Percentage

GENERAL APTITUDE

Basics

- Percentage always refers to 100 as the base.
- A percentage value can be more than 100 not necessarily less than 100 always.

Basic Formulae

(1) a % of b is calculated as = (a/100)* b

(2) What % of a is b, (?/100) * a = b

? = (b/a) * 100 is the formula for calculation

(3)Percentage increase Calculation

If the number "a" increases to "b" ,% increase is calculated as

= {(b-a)/a} * 100

Note: The base value for calculation is always the original number which is "a" in this case

(4) Percentage decrease Calculation

If the number "a" decreases to "b" ,% decrease is calculated as = {(a-b)/a} * 100

Note the base value for calculation is always the original number which is "a" in this case.

(5) If the number N increases by p % , the new value is calculated as

= N * (1 + (p/100))

(6) If the number N decreases by p %, the new value is calculated as

= N * (1 - (p/100))

(7) Consider two numbers a & b such that a>b.

By what % a exceeds b is calculated as ((a-b)/b) * 100

By what % b is less than a is calculated as ((a-b)/b) * 100

Any % calculation is always with respect to a base value. A wrong choice of base will end up giving you a wrong answer.

If 25% of (280) is equal to 7% of (x), then x is

a) 500 b) 1000 c) 700 d) 800

Solution:

- (25/100)* 280 = (7/100) * x
- x = 25 x 280 /7 = 1000 (choice b)

If A:B = 6:5, then by what % is A is more than B?

a) 20% b) 30% c) 50% d) 10%

Solution:

Let A = 6k & B = 5k ,where k € z+

More than B , means B becomes the base for comparison,

Hence required result = {(6k – 5k)/5k } * 100

= 20 % (choice a)

150 is what % of 120?

a) 150% b) 125% c) 110% d) 75%

Solution

- 150 = (?/100) x 120
- ? = 150 * 100 /120
- = 125% (choice b)
- Note that you can get a % value greater than 100 as your answer as specified earlier.

What % of 60 is 40?

a) 33 1/3% b) 66 2/3% c) 50 d) 80%

- Solution
- (?/100) * 60 = 40
- ? = (40/60) * 100
- = 66 2/3% (Choice b)

Which of the following is least?

a) 20% of (80) b) 30% of (60)

c) 35% of (50) d) 40% of (45)

- Solution
- a) 20 % of 80 = 16
- b) 30 % of 60 = 18
- c) 35 % of 50 can be converted as 50% of 35 = 17.5
- d)40 % of 45 = (2/5) * 45 = 18
- Hence least is option a.

A number when decreased by 20% becomes 136. What is the number ?

a) 160 b) 150 c) 170 d) 140

Solution

- Let the number be N.
- N (1- (20/100)) = 136 (Refer to formula discussed in basics section)
- N (1 – (1/5)) = 136
- N = 136 * 5/4 = 170 (choice c)

A number when increased by 40% becomes 420. What is the number ?

a) 200 b) 300 c) 400 d) 320

- Solution
- Let the number be N.
- N (1 + (40/100)) = 420
- N * 7/5 = 420
- N = 300 (Option b)

The price of an article is first decreased by 10% & then increased by 10% successively . If the price after these changes is Rs990, the original price of the article was,
a) 990 b) 1000 c) 1010 d) 1020

- Solution
- Let the original price = k
- Price after first change = k (1- (10/100)), now this price undergoes the second change.
- Hence price after second change =

k (1- (10/100)) (1 + (10/100)) = Rs 990

k * 9/10 * 11/10 = 990

On simplifying k = 1000 (choice b)

If A's income is 20% more than that of B, then by what % is B's income less than that of A?

a) 25% b) 20% c) 16 2/3% d) 50%

- Solution
- If B's income is k.
- A's income = k(1+(20/100))= 1.2k
- by what % is B's income less than that of A
- Recall that now the base for calculation is A's income
- Required result = {(1.2k – k)/1.2k} * 100

  = (1/6) * 100 = 16 2/3 % (Option c)

Also note that while A's income exceeds B's income by 20%, B's income is less than A's income by 16 2/3%. Both these values are not equal, as percentage calculation depends on choice of base value.

The price of an ice cream is decreased by 20%, then by what % should the consumption be increased in order to maintain a constant expenditure?

a) 20% b) 50% c) 25% d) 40%

- Solution:

	Price	Consumption	Expenditure
Original	100	4	400
Revised	80	5	400

If original price = Rs 100,revised price is Rs 80/-

Choose a common multiple for 100 & 80 and fix that value as expenditure.

Work out the consumption values as shown in the table.

Consumption has increased from 4 to 5 unit's, so % increase is

((5-4)/4) x 100 = 25%.

