

Math ke funde...all these will have lots of applications in DI also.....

**Code:**

Percentage Table

	SUBTRACTED	ADDED
4	4.16(1/24)	3.86(1/26)
5	5.26(1/19)	4.76(1/21)
10	11.11(1/9)	9.09(1/11)
12.5	14.28(1/7)	11.11(1/9)
15	17.55	13
20	25	16.67(1/6)
25	33.33	20(1/5)
30	42.8	23
40	66.67(2/3)	28
50	100	33.33(1/3)
60	150	37.5(3/8)

when subtracted then add this%      when added the subtarct this%

-This table is used in questions related to topics like Profit and loss, time speed and distance, C.I.,S.I, etc. and also in D.I.

-This reduces ur calculation to the minimum level( but u shud know the reciprocals till 30 for that coz it will help a lot)

-Example – If the price of sugar increases then by how much % should one reduce his consumption to avoid extra expenditure.

When price of sugar is increased by 50% the consumption will reduce by 33.33%and like wise.

This will b most useful in TSD questions.

{If anyone knows abt. This % table in any book plz. Let me know the name of the book.}

As my personal advice I wud suggest all ppl seriously wanting to appear for cat shud learn the reciprocals, squares and cubes till 30 and roots also. I have felt that this makes calculations much faster. When I was preparing for cat we were told to keep on thinking in numbers until we were comfortable with there use all of us.

## COIN CONCEPT

When 2 quantities are sold as a group together .  
Here r some more fundas, with examples.

**Example-** A horse and a carriage were bought for Rs. 12000. the carriage was sold at a loss of 10% , horse was sold at a profit of 20%. Together I received Rs.13500. what is the C.P. and S.P. of each.

**Method-**Assume everything to be a horse, so I shud have sold everything at 20% profit.20% of 12000+12000= 14400.But I received Rs. 13500 only that makes a difference of 900 or Rs. 900 are less. This also makes a difference of 30% coz we calculated 40% profit (20+20%), but we had [+20%+(-10%)]=10%  
I calculated 30% more on carriage.  
30% or carriage=900  
therefore 100%=3000  
so now we have the individual cost of the horse, the carriage is for 9000/-and the S.P. can b calculated now.

We have similar questions in many forms which can b done by applying the above concept

**Sample Question.** 5 kg of rice and 2 kg of tea cost Rs/- 35, prices of rice grew by 10% and tea by 35% and together I could purchase it for Rs.420. What is the price of tea. (in these type of questions, whatever is asked take reverse of that, here tea is asked so work on rice.)

### Method

350+10% of 350=385  
420-385=35  
There is a difference of 25%(35%-10%)  
This is Rs. 35  
25% corresponds to Rs. 35  
therefore 100%=140  
2 Kg=Rs 140. so 1kg =70

**Example.-** I hired a servant for Rs. 300 per month and a cycle if he works for a year. After 8 months I threw him out and paid him Rs. 50 for that month and the cycle. How

much does the cycle cost?

**Method-** In 8 months the servant has earned  $\frac{2}{3}$ rd ( $\frac{8}{12}$ ) of the cycle. So he is left with just  $\frac{1}{3}$ rd of the cycle, which we will cut in place of 300 we gave him only 50.

$\frac{1}{3}$  corresponds to  $(300-50)=250$

therefore  $1=750$ . so the cost of the cycle is Rs. 750.

### **Sample Questions –**

1. Deccan queen moves for Pune from Mumbai at 5:00 a.m. and it reaches Pune at 9:00 a.m. Shatabdi starts at 7:00a.m. from Pune and reaches Mumbai at 10:30 a.m.. What time did the 2 trains meet.
2. Ajay and Vijay are at a distance of 100 mts., when 3rd time they meet ,they are at a distance of 20mts from Vijay's side and each of them have completed at least 100 mts., what are the ratio of the speed of Ajay and Vijay.
3. One car sets off at 8:00 a.m. at 60kmph, at 11:00 a.m. another car starts at 100kmph. At what distance from the starting point both will meet.
4. Mumbai to Pune local starts at 5:00 a.m. and they end at 12:00in the night. They take 4 hrs .And every 15 mins. one local is initiated from each station. – a)A 5:00a.m. local will meet how many locals in its journey. b) at what intervals it will meet the local.
5. On a highway12 trucks cross in 1hour at the equal intervals, if I move from opposite directions at double the speed of the truck , in one hr. I will cross how many trucks?
6. Vijay and Pallavi went for 100, mts. ski race. Initially Pallavi's speed was 1m/smore so Pallavi gave Vijay some lead in terms of time, when Pallavi caught up with Vijay, then Vijay increased his speed by 2m/s and he was the winner by 7 minutes and 8 seconds. Had the race been 500mts longer, he would have won by 25 more seconds. A) at what point Pallavi caught up with Vijay b.) what was the lead given to Vijay. C)speed of Pallavi, speed of Vijay.

Ans. for each question.

1. 7:56 a.m.
2. ratio-14:11
3. 450kms.
- 4 a)17 trains
- 5 36 trucks.
- 6 A)1440 mts. C)V-3m/s P-4m/s.

7. On a republic a day a 10 KM convoy has to cover 30km distance. Convoy moves at 10kmph. A motorcyclists starts from back of the convoy, moves in front , again goes

back and from back again goes to the front, and in the mean time the convoy has completed its journey.

- a. What is the speed of the motorcyclists?
- b. If he increases his speed by double, then how many rounds will he take ?

8. A,B,C had to go 100 kms. A had a motorcycle by which he could go @25 kmph. Walking is done @5kmph. A picks up B, while C walks, after sometime A drops B , B moves on , A comes back picks up C and all of them reach at the same time.

