1. What percent is 2 minutes 24 seconds of an hour?

a. 6%

b. 2%

c. 4%

d. 8%

2 . Adding  20%  of  x  to  x  is  equivalent  to  multiplying  x  by  which  of  the  following?

a. 12.5

b. 1.05

c. 1.15

d. 1.20

3 . What is the value of  81/3%  of   600+  37 ½  of  400

a. 100

b. 300

c. 150

d. 200

4.  Two  third  of  three fifth   of  five  sixth  of  a  number  is  what  percentage  of  that  number?

a. 66 2/3 %

b. 33 1/3 %

c. 60%

d. 40%

5.  Due  to fall  in manpower , the production  in a factory  decreases  by  40%, By  what  percentage   should  the  working  hours  be  increased  to  restore  the  original  level  of  production?

a. 662/3 %

b. 46 1/3%

c. 25%

d. 40%

6. The salary  of  all officers  is  increased  twice successively  by  20%.  What  is  the  net  percentage  increase  in  their  salaries?

a. 20%

b. 40%

c. 21%

d. 44%

7. In  an  examination  it  is  necessary  for  a  candidate  to  get   45 %  of  the  maximum  marks  to  pass. A  candidate  who  gets  180  marks, fails by  45 marks. Find  the  maximum  marks.

a. 450

b. 600

c. 500

d. 550

8. 10 litres  of  water  is  added  to  50 litres  of  a  solution  containing  20%  of  alcohol  in  water . What  is  the  strength  of  alcohol  in  the  solution  now ?

a. 20%

b. 16 2/3 %

c. 12 1/2 %

d. 33 1/3 %

9. The  population  of a town  increase  annually by 20% .  If  the  present   population  is  2,00,000, then  what  is  the  difference  in  population  after  two  years  and  three years

a. 63,250

b. 48,800

c. 60,800

d. 57,600

10. Population  of  a  city  decreases  by  10%  at  the  end  of  first  year  and  increases  by   10%  at  the  end  of  second  year  and  again  decreases  by  10%  at  the  end  of  third  year.  If  the  population  of  the  city  at  the  end  of  third  year  is  4455,  then  what  was  the  population  of  the  city  at  the  beginning  of  the  first  year?

a. 5,000

b. 4,500

c. 4,950

d. 1,000

11. If  the  price  of  an  article  decreases  by  111/9 % and  the  sale  of  the  article  increases  by  12 ½ %,  what  is  the  net  effect  on  revenue?

a. 1% loss

b. 1% gain

c. No loss or no gain

d. Cannot  be  determined

12. In  an  exam  80%  of  the  boys  and  40%  of  the girls  passed.  The number  of  girls  who  passed  is  120, which  is  2/3rdof  the  number  of  boys  who  failed.  What  is  the  total  number  of  students  who  appeared  for  the  exam?

a. 1200

b. 380

c. 3800

d. 2180

13. The  population of  cities  A and B is equal. The  population  of  city A  increases  in  two  successive  years  by  20%  and  15%  respectively and  that  of  city  B  increases  successively  by  20%  and  10%  respectively.  If  the  difference  in  the  population  of  two  cities  after  2  years  is  768,  then  what  was  the  total  population  of  the  two  cities  initially?

a. 12,800

b. 26,500

c. 24,600

d. 25,600

14.  What  quantity   of  water  should  be added  to  reduce  5 litres  of  45%   acidic  liquid   to  25%   acidic  liquid?

a. 3litres

b. 2litres

c. 4litres

d. 4.5litres

15.  A, B, and  C  contest  an  election  from  a particular  constituency.  A  and  B  together  got  50%  more  votes  than  C.  The  vote  share  of   A  and  C  together  is  30  percentage  points  more  than  the  vote  share  of  B. Who  won  the  election?

a. A

b. B

c. C

d. Cannot  be  determined

16. In  an  examination  amar  got  8%  less  than  the  pass  mark  and  mohan  got  20%  more  than  the  pass  mark.  If  the  difference  between  the  percentage  of  their  mark  is  14,  then  what  is  the  pass  percentage

a. 40%

b. 50%

c. 60%

d. cannot  be  determined.

17. The  salaries  of  A and  B  together  is  Rs. 14,000. A spend 80%  of  his  salary  and  B  spends  85%  of  his  salary. What  is  the  salary  of  B  if  their  savings  are  equal?

a. Rs. 6,000

b. Rs. 8,000

c. Rs. 7,500

d. Rs. 6,500

18. A  sum  of  Rs. 395  was   divided  among  A, B, and  C  in  such  a  way  that  B  gets  25%  more  than  A  and  20%  more  than  C.  What  is  the  share  of   A?

a. Rs.195

b. Rs.180

c. Rs. 98

d. Rs. 120

19. There  are  three  positive  intigers  such  that  70%  of the  first  number ,  58 1/3% of  second  number  and  38 8/9%  of  the  third  number  are  all  equal.  Which  of  the  following  can  those  three  numbers  be?

a. 5,6,9

b.10,12,18

c.15,18,27

d. All  the  three

20.  Three  times  a number  is 20%  more  than  twice  another  number   when  increased  by  105.  If  twice the first  number increased  by 36  is 20%  less  than  three  times  of  the  second  number,  then  what  is  the  first  number?

a. 150

b.162

c. 180

d.None of  these

**Answer & Explanations**

1. 2mt 24s =144s

          144\*100/60\*60=4%

2. 120x/100= 1.2\*x

3. 25\*600/300 +  75\*400/200  =50+150= 200

4. 2/3\*3/5\*5/6 =1/3

           1/3 x/ x\*100 = 100/3 =  33 1/3 %

5. Increase in working hours   40\*100/100-40 =4000/60 =66 2/3 %

6. M . F   =  120/100\*120/100 =  36/25

          Net  %  increase    =  (  M . F  -1 ) \*100  =(  36/25-1) \* 100

           11/25 \*100 =  44 %

7. Let  max .  mark  =  x

                      pass  mark  =45x/100

                      180 = 45x/100-45

                       x =  180\*100-4500/45 =500

8. Quantity  of  alcohol  in  50 litres  =  50\*20/100  =10

                           strength  in  60 litre  solution  =  10/60\*100  =  100/6  = 16 2/3

9. M .F  for  2Yrs  =  120/100\*120/100 =36/25

                        M .F  for   3Yrs  =120/100\*120/100\*120/100 =6/5\*6/5\*6/5 =216/125

                         Population  after  2Yrs   =  2,00,000\*36/25 =  2,88,000

                         Population  after  3 Yrs   =  2,00,000\*216/125 = 3,45,600

                          Difference    =   3,45,600 – 2,88,000  =57,600

10. M. F  =  90/100\*110\*100\*90/100 =  81\*11/1000

                        Population  before  3Yrs  =  I.Q /M. F =  4455\*1000/81\*11 = 5000

11. M. F 1 = 100-100/9/100 =800/900 = 8/9

                          M. F  2 = 100+25/2/100 =225/200 =9/8

                          Total  M. F  =8/9\*9/8 = 1

                          Overall  %  change  =  ( M. F – 1 ) \*  100  = ( 1 – 1 ) \* 100 =  0

12. Let  the Number of  boys  = x ,   Number  of  girls  =y

                                40y/100 =120

                                      y  =  300

                            120=  2/3\* 20x/100 = 2x/15

                                       x  =  900

                                  Total  =  x+y  =  300+900 =1200

13. Population  of  city  A =  Population  of  city  B  =  A

                               M . F  of   A  =   120/100\*115/100 =  138/100

                               M . F  of   B   =   120/100\*110/100 =132/100

                               Population  of  A  after  2  years    =    A\*138/100

                               Population  of  B  after  2  years    =     A\*132/100

                                              Difference   =    A/100( 138 –132 )   =  768

                                                            A   =   768\*100/6  =   12800

                                               Total  initial  population   =  12800+12800  =  25,600

14. Quantity  of  acid  in  5litres  =45\*5/100  =  2.25litres

       Let  X  litres  of  water  is  added  to  the  solution,  then  there  is  2.25litres  of  acid  in  ( 5+  X )   
      Litres  of  liquid.

                                   25%  of  ( 5 + X )  =   2.25,     25/100\*  ( 5 + X )   =  2.25

                                                X   =   225-125/25  =   4

15. Let a,b,c be the  vote  share  of  A, B, C  respectively

                                                a + b  =  1.5 c

                                                a + c   =  b + 30

                                              a + b + c   = 100,    2b + 30 =  100,

                                                         b  =  35

                                                         a  =   25,  c =  40,  So, C  won  the  election.

16. Let  P  be  the  pass  percentage,  then

                                   Amar  got  0.92 P% and  mohan  got  1.2 p%

                                   Given  that,  1.2 P – 0.92 p  =  14

                                              P  =14/0.28  =  50%

17. Let  the  salaries  of  A  and  B are  X  and  Y  respectively

                                                   X  +  Y   =   14,000

                                            Savings  of   A   =  20X/100  =  Savings   of   B   =  15Y/100

                                                                      X  =  ¾  Y

                                                      3/4Y + Y   =   14,000,     7Y/4   =14,000,   Y   =8,000

18. Let  each  one’s  share  is  A,B and C respectively,  then

                                          B  =125A/100  =  120C/100

                                                 A =100B/125 =4/5B,  C =  100B/120 =  5/6B

                                            4/5B +B  +5/6B  =395,   79B/30  =395,  B =395\*30/79 =150

                                                           A  =  4\*150/5  = 120

19. All  the  three  are  in the  same  ratio

20. Let  the  two  numbers  be  x  and  y.

                                               3x  =  1.2( 2y +105)

                                               3x   =  2.4y  +126     ………………..(1)

                                              2x +36  =  0.8(3y)

                                                2x +36  =2.4y            ………………..(2)

                                                     x   =    162

**Percentages**

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.  
Thus, 20%= 20/100= 1/5  
To express a/b as a percent, we have, a/b= (a/b)\*100%.  
Thus, 1/4= (1/4)\*100%= 25%.

1. If A is R% more than B, then B is less than A by R/ (100+R)\*100  
2. If A is R% less than B, then B is more than A by R/(100-R)\*100  
3. If the price of a commodity increases by R%, then reduction in consumption, not to increase the expenditure is: R/(100+R)\*100  
4. If the price of a commodity decreases by R%, then the increase in consumption, not to decrease the expenditure is: R/(100-R)\*100

**Results on population:**

Let the population of a 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

3. If a number is increased by x% and thereafter reduced by x%, then the number will be reduced by x2/100 percent

4. If a number is reduced by x% and there after increased by x% then the number will be reduced by x2/100 percent

5. If in an examination, in which the minimum pass percentage is x%, a candidate secures y marks and falls by z marks, then the total number of marks in this examination will be 100\*(y+z)/x

6. If in an examination x% and y% candidates respectively fail in two different subjects while z% candidates fail in both the subjects, then the percentage of candidates who pass in both the subjects will be [100-(x+y+z)]%

**Tips:**

1. If an object's price is increased or decreased by x% and the other factor is decreased by y% then the net effect is given by:  
Net Effect= [x+y+xy/100]%

2. If the net effect is nil, ie, there is no loss or no gain, then the above formula becomes: y=100x/100+x

3. If the price of an article is successively increased by x%,y% and z% then single equivalent increase in the price will be [x+y+z+{xy+yz+zx}/(100)+xyz/1002]%

4. If after spending p1% first, then p2% from the remaining and so on, B is the balance amount, then the total (original) amount is given by:  
Total amount= B\*100\*100...../ (100-p2).....

Population formula: 1)If the population increases by x% during the first year, by y% during the second year, by z% during the third year, the population after three years will be:  
P(1+x/100)(1+y/100)(1+z/100)

Percentage= (Sum of quantities)/(Number of quantities)

Percentage increase by x%= ((x+100)/100)\*Initial

Percentage decrease by x%= ((100-x)/100)\*Initial

**Exercise questions**

1. A trader makes a profit equal to the selling price of 75articles when he sold 100 of the articles. What % profit did he makein the transaction?  
A) 33.33%  
B) 75%  
C) 300%  
D) 150%

2. A merchant buys two articles for Rs.600. He sells one of themat a profit of 22% and the other at a loss of 8% and makes no profitor loss in the end. What is the selling price of the article that hesold at a loss?  
A) Rs. 404.80  
B) Rs. 440  
C) Rs. 536.80  
D)Rs. 160

3.A trader professes to sell his goods at a loss of 8% but weights900 grams in place of a kg weight. Find his real loss or gainpercent.  
A) 2% loss  
B) 2.22% gain  
C) 2% gain  
D) None ofthese

4. Rajiv sold an article for Rs.56 which cost him Rs.x. If he hadgained x% on his outlay, what was his cost?  
A) Rs. 40  
B) Rs.45  
C) Rs. 36  
D)Rs. 28

5. A trader buys goods at a 19% Amount on the label price. If hewants to make a profit of 20% after allowing a Amount of 10%, by what% should his marked price be greater than the original labelprice?  
A) +8%  
B) -3.8%  
C) +33.33%  
D) None of these

6. If apples are bought at the rate of 30 for a rupee. How manyapples must be sold for a rupee so as to gain 20%?  
A) 28  
B)25  
C) 20  
D) 22

7. Two merchants sell, each an article for Rs.1000. If Merchant Acomputes his profit on cost price, while Merchant B computes hisprofit on selling price, they end up making profits of 25%respectively. By how much is the profit made by Merchant B greaterthan that of Merchant A?  
A) Rs.66.67  
B) Rs. 50  
C) Rs.125  
D)Rs.200

8. A merchant marks his goods in such a way that the profit onsale of 50 articles is equal to the selling price of 25 articles.What is his profit margin?  
A) 25%  
B) 50%  
C) 100%  
D)66.67%

9. A merchant marks his goods up by 75% above his cost price. Whatis the maximum % Amount that he can offer so that he ends up sellingat no profit or loss?  
A) 75%  
B) 46.67%  
C) 300%  
D) 42.85%

10. The price of a T.V. is increased 30% before budget and inbudget 20% is also increased. Then total increase in price will be  
A)50%  
B) 56%  
C) 55%  
D) 59%

**Answer Key**

1.C; 2.A; 3.B; 4.A; 5.A; 6.B; 7.B; 7.B; 8.C; 9.D; 10.B