(Option c)

The price of sugar increased by 50%, then by what % does the consumption of sugar be reduced so that the total expenditure on sugar increased by 20%?

a) 20% b) 25% c) 40% d) 10%

- Solution:

	Price	Consumption	Expenditure
Original	100	1	100
Revised	150	120/150	120

Expenditure increases by 20 % , original consumption is one unit, revised is 120/150 =4/5 = 0.8 units.

Hence % reduction in consumption = ((1-0.8)/1) x 100

= 20% (Option A)

The price of tea increased by 20%, then by what % should the consumption be decreased so that the total expenditure is decreased by 10%?

a) 20% b) 25% c) 40% d) 10%

- Solution:

	Price	Consumption	Expenditure
Original	100	1	100
Revised	120	90/120	90

Expenditure reduced by 10 %,original consumption = 1 unit.

Revised consumption is 90/120 = ¾ units = 0.75.

% reduction in consumption = ((1-0.75)/1) x 100 = 25% (option b)

The length of a rectangle increased by 25% and the breadth decreased by 10%. What is the increased % in its area?

a) 10% b) 35% c) 15% d) 12.5%

- Solution:

	Length	Breadth	Area
Original	L	B	LB
Revised	L (1 +(25/100))	B (1- ((10/100))	
	= 1.25 L	= 0.9 B	1.25L x 0.9B
	=1.125LB		

% increase in area = { (1.125LB – LB)/LB} x 100

= 12.5% (Option d)

A spends 60% of his salary and saves the remaining. His salary is increased by 25% and he increased his expenditure by 20%. By what % does his saving increase?
a) 30% b) 32.5% c) 35% d) 40%

- Solution:

	Salary	Expenditure	Saving
Original	100k	60k	40k
Revised	125K	72k (60 x 1.2)	53k

- % increase in saving = ((53k – 40k)/40k) x 100
- = 32.5% (Option b)

In an examination 65% of the students passed. If the number of failures is 420, find the total number of students?

a) 1000 b) 900 c) 1200 d) 1500

- Solution:
- If 65 % students passed, failure is 35 % of total students.
- Let total students = T
- 35% of T = 420 given
- T = 420 x (100/35) = 1200 (option c)

In an election between 2 candidates, a candidate secured 62% of the votes and is elected by a majority of 144 votes. Find the total number of votes polled?

a) 400 b) 600 c) 800 d) 1000

- Solution:
- Let total votes polled be 100k.
- One candidate secured 62% of total votes = 62k.
- The other candidate would have bagged 100k – 62k = 38k votes.
- Given 62k – 38 k = 144, k=6
- So 100k = 100 x 6 = 600 which is the total number of votes.(Option b)

The value of a machine depreciates 10% annually .If its present value is Rs.4000, its value after 2 yrs in rupees will be,

a) 3200 b) 2000 c) 3000 d) 3240

- Solution:
- Depreciation means reduction in the book value.
- We can visualize the problem as follows

- Present value → Reduced value after first year → Reduced value after second year.

4000 (reduction by 10%)

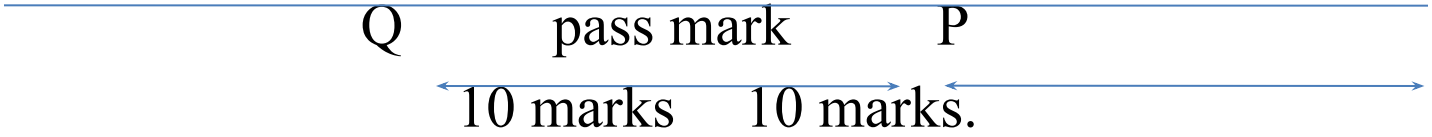
4000(1 – (10/100) = 3600 (reduction by 10 %)

=3600 ((1-10/100) = 3240 (Option d)

In a test P got 40% of the maximum marks and got 10 marks more than the pass mark. Q got 30% of maximum marks and failed by 10 marks. Find the pass mark?

a) 60 b) 70 c) 80 d) 90

- Solution:
- We visualize a mark spread as indicated below.



P's mark = 40 % of maximum

Q's mark is 30% of maximum.

Difference between their marks = 10 + 10 = 20 (See figure above).

Implies 40 % of maximum – 30% of maximum= 20

So maximum marks is 200.

P's score = 40 % of 200 = 80 ,which is 10 marks more than pass mark.

So pass mark = 80 – 10 = 70 (choice b)

In a group of persons 70% of the persons are male and 30% of the persons are married. If 2/7 of the males are married, what fraction of the females is single?

a) 2/7 b) 1/3 c) 3/7 d) 2/3

- Solution:
- The excel sheet below shows the complete working.

	Married	Unmarried	Total
Males	20k	50k	70k
Females	10k	20k	30k
Total	30k	70k	100k

- Based on the above table 20 k females are unmarried out of a total of 30k females Hence required result is 2/3 (option d).