- a. At what distance B was dropped
- b. Motorcyclists traveled how many kms?
- c. Journey is of how many hours?
- d. A picked up C at what distance?

9. Robbery took place at 5:00a.m. and robbers took at speed of 60kmph at 9:00 a.m. police went after the chase @80kmph . A helicopter moved @120 kmph which used to go to the robbers and come back to police and again go back. Ultimately when robbers were caught, helicopter had moved how many kilometers toward the robbers.

### **Sample questions.**

1. A,B,C can finish the work in 10,12,15 days. A,B started working, then B left after 2 days. In how much time the work will be completed, if C joined after 4 days.
2. A can do a work in 15 days, A& B started, but after 4 days B left and the work was completed in 10 days. How much time will B take to complete the whole work.
3. A can finish a work in 30 minutes , B in 45 Minutes, but C was disturbing them and breaking the work ,They could finish the work in 3 hours. How much time c can break the work.
4. ( use data form above question also) If C is a destroyer and takes 10 days to destroy the work and order being A,B, C. In how much time work will be completed.
5. A can do a work in 20 days , B in 10 days and C in 25 days. 1 day before the work was to be completed C left, then half day before the work was scheduled to be completed B left and now A completed the work.
  - a. In how many days the work will get over?
  - b. How much extra time was taken?

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□ Posted: Mon Jun 09, 2003 10:54 pm

 reply  quote



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**Re: Important Table**  
**CALENDAR.**

1. 1st January 0001 was a Monday.
2. Calendar repeats after every 400 years.
3. Leap year- it is always divisible by 4, but century years are not leap years unless they are divisible by 400.
4. Odd days- remainder obtained when no. of days is divided by 7. Normal year has 1 odd day and leap year has 2 odd days.
5. Calendar moves ahead by number of odd days.
6. While checking leap year just analyze whether February falls in that period or not.
7. Century has 5 odd days and leap century has 6 odd days.
8. Take out net odd days.( add all the odd days and again divide by 7)
9. In a normal year 1st January and 2nd July and 1st October fall on the same day. In a leap year 1st January 1st July and 30th September fall on the same day.
10. 1st January 1901 was Tuesday.
11. We calculate odd days on the basis of the previous month.

Example – what day is it on 29th August 1982?

Method- As we know 1/1/1901 was a Tuesday now we take 1982 and 1901

-  $1982 - 1901 = 81$  years.

-  $81/4 = 20 \dots$  ( disregard decimal)

-  $81 + 20 = 101$

-  $101/7$ - remainder is 3, so 3 days from Tuesday is Friday.

- Now check whether it is a leap year or not. In this case it is not a leap year. Therefore 2nd July will be Friday

- Now we have to go month wise . 2nd august = 3 odd days= so from Friday 3 odd days will be Monday so 29th August will be a Sunday.

1. A product is made by mixing two kinds of metals in the ratio of 1:3 and the costs are in the ratio of 5:2. If it is sold at 50% profit to the retailer, who adds 25p and sells it at Rs. 8.50 per Kg. What is the C.P. of each per Kg.
2. Raghu wanted to sell something at a profit of 15%, then his C.P. decreased by 5. Raghu decided to earn a profit of 20%, but in totality he received Rs. 3000 less than before. What was the C.P. of the article.
3. If a shopkeeper marks his goods 50% above the C.P., but he gives 2 articles free if a person purchases 20 articles. Further the shopkeeper gives a discount of 10%. A customer bought 230 Articles. What is the profit%.
4. I bought 40 lts. Of milk for Rs. 600, when I went to sell it, I made a loss of as much money, which I received by selling 10 lts, what is my S.P.
5. A company invested Rs. 200 crores. Manufacturing cost comes to Rs. 6000 per unit for the 1st 10000 units, after that it reduces to 5000 per unit. If it is being sold at Rs. 8000 per unit, what is the break even point in terms of unit and in terms of sale.
6. A company manufactures computer chips in lots of Rs 100, if any defective chips found, the co. has to pay Rs. 50 per chip, so it can give its chip s for checking , 1st co. charges Rs. 2000 for checking 100 chips, but it can correct only 80% of the chips, another company charges Rs3000, but it corrects all the chips.
  - a. upto how many wrong chips per 100 we shud not use any rectification process.
  - b. At what level we should prefer 2nd rectification process over the 1st.
7. A contractor hired 30 men to complete a job in 50 days with 8 hrs, of working, 30 days passed and only 25% work was complete. He called some extra worker and made them work for 12 hrs in a day and he completed the work in time, How many more men did he employ.
8. A can finish a work in 9 days , B in 15 days, after how many days B should join so that work is completed on the 6th day.
9. 5 women & 7 men can complete a work in 8 days, 3 women & 10 men complete it in 6 days, then 10 men and 10 women will complete the work in how many days.
10. In a garrison there is food for 10000 men and it lasts for 1 month if 2kg per head is given everyday. Due to a war 10000 more men join and ration was reduced to 1.5 kgs. And the food got over by 10th day. If instead of 10000 men 5000 men would have joined and the earlier supply would have continued. Than food would have lasted for how many days.

1. John dropped a ball from a height of 8 feet. Everytime it bounces from half the distance it has come. What is the distance traveled by the ball before it comes to rest.
2. Product of 5 consecutive terms is 2000. what is the 1st and last term, and what is the ratio.
3. What is the smallest number that is divided by 8,9 leaving a remainder of 3 in both the

cases.

4. What is the smallest number that is divided by 5 and 8 leaving a remainder of 2 and 5 respectively.
5. Number of factors of 72? Out of these how many are odd? How many will be perfect squares? How many will be prime factors.
6. What does  $(999)^{999} \times 999^{999}$ ..... 99 times end with?
7. What is the remainder if  $14^{14} \times 14$ ..... 23 times is divided by 15?
8. What is the remainder when  $7^7 \times 7$ ..... 84 times is divided by 342.
9. Numbers of zero's at the end of product of 100 prime numbers.
10. A is 25% more than B. B is how much % less than A.
11. A train met with an accident and traveled with  $\frac{5}{6}$ th of the original speed from then. It was late by 15 minutes had the accident occurred 150 mts. Further. It would have been late by only 7 minutes. What is its usual speed.
12. The temperature from Monday to Friday were in proportion, on Monday it was 30 and Friday 53.33. what is the temperature on Thursday.
13. 15 men, 10 women and 20 children went to lucknow for a picnic. Total money spent was Rs. 30000 and it was spent in the ratio of 4:3:4, between men, women and children. How much does each spend and in what ratio?
14. In an alloy, 2 metals are mixed in the ratio of 2:3 and their cost are in the ratio of 5:2, If that alloy is sold @ of 200/kg at 25% profit. What is the cost of each metal separately.
15. A beats B by 30 mts in a 100 mts. Race, B beats C by 40 mts. In a 100 mts. Race, A will defeat C by how much in a 400 mts race.

## **PARTNERSHIP**

1. Capital = money put in the beginning = investment \* months
2. Net Capital or net investment = capital \* time
3. Time should always be calculated in months or days.
4. Profits are distributed in the ratio of net capital.
5. If capitals are given in the form of fraction like  $A = \frac{1}{3}$ ,  $B = \frac{3}{5}$ ,  $C = \frac{4}{7}$   
Then capitals are in the ratio of 35:63:60 ( using LCM method)
6. Sleeping Partner- who gets share of profit only, after everything is subtracted from the profit.
7. Working partner- he gets some money for working. This money is to be subtracted from the total profit and then he gets his due share from the new profit.
8. If a partner takes loan at a certain interest then interest is added to the profit, but in the end he also gets back his share of interest in share of profit.
9. Taxes are reduced from the original profit before hand. But individual income tax is given after distribution of profits.

.Simplify.  $(26.21 \times 26.21 - 14.79 \times 44.79) / 4.1 \times 26.21 - 4.1 \times 14.79$

2. The HCF of 2 nos. is 113 and their LCM is 228825. One of the no. is 2825. Find the other.
3. The LCM of 2 nos. is 28 times of their HCF. The sum of their LCM and HCF is 1740. If one of the nos. is 240, Find the other no.
4. The sum of 2 nos. is 684 and their HCF is 57. Find all the possible pairs of such numbers.
5. Three plots having an area of 132, 204 and 228 square mts. Respectively are to be sub-divided into equalized flower beds. If the breadth of a bed is 3mts., find the maximum length that a bed can have.
6. There are 408 boys and 312 girls in a school which are to be divided into equal sections of either boys or girls alone. Find the maximum number of boys or girls that can be placed in a section. Also find the total number of sections thus formed.
7. A wine seller had three types of wine , 403 gallon of 1st type, 434 gallon of 2nd type, 465 gallon of 3rd type. Find the least possible number of casks of equal size in which different types of wine can be filled without mixing.
8. Four bells ring at intervals of 6, 8, 12 and 18 seconds. They start ringing simultaneously at 120' clock. Find when they will again ring simultaneously ? how many times will they ring simultaneously in 6 minutes.
9. 3 equal circular wheels revolve round a common horizontal axis with different velocities. The first makes a revolution in  $5 \frac{1}{3}$  minutes, 2nd in  $2 \frac{6}{7}$  minutes and the 3rd in  $3 \frac{3}{7}$  minutes. 3 markings one in each wheel , are in horizontal line at a certain moment. What is the shortest interval after which they will be in horizontal line again.
  
10. A, B, C start at the same time from the same place in the same direction to walk round a circular course 12 miles long. A, B, C walk respectively at the rate of 3, 7 and 13 miles per hour. In what time will they come together again at starting point?
11. A gardener planted 103041 trees in such a way that a number of rows were as were the trees in a row, find the number of rows.
12. On 26th January 1986, students of a school were made to stand in several rows. Each row had as many students as were the total no. of rows. If the total number of students was 1024, how many students were standing in each row?
13. Find the least number by which when added to or subtracted from 1850 makes it a perfect square.
14. If the sum of 2 nos. be multiplied by each separately, the products so obtained are 2418 and 3666. Find the nos.
15. If a number of four digits a, b, c, d in the given order is to be divided by 7, then  $2b + 3c + d - a$  must be divisible by 7. of the numbers 0119, 1067, 5327, and 6875 which numbers are divisible.
16. The sides of a triangular field are of lengths 2646, 5157 and 5634 mts. Find the greatest length of the tape by which the three sides may be measured completely.



17. Find the least number divisible by each of the number 21,36,66. How many numbers are there less than 10000 which are divisible by 21,36, and 66?
18. Find the number between 2500 and 3000 which are divisible by 21, 24 and 28.
19. Find the side of largest possible square slabs which can be paved on the floor of a room 5m 44 cm long and 3m 74 cm broad. Also find the number of such slabs required to pave the floor.
20. A heap of pebbles when made up into groups of 32,40,72 then the remainders are respectively 10,18 and 50. find the least number of pebbles in the heap.

Answers.

1. 10
2. 9153
3. 420
4. 57,627 and 285,399
5. 4mts.
6. 24,30
7. 42
8. 1min. 12 sec.,5 times
9. 4hrs.
10. 12hrs.
11. 321
12. 32
13. 86
14. 47,31
15. 0119,5327
16. 9 mts.
17. 2772,5544,8316
18. 2520 2688,2856
19. 34cms,176
20. 1418

1. If  $3:21::a:63$ , then find the value of a
2. If  $a:b=8:15$ ,  $b:c=5:8$  and  $c:d=4:5$  find a:d
3. Find the mean proportion to 9 and 4.9
4. Find the third proportional of 6 and 30
5. The ratio between 2 quantities is 5:7, If the first is 155, find the other.
6. the shadow of qutab minar , which is 72 mts. High is 8 mts. At a particular time of day. Find the height of an electric pole which casts a shadow of 10 mts, under the similar conditions on the same day and time.
7. Two car drivers take  $3\frac{1}{4}$  hours and 4 hrs. respectively to cover a distance of 650 kms. From a city P to Q. Find the ratio of the average speeds of the two cars.

8. Two numbers bear a ratio of 2:7. If each of them is increased by 14, then their ratio becomes 4:7. find the two nos.
9. Two numbers are in the ratio of 4:7. The difference of their squares is 132. Find the numbers.
10. If 16 men working 7 hrs. a day can plough a field in 48 days, in how many days will 28 boys working 12 hours a day plough the same field, if one man does a work as 2 boys.

Answers.

1. 9
2. a:d=4:15
3. 2.1
4. 150
5. 217
6. 90mts.
7. 16:13
8. 6 and 21
9. 8 and 14
10. 4 days.

1. A contractor undertook to finish a certain work in 124 days and employed 120 men. After 64 days, he found that he had already done  $\frac{2}{3}$  of the work. How many men can be discharged now so that the work may finish in time?
2. The length and breadth of a rectangle are increased in the ratio 3:4 and 4:5 respectively. Find the ratio between new ones and old areas.
3. A man went to the market to buy fruits. He bought apples, mangoes and dates. The ratio of the weight of apples to that of mangoes bought is the same as the weight of mangoes to that of dates bought. If he bought 7.2 kgs of apples and 5 kg of dates, find the weight of mangoes bought.
4. A greyhound pursues a hare and takes 4 leaps for every 5 leaps of the hare; but 3 leaps of the hound are equal to 4 leaps of the hare, compare the rates of the hound and hare.
5. A mixture consists of three substances whose volumes are in the ratio 5:6:8. The weights of equal volumes are in the ratio 4:5:3. What is the ratio of the weight of the three substances composing the mixture?
6. The force of gravity at the surface of a planet is jointly proportional to the density of the planet and its radius. The planet Jupiter has a radius equal to ten times the radius of the earth. The densities of Jupiter and earth are respectively 1.75 and 5.67. If a man can jump to a height of 1500 cm, on earth how high can he jump on the surface of Jupiter, given that the height to which a man can jump is inversely proportional to the force of gravity?
7. The distance of the horizon at sea varies as the square root of the height of the eye above the sea level. When the distance is 14.4 kilometers, the height of the eye is 18 mts.. find in kms. the distance when the height of the eye is 8 mts., and find in mts. The height of the eye when the distance is 7.2 kms.
8. The pressure of a certain mass of a gas varies inversely as its volume. When  $p$  (measured in kg. weight per square decimeter) is 20 then  $v$  (measured in cubic

decimeter) is 450. find in kg. weight per square decimeter the pressure when the volume is 300 cubic decimetres. Also find volume when the pressure is 60 kg weight per square decimeter.

Answers.

1. 56 men
2. 5:3
3. 6kg.
4. 16:15
5. 10:15:12
6. 486 cm
7. 9.6km, 4.5 m
8. 30,150

### CLOCKS.

- Here “#” means degrees.
- Normal clock has 60 divisions and each division =6 #
- In 60 minutes , minute hand moves 60 divisions whereas hour hand covers 5 divisions whereas hour hand covers 5 divisions, therefore minute hand overtakes 55 divisions in 60 minutes, so to overtake 1 division it needs  $12/11$  minutes.
- Minute hand covers 12 times the no. of divisions covered by hour hand in same time.
- Whenever u need to imagine; imagine the position of hand at exact hour, because u know the gap between the hour hand and minute hand= $(\text{hour} * 5)$  and minute hand is behind
- Angle between hands –  $(11m - 60h)/2$ , If the angle calculated does not exists in the ans. options, then subtract your ans. from  $360\#$
- Whatever position comes 1 in an hour, it takes place 11 times in 12 hrs.
- When u get ans. in decimals then remember base is 60.
- For every hour the gap is  $60/13$
- I f two watches move at different speeds, then they show the same time when the gap is 12hrs. or 720 minutes.
- We use the concept of ratio to find time.

In a normal watch hands coincide every  $65 \frac{5}{11}$  minutes. If it is written that hands are coinciding every 65 minutes. it means, true time is 65 minutes but watch is giving  $65 \frac{5}{11}$  minutes, so it is gaining  $\frac{5}{11}$  minutes every 65 minutes, therefore to calculate the variance , we find the number of time periods of 65 minutes and multiply it by  $\frac{5}{11}$

Q. when will there be an angle of  $30\#$  between 5 and 6?

Method-  $5 * 5 = 25$

$30/6=5$ , 6 here means 6 divisions.

Now we get 2 answers-

i.  $25-5=20$  so  $20*(12/11)$

ii.  $25+5=30$  so  $30*(12/11)$

Q. what time between 5 and 6 in a railway clock both hands will be together.

Q. Between 7 and 8, what time will the minute hand and the hour hand be pointing towards each other.

Q. Between 5 and 6 both the hour hand and the minute hand are equidistant from 5, but they are not together. What is the time?

Q. what is the change in angle from 3:10 to 3:20 pm.?

A train came at 4:15 and left between 4 and 5 and the angle remained same. What is the duration of the halt?

Q. I sent my servant between 3 and 4 and he came back between 4 and 5. hands had interchanged their positions. What time he came back and went out. How much time had the servant gone out?

Q. A watch loses 3 minutes every 2 hrs, it was set at 8:00 am on Sunday. When will it show the same time again.

Q. A watch gains 0.25% in the 1st week then loses 0.5% in the 2nd week. What variance it shows?

Q. In a wall clock, the minute hand is 6 inches long and hour hand is 4 inches long, what is the difference in area swept by both the hands between 2:15 and 4:15?

Q. At 8:00 am on Sunday watch A was behind by 10 minutes and watch B was ahead by 12 minutes. On Monday at 2:00 pm watch A was ahead by 5 minutes and watch B was behind by 6 minutes.

i. When watch A showed the correct time what was the time in watch A.

ii. When watch B showed the correct time what was the time in watch B.

iii. When did watch A and B show the same time?

iv. When watch A and B showed the same time, what was the time in A and B.

Q. A clock takes 6 sec. to strike 6, how much time it will take to strike 12?

1. The ratio of milk and water in a 20 lt. mixture is 3:1. how much milk must be added so that this ratio become 4:1
2. Rs. 232 are divided among 480 children such that each boy gets 40 paise and each girl gets 60 paise. How many girls were there?
3. A certain sum of money is distributed among two friends in the ratio 5:11. If one of them got Rs. 1200 more than other, what was the total sum?
4. Divide Rs.395 among A,B,C such that B gets 25% more than A and 20% more than C.
5. Divide Rs. 730 among Sudha, Kamla, and Kamal such that if Sudha gets Rs. 3, then Kamla gets Rs.4 and if Kamla gets Rs. 3.50, then Kamal gets 3.
6. Divide Rs. 4300 in A,B,C and D such that when A gets Rs. 9, then B gets Rs. 6 then C gets Rs 5 and when C Rs. 4 then D gets Rs. 3.
7. Divide Rs. 558 IN A,B, C such that if Rs. 4,6 and 8 are decreased respectively

from their shares then the ratio of their shares is 2:3:7.

8. Divide Rs. 258 in 8 men , 6 women and 10 children such that a woman gets  $\frac{3}{2}$  of a child and a man gets twice of a woman. What is the share of each man , women and child?

9. Rs. 430 are divided among 45 persons consisting of men women and children. The combined shares of all men , all women and all children are as 12:15:16 whereas the individual share of a man , a woman, and a child are as 6:5:4. find what one man , one woman and one child gets.

10. A bag contains 1 rupee, 50paise and 10 paise coins. The ratio of 1 rupee and 50p coins is 2:5. the ratio of 50p and 10p coins is 4:9. If total money is Rs. 1125, find the number of each type of coins.

### ANSWERS

1. 5lts.
2. 200
3. 3200
4. Rs 120,150,125.
5. Rs. 210,280,240
6. Rs. 1350,1200,1000,750
7. Rs.94,141,323
8. .Rs.18,9,6
9. Rs 12,10,8
10. 32,80,160.

1. Between 2 stations the first , second and the third classes fare were fixed at first in the ratio of 8:6:3, but afterwards the 1st class fares were reduced by  $\frac{1}{6}$  and the 2nd class by  $\frac{1}{12}$ . in a year, the number of first, second and third class passengers were respectively 9:12:26 and the money at the booking offices was 1088. How much was paid by first class passengers?

2. If Rs.150 be divided among 6 men, 12 women, and 17 boys so that 2 men receive as much as 5 boys and 2 women as much as 3 boys, how much will each man, woman and boy receive?

3. Annual incomes of A and B are in the ratio 4:3 and their annual expenses bear a ratio of 3:2. If each of them saves Rs. 600 at the end of the year, find the annual income of each.

4. A student appeared in an examination with hindi ,english, physics, chemistry and maths. As subjects. He got the marks in these subjects in the ratio of 5:3:4:6:7. the maximum marks in each subjects were 100. he got 70% marks in aggregate in all subjects. if he gets 60% marks are essential for getting first class in each subjects, then point out the subjects in which he got first division.

5. The annual income of A,B,C taken together is Rs. 33600.A spends 80% of his income , B spends 87.5% of his income and C spends 90% of his income. if their annual savings are as 16:17:12, find the annual saving of each.

6. At the beginning of a term, the ratio of the number of boys in a school under 15 years

to those over 15 years age was 5:4. At the end of term the ratio was 7:8 as 20 of the boys had reached the age of 15 during the term. Find the total number of boys in the school , given that no boy left or was admitted during the term.

7. A man gives  $\frac{3}{8}$  of his property to one son and 30% of the remainder to another . he then distributed the remaining property among three charities in the proportion 2:5:7. The difference of his son's share is Rs. 1800. what was the value of his property and how much was given to each charity?

Answers.

1. Rs.320.
2. Rs.7.50,4.50,3
3. Rs.2400,1300
4. hindi 70, chem.. 84, maths 98
5. 1600, 1700 1200
6. 225
7. Rs.600,1500,2100

1. It was intended that Rs. 19.50 should be divided between three boys A, B,C, in the ratio of 2:3:4 but by mistake the distribution was made in the proportion of  $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ . how much does B gain or loose by error?

2. Three persons A,B and C agree to pay their total bill in the proportion 4:5:6. a pays the first day's bill which amounts to Rs. 45.75;b the second days bill which amounts to 59.60 and C the third day's bill which amounts to Rs. 74.65. how must they settle their accounts?

3. a employer reduces the number of his employs in the ratio of 9:8 and increases the wages in the ratio of 14:15..Find in what ratio the wage bill is increased or decreased and find the difference in the amount of the bill, if it was previously Rs. 1680.

4. a sum of Rs. 2368 was divided among 8 men, 10 women and 12 children in such a way that each man got 25% more than a woman and each women got 25% more than a child. How much did each woman get?

5. A man , his wife and son worked in a garden . the man for 2 days, his wife for 3.5 days and the boy for 4 days. Their daily wages were, man's to women's in the ratio of 7:4 and the man's to boy in the ratio of 7 to 3. their total earnings amounted to Rs. 60. find the daily wages of each.

6. A tin is full of wine. out of this tin 4 gallons of wine are taken out and 4 gallons of water are added. After this 4 gallons of mixture were taken out and again 4 gallons of water were added. Now ratio of wine and water in the tin 36:13. find the volume of tin?

7. If an election in which each elector may vote for 2 candidates, half of the electors vote for a but divide their other votes between B,C, D in the ratio 3:2:1. of the remainder , half vote for B and divide their votes between C and D, in the ratio of 2:1. Of the remainder, half vote for C and D. and the remainder 840 in number do not vote. How many votes does each candidate get?

Answers.

1. Rs. 0.50 loss
2. A to C Rs. 2.25, B to C Rs. 0.40
3. 21:20, Rs.80
4. Rs.80
5. Rs. 10.50, 6,4.50
6. 28 gallons
7. 3360,3360, 3080, 1960.

1. The price of cloth is increased by 20% . By how much % must a family reduce the consumption of the cloth so that their expenditure may remain the same.
2. A reduction of 40% in the price eggs would enable a purchaser to purchase 48 more eggs more for Re. 1. Find the reduced price per dozen . Also find the original price.
3. If the price of sugar falls by 12.5%, a person can buy 9 kgs. More sugar for Rs. 126 than before. If the price had risen by 12.5%. How much less sugar could ha have bought for the same sum?
4. A candidate secured 20% marks in an examination and failed by 10 marks . another secured 42% marks and got 1 mark more than the marks required to pass the examination. Determine the maximum number of marks and the % necessary to pass the examination.
5. In an examination 40% marks are required to pass. A obtains `0% less than the no. of marks required to pass. B obtains 11 1/9% less than A, and C 41 3/17% less than the no. of marks obtained by A and B together.Does C pass or fail?
6. In an examination 75% candidates passed in English and 70% candidates passed in maths, 23% candidates failed in both subjects. If 136 candidates passed in both the subjects, find out the no. of candidates that appeared in the examination.
7. The population of a town increases by 10% every year for 2 yrs. And then decreases by 10% every 2 yrs. If the population just before 4 years was 10000, what was it after 4 years.
8. At an election , a candidate secures 40% of the total votes but is defeated by the other candidate by 300 votes. Find out the total number of votes polled.
9. 10%of the soldiers of an army are killed in the battle. 105 of the remaining soldiers died of disease and 10% of the remaining were disabled. Now only 72900 soldiers are left in the army. How many soldiers were there in all in the army in the beginning.
10. Mohan saves 20% of his salary . due to dearness his monthly expenditure increases by 20% and then he is able to save only Rs. 20. find his monthly salary.

Answers.

1. Rs. 16 2/3
2. new 10 ps, price 16 2/3 ps.
3. 7kg
4. 40%
5. pass

6. 200
7. 98010
8. 1500
9. 1000000
10. Rs 500

1. In a direct election between 2 contestants for the post of secretary , 4% of the total votes cast are declared to be illegal. one of the contestants secures 55% of the valid votes and wins with a majority of 240 votes. Find the total number of votes cast.
2. 2 nos. are greater than the 3rd number no. by 25% and 20% respectively. What % of first number is the 2nd no.?
3. The no. of boys and girls who appeared at an examination were 16:9 and the no. of boys and girls passing the examination were in the ratio 4:3 . if 75% of the girls passed the exam , find the % of boys who passed the examination and the % of all candidates passing the candidates.
4. Entry fee in an examination was Re. 1 . later this was reduced by 25% which increased the sale by 20% Find the % increase in the number of visitors.
5. 2 candidates contested in an election . At the election 10% of the ppl on the voting list did not vote, and 60 votes recorded were rejected as illegal. The majority of the successful candidates was 308 and it was found that he had been supported by 47% of the whole no. on the voters list . what was the number of legal votes recorded by each candidate?
6. In an examination paper of 5 questions , 5 % of the candidates answered all of them and 5% none. Of the rest , 25% answered only 1 question and 20% answered 4. If 24.5% of the entire number answered only 2 questions and 200 candidates answered only 3 questions , how many competed?
7. The total population of a country is  $2.94 \times 10^6$  out of which 1.50 million are male and the rest females. Out of every 1000males, 98 can read and write , but only 5.3% of total population can do so. Find what % of women in the whole women population of the country can read and write.
8. A mans taxable income is Rs 28600. In a certain year the income tax for taxable income over Rs. Rs. 25000 but not exceeding Rs. 30000 is computed according to the following rule- “Total Income Tax = tax – surcharge where surcharge =15% of the tax and tax = Rs. 3200+30% of the amount by which taxable income exceeds Rs. 25000.” Determine the tax he must pay.

Answers.

1. 2500
2. 96%
3. 56.25%,63%
4. 60%
5. 2914,2606
6. 800



- 7. 0.6215%
- 8. 4922

**SIMPLE INTEREST AND COMPOUND INTEREST.**

Here's a table for calculating SI and CI

-----	S.I.	-----	C.I.
1-----	S	-----	Upto S
2-----	2S	-----	Upto 2S+X
3-----	3S	-----	Upto 3S+3X+
4-----	4S	-----	Upto 4S=6X++
5-----	5S	-----	Upto 5S+10X+++
6-----	6S	-----	Upto 6S+15X+++

“++” it roughly takes a value of Rs. 2 for Rs 100 of X.

Q. the difference between CI and SI is Rs 9848 at 8% interest put out for 4 yrs. What is the principle?

Method-

For 4 yrs. The value that corresponds is 6X++

So  $6X++ = 9848$

Here we divide the amt. by 100 and ignore the decimal part so we get 98 and now we subtract 2 from it and now we get 96

So  $6x = 96$ ,  $x = 16$

8% of SI = 16

So 1% of SI = Rs. 2.

100% of SI = 200

200 is 8 % of principle therefore the principle is 2500.

Sample- What is the interest on Rs. 17250 for 3 yrs. At 8% interest compounded annually?

Method-  $8 \times 3 = 24$

$(8 \times \text{👨} / 100 = 0.64.$

$0.64 \times 3 = 1.92 + (\text{approx. } 2)$

so  $24 + 2 = 26\%$

26% of 17250 = 4490

( here all the calculations can be done mentally and approximated, we generally do not need to write. This saves time. And we always have ans. options in the exam, so we can get the ans. closest to it, but we need practice for this)

Note – For 10% CI it keeps on increasing in this order every year.

1st year 110  
 2nd year 121  
 3rd year 133.1  
 4th year 146.4 and so on.

INSTALLMENT-

Q. A television worth Rs. 15000/- is bought at 10% interest, to be payable in 4 yrs. Tell me the equal installments?

Method –

According to the above table 4 yrs corresponds to 46.4%

So  $15000 + 46.4\% = 21960$ .

Now

1-----	2-----	3-----	4
x-----	-----	-----	1.331x
-----	x-----	-----	1.21x
-----	-----	x-----	1.10x
-----	-----	-----	4.641x

add all the three to get 4.641

now  $4.641x = 21960$  so we can find out X.

MONTHLY INSTALLMENT.

$$R\% = \frac{24 * I * 100}{N(F+L)}$$

Here I = interest rate

N=no. of installments

F=principle to be paid at time of 1st installment.

L= principle to be paid at time of last. Installment; it can be negative also.

Q. I borrow Rs 500, and pay Rs. 50 monthly for a year find the rate %?

Method-  $R = \frac{24 * 100 * 100}{12(500-50)} = 44\%$

Here I comes as 100 coz we pay 50 for 12 months which comes as 600 so 100 is the interest amount.

And L comes as 50 because we have paid  $50 * 11 = 550$  by now and only Rs. 50 is left over.

Note--C.I moves in GP and SI moves in AP

0-----	5-----	10-----	15-----	20
S.I x-----	1.5x-----	2x-----	2.5x-----	3x
C.I x-----	1.5x-----	2.25x-----	3.375x-----	5x

At the same intervals previous sum is multiplied by same ratio.

0-----5-----10-----15-----20  
 CI x-----nx----- $(n^2)x$ ----- $(n^3)x$ -----  $(n^4)x$

Q. if Rs 5000 becomes Rs 20000 in 10 years. What was the amount after 7.5 years.

Here we take the above table as 0. , 2.5, 5, 7.5, 10. and x, nx,  $(n^2)x$ .....

So for 7.5 years. We have  $(n^4)x = 4x$

So  $n^4 = 4$

$N = 2^{1/2}$

$(2^{1/2})^3 = x$

$1.414 * 2 = 2.828$

$2.828 * 50000$  is the ans.

Note- here i had some problems for formatting the table so u all can see so many"  
 -----"

1. A working man has a rise of a 12.5% in his wages rate per hour. There is a drop of 8% in the number of hours worked per week. If his original weekly wages for a week of 50 hrs. was Rs. 120, find (a) his new wages per hour. (b) the percentage increase in the total weekly wages.
2. A student was asked to divide 7.5 by 8.3 and to obtain the quotient correct to 3 decimal places , but he divided 8.3 by 7.5 and got the result correct to 2 decimal places . by how much % was the result wrong?
3. The incomes of A and B are in the ratio 5:3, their expenses are in the ratio 2:1. If the total annual savings of A and B are 3600 each, find the monthly income of A and B.
4. The measure of one side of a rectangle is too long by 4% of its true length and that of the other is short by 5% of its true length. Find the error % in measure obtained for the area of the rectangle.
5. The freight of a machine amounts to 20% of its price. Had the price been 10% less than what it is, the total cost of the machine would have been Rs. 480 less. What is the price of the machine?
6. Which bargain is better discount: discount series of 20%, 15% and 10% or discount series of 25%, 12% and 8%.

Answers.

1. Rs. 2.7/hr, 3.5%
2. 22.8%
3. 1500,900
4. 1.2%
5. 4000
6. 2<sup>nd</sup>

1. A mixture of 70 lts. Of wine and water contains 10% of water. How much water must be added to make 37% of the resulting mixture?
2. In what ratio should water be added to a liquid costing Rs. 12 per litre so as to make a profit of 25% by selling the diluted liquid at Rs. 13.75 per litre.?
3. A man invested Rs. 11000 partly in 6% stock at 125 and partly in 5% stock at 120. The total annual dividend received by him was Rs. 490. Find the amount invested in 5% stock.
4. The average salary per head of all workers in a workshop is Rs. 95. The average salary of 15 officers is 525 and the average salary of the rest is Rs. 85 . Find the number of workers in the workshop.
5. A mixture contains wine and water in the ratio 3:2. another contains wine and water in the ratio 4:5 . how many gallons of the latter must be mixed with 3 gallons of the former so that the resulting mixture may contain equal quantities of wine and water?
6. A cup of milk contains 3 parts of pure milk and 1 part of water. How much of the mixture must be withdrawn and water substituted in order that the resulting mixture may be half milk and half water?
7. 2 bottles A and B contain diluted sulphuric acid . in the bottle A, the amount of water is double the amount of acid while in the bottle B, the amount of acid is three times that of water. How much should be taken from each bottle in order to prepare 5 litres of mixture containing equal amounts of acid and water?
8. 2 vessels contain milk and water respectively in the ratio 3:1 and 5:3. find the ratio in which these two are mixed to get a new mixture in which the ratio of milk to water 2:1
9. One alloy of metal contains 90% copper and 10% tin. Another alloy contains 93% copper 4% tin. If they are mixed so that mixture may contain 9% tin, what % of copper it will contain?
10. 9 litres are drawn from a cask full of wine and it is then filled with water. 9 litres of the mixture are drawn and the cask is again filled with water. The quantity of wine now left in the cask is to that of water in it as 16:9. How much does the cask hold?

Answers.

1. 30 lts.
2. 11:1
3. Rs. 6000
4. 645
5. 5.4 gallons
6.  $\frac{1}{3}$  part.
7. 3.2
8. 1:2
9. 90.5%
10. 45 lts.

1. Four gallons are drawn from a cask full of wine. It is then filled with water. Four gallons of mixture are again drawn and cask is again filled with water. The quantity of wine now left in the cask is to that of wine in it as 36:13. how much does the cask hold?
2. A vessel contains mixture of spirit and water . spirit is 18%. 8 lts. Of mixture is taken out of the vessel which is again filled with water. If the present percentage of spirit is 15%, find the quantity in lts of the mixture in the vessel.
3. Gold is 19 times as heavy as water and copper 9 times. In what ratio should these metals be mixed that the mixture may be 15 times as heavy as water?
4. A man buys milk at 85 paise per lt. and mixes water in it. He sells the mixture at the same rate and thus gains  $11 \frac{1}{9}$ . Find the quantity of water mixed by him.
5. @ liquids are mixed in the ratio 5:3 and by selling the mixture at Rs 12.25/ litre, a profit of  $16 \frac{2}{3}\%$  is made. If the first liquid costs Rs 4/litre more than the second, find the price per litre of each liquid.

Answers.

1. 28 gallons
2. 48
3. 3:2
4.  $\frac{1}{9}$  per litre.
5. 1st Rs. 12/.litre, 2ndRs. 8/litre

1. Walking at a 4kmph, a clerk reaches his office 5 minutes late. If he walks at 5 kmph, he will be 2.5 minutes early. Find the distance of his office from his house.
2. A man traveled a distance of 61 kms in 9 hr. partly on foot at the rate of 4kmph and partly on bicycle at the rate of 9kms per hour. Find the distance traveled on foot.
3. A person has to reach a place 40 kms away. He walks at the rate of 4kmph for the 1st 16 kms. and then travels in a tonga for the rest of the journey. However, if he had traveled by tonga for the 16 kms and covered the remaining distance on foot at 4kmph, he would have taken an hour longer to complete the journey. Find the speed of the tonga.
4. I traveled  $\frac{1}{3}$ rd of a journey with a speed of 10 kmph , the next one-third with a speed of 9kmph and the rest at a speed of 8kmph. If I had traveled half the journey at a speed of 10kmph and the other half with a speed of 8kmph, I would have been half a minute longer on the way. What distance did I travel?
5. Two places P and Q are 162 kms apart. A train leaves P for Q and at the same time another train leaves Q for P . The two trains meet at the end of 6 hrs. . if the train traveling from P to Q travels 8 kms an hour faster than the other, find the speed of the 2 trains.
6. A train 100 mts long meets a man going in opposite direction @5 kmph and passes him in 7.2 seconds . At what rate is the train going?
7. A train 300 mts. Long overtook a man walking along the line ( In the same

direction as the train) at the rate of 4km an hour and passed him in 30 sec. The train reached the station in 15 minutes after it had passed the man. In what time did man reach the station?

8. A train of 24 carriages, each of 60 mts. Length with an engine of 60 mts length is running at a speed of 60 kmph. Find out the time within which the train will cross the bridge measuring 1.5 km in length.

9. A train running between two towns arrives at a destination 10 minutes late when it goes 60 kmph and 16 minutes late when it goes 40kmph. Determine the distance between the two towns.

10. A train traveling @ 60kmph, while inside a tunnel, meets another train of half its length traveling in the opposite direction at 90kmph and passes completely in 4.5 seconds. Find the length of the tunnel, if the first train passes completely through it in 4 minutes 37.5 seconds.

Answers.

1.  $5/2$  kms
2. 16 kms
3. 8 kmph
4. 18 kms
5. 17.5 kmph, 9.5 kmph
6. 45 kmph
7. 2.5 hr.
8. 3 minutes
9. 12 kms
10. 4.5 km

1. A train 150 meters long, traveling at 75 kmph overtakes another train travelling in the same direction at 45 kmph. In how many seconds does the first train pass a passenger sitting in the second train? If the first train passes the second completely in 30 seconds, find the length of the second train.

2. A train going @72kmph over takes another train 192 mts. Long, going in the same direction on a parallel line at 54 kmph and completely passes it in 1.5 minutes. Find the time in which the trains would have completely passed each other, if they had been going in opposite direction, and also the length of the faster train.

3. A boat's man takes his boat in a river against the stream from a place A to place B where  $AB=21$  km and again returns to A. Thus, he takes 10 hr. in all. The time taken by him down stream in going 7 km is equal to the time taken by him against stream in going 3 km. Find the velocity of the river.

4. Two men together start on a journey in the same direction. They travel 9 and 15 km respectively daily. After travelling for 6 days the man travelling at 9 km per day doubles his speed and both of them finish the distance in the same time. Find the time taken by them to reach their destination.

5. The driver of a car driving at the speed of 38 kmph locates a bus 40 mts ahead of him. After 20 seconds , the bus is 60 m behind. Find the speed of the bus.

6. A monkey climbing up a greased pole ascends 12 mts. And slips down 5 mts. In

alternate minutes. If the pole is 63 mts high, how long will it take for him to reach the top?

7. A hare sees a dog 100mts away from her and scuds off in the opposite direction at a speed of 12 kmph. A minute later the dog perceives her and gives chase @ 16kmph. