per kg

In our case R= Rs. 100 , x=21% , y=3kg

{(100 x 21)/(100 x 3)} = Rs. 7

Alternate method:

Expenditure = price per quantity × consumption

E = P × Q =100……. (1)

Now, as per the question,

$$E=P(\frac{100-21}{100})(Q+3)=100.....(2)$$

$$P\times Q=P(\frac{100-21}{100})(Q+3)$$

$$Q=(\frac{100-21}{100})(Q+3)$$

$$Q=\frac{79}{7}kg$$

$$\text{Price}(p)=\frac{100}{79}\times7=\frac{700}{79}rs$$

$$reduced\ \text{price will be}=\frac{700}{79}(\frac{100-21}{100})=7rs$$

PROBLEM TYPE-2: PROBLEMS BASED ON MIXTURES

Example:

A vessel has 60 L of solution of acid and water having 80% acid. How much water is to be added to make it solution in which acid forms 60%?

(a) 48 L

(b) 20 L

(c) 36 L

(d) None of these

Solution: (b)

Given, percentage of acid = 80%

Then, percentage of water = 20%

In 60L of solution, water = (60 x 20)/ 100 = 12L

Let p liter of water is to be added.

According to the question,

=>{(12 + p)/(60 + p)} x 100 = 40 (∵ 100 – 60 = 40% water)

=>1200 + 100p = 2400 + 40p

⇒ 60p = 1200

p= 20L

PROBLEM TYPE-3:
PROBLEMS BASED ON RATIOS AND FRACTIONS

Example:

If the numerator of a fraction is increased by 20% and the denominator is decreased by 5%, the value of the new fraction become 5/2. The original fraction is:

(a) 24/19 (b) 3/18

(c) 95/48 (d) 48/95

Solution: (c)

Let original fraction be p/y

According to the question, {(120/100)p/(95/100)y} = 5/2

120p/95y = 5/2 => p/y = (5/2)x (95/120) = 95/48.

PROBLEM TYPE-4:
PROBLEMS BASED ON INCOME, SALARY, EXPENDITURE

Example:

The monthly income of a person was Rs 13500 and his monthly expenditure was Rs 9000. Nextyear his income increased by 14% and his expenditure increased by 7%. The per cent increase inhis savings was:

(a) 7% (b) 21%

(c) 28% (d) 35%

Solution: (c)

Given, monthly income = 13500 and expenditure = 9000

Then, original savings= Rs. (13500-9000) = Rs 4500

New income = 114% of Rs. 13500 = Rs 15390

New expenditure= 107% of Rs 9000 = Rs 9630

New saving = Rs. (15390 – 9630) = Rs 5760

NS = new savings, OS = Original savings

Percentage increase in savings = {(NS – OS)/OS} X 100

{(5760 – 4500)/4500} X 100 = (1260/4500)X 100 = 28%

Example:

A number, on subtracting 15 from it, reduces to its 80%. What is 40% of the number?

(a) 75 (b) 60

(c) 30 (d) 90

Solution: (c)

Let the number be p.

According to the question, p – 15 = p(80/100)

p -15 = 4p/5 $\Rightarrow$ 5p – 75 = 4p $\Rightarrow$ p = 75

Now, 40% of 75 = (75 x 40)/ 100 = 30

Example:

lf A has 4/5 of the number of books that shelf B has. If 25% of the books A are transferred to B and then 25 % of the books from B are transferred to A then the percentage of the total number of books that on shelf A is:

(a) 25% (b) 50%

(c) 75% (d) 100%

Solution: (b)

Let the number of books in shelf B be 100.

$\therefore$ Number of books in shelf A = {(100 x 4)/5} = 80

On transferring 25% i.e.,of books of shelf A to shelf B, the books on

shelf B = {100 + (80 x 25)/100}

B = 100 + 20 = 120

Books left in shelf A = 80-20 = 60

Again, on transferring 1/4th books of shelf B to shelf A, the books on

shelf A = {60 + (120/4)} = 90

Total no of books in A and B = 120 +60 = 180

Required percentage of books on shelf A = (90/180) x 100 = 50%

Question:

In an examination, 52% of the candidates failed in English and 42% failed in Mathematics. If17% failed in both the subjects, then the percentage of candidates who passed in both the subjects, was:

(a) 23% (b) 21%

(c) 25% (d) 22%

Solution: (a)

In an examination a% of total number of candidates failed in a subject X and b% of total number of candidates failed in subject Y and c% failed in both subjects.

Then, percentage of candidates who passed in both the subjects: [100–(a + b– c)%].

Why so?

We need to subtract failed candidate from total to calculate pass candidates, but in this process, we subtract people who were fail in both of subjects twice, so we added c again.

Now equation can be read as [100—a-b+c]

Here, a = 52, b = 42 and c = 17, then Percentage of candidates who passed in both the subjects

= [100 –(52 +42–17)] = 100–77=23%

Question:

If a% of a is 9, then ‘a’ is equal to

(a) 300 (b) 400

(c) 30 (d) 20

Solution: (c)

Given, a% of a = 9. (a/100) x a = 9$\Rightarrow$ a^2 = 900

Therefore a= 30

Question: When 75 is added to 75% of a number, the answer is the number. Find 40% of that number.

(a) 100 (b) 80

(c) 120 (d) 160

The right answer is option c

Let the number be p.

75% of p + 75 = p $\Rightarrow$(75/100)p + 75 = p

$\Rightarrow$ 75 = p –(75p/100) $\Rightarrow$ 75 =(25p/100)

$\Rightarrow$ p= 75 × 4 = 300 $\therefore$ 40% of p =(40/100) × 300 = 120.

Question:

If 40% of A is added to 50% of B, the answer is 80% of B. What percentage of B is A?

(a) 30% (b) 40%

(c) 70% (d) 75%

Option D is the right answer

According to the question,

$$A\times\frac{40}{100}+\frac{B\times50}{100}=\frac{B\times80}{100}$$

$$\Rightarrow A\times\frac{2}{5}+\frac{B\times1}{2}=\frac{B\times4}{5}$$

$$\Rightarrow\frac{2A}{5}=\frac{4B}{5}-\frac{B}{2}=\frac{8B-5B}{10}=\frac{3B}{10}$$

$$\Rightarrow 2A=\frac{3B}{2}$$

$$\Rightarrow 4A=3B$$

$$\Rightarrow A=\frac{3B}{4}$$

$$\Rightarrow A=75\%of\ B.$$

Question :

If 50% of (x – y) = 30% of (x + y), then what per cent of x is y?

(a) 25% (b) 100/3 %

(c) 40% (d) 400%

Given, 50% of (x – y) = 30% of (x + y)

$$\Rightarrow\frac{50\times(x-y)}{100}=\frac{30\times(x+y)}{100}$$

$$\Rightarrow\frac{1}{2}(x-y)=\frac{3}{10}(x+y)$$

$$\Rightarrow\frac{x}{2}-\frac{3x}{10}=\frac{3}{10}y+\frac{y}{2}$$

$$\Rightarrow\frac{5x-3x}{10}=\frac{3y+5y}{10}$$

$$\Rightarrow\frac{x}{5}=\frac{4y}{5}$$

$$\Rightarrow x=4y$$

$$\Rightarrow y=\frac{x}{4}$$

$$\frac{y}{x}=\frac{1}{4}\times100=25\%$$

Question :

A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had

(a) 588 apples (b) 600 apples

(c) 672 apples (d) 700 apples

The right option is option d

Let the fruit seller originally have y apples.

According to the question,

Total apples – sold apples = left apples

y – 40% of y = 420

y – (40/100)x y = 420

y – (2y/5) = 420

{(5y – 2y)/5} = 420

3y/5 = 420

y =(420 x 5)/3 = 700

Question:

If X= 5.35 Y, then find the percentage increase when the value of something is from Y to X.

Solution:

Use the formula: (n-1)100%

Percentage increase from

Y to X = (5.35 -1) 100= 435%

Example:

A number exceeds 20% of itself by 40. The number is:

(a) 50 (b) 60

(c) 80 (d) 48

Solution:

Let the number be p.

20% of itself means => p x (20/100)

Now, according to the question,

p – 20% of p = 40 => {p – (20 x p)/100} = 40

=> {p-(p/5)} = 40$\Rightarrow$ 5p – p = 200

$\therefore$ p = 50

Alternate Method:

Obviously, it is clear that difference is 80% i.e. 4/5 of number which is equal to 40

4/5p = 40, p = 40 x 5/4= 50.

Question:

In an examination, 35% is passing marks one candidate obtain 135 marks and failed by 40 marks then find the maximum marks?

Solution:

35% = 135 + 40, $100\% = \frac{175}{35}\times100 = 500$

Question:

Rohit obtained 480 marks out of 600 and Mohit obtained 560 marks out of 800. Whose performance is better and how much %?

Solution:

Rohit got = $\frac{480}{600}$ x 100 = 80 %

Mohit got = $\frac{450}{800}$ x 100 = 70 %

Rohit performance is better.

% better = $\frac{10}{70}$ x 100 = 14 $\frac{2}{7}$ %

Question:

In an election between two candidates, 65 votes were declared invalid one candidate gets 52% votes and win by 98 votes. Find the total number of votes?

Winner 52% Looser 48%

4% = 98

100% = 2450

Valid vote = 2450

Total vote = 2450 +65 = 2515

Question:

The length and breadth of the rectangle are increased by 30% and 20% respectively, so find the net % change in its area?

Solution:

Net % change = x + y + $\frac{X \times Y}{100}$ = 30 + 20 + $\frac{30 \times 20}{100}$ = 56%

Question:

A, B and C are three persons. A earned 40% more than B and B earned 20% less than C, so what % more earned A than C.

Solution:

A	B	C
112	80	100

A more earned than C = 112 – 100 = 12

$\%\text{moreeraned} = \frac{12 \times 100}{100}$ = 12 %

Question:

Due to reduction of 20% in the price of apples enables a person to purchase 16 apples more for Rs.320, so find the reduced rate of 10 apples?

Solution:

Reduced rate = $\frac{320 \times 20}{100}$ = 64

Reduced rate of 1 apple = $\frac{64}{16}$ = Rs. 4

Reduced rate of 10 apples = 4 x10 = Rs.40

Question:

A mixture of 40 litres of milk and water contains 10% water. How much water should be added, so water may be 20% in the new mixture?

Solution:

$40 \times \frac{10}{100}$ 4 lit., 80% = 36, 1% = $\frac{36}{80}$

20% = $\frac{36}{80} \times 20$ = 9 Lit. Req. water = 9 – 4 = 5 lit.

Question:

Fresh fruit contains 68% water and dry fruit contains 20% water. How much dry fruit can be obtained from 100 kg. of fresh fruit ?

Solution:

Fruit content in 100 kg. of fresh fruits = 100× $\frac{32}{100}$ = 32 kg.

Since , dry fruits contain 80% fruit content,

80% = 32, 1% = $\frac{32}{80}$, 100% = $\frac{32}{80} \times 100$ = 40 kg.

Question:

In an examination, 35% of the candidates failed in Mathematics and 38% failed in English. 28% passed in both subjects, then how much percent failed in both the subjects?

Solution:

Failed in Maths = 35%

Passed in Maths = 100% ¯ 35% = 65%

Failed in English = 38%

Passed in Maths = 100% ¯ 38% = 62%

Failed in both subjects = 100% – (37%+28%+34%) = 1%

Question:

A number is mistakenly divided by 10 instead of being multiplied by 10.What is the percentage error in the result?

Solution:

Let the number is 10.

Actual result = 10 x 10 = 100

Wrong result = $\frac{10}{10}$ = 1

% change = $\frac{100-1}{100}$ x 100 = 99%

Question:

The numerator of a fraction is increased by 400% and the denominator is increased by 500%, so the resultant fraction is 15/22. Find the original fraction?

Solution:

$\frac{500\% \text{ of } x}{600\% \text{ of } y} = \frac{15}{22}$ $\frac{5x}{6y} = \frac{15}{22}$

Original Fraction $\frac{x}{y} = \frac{15 \times 6}{22 \times 5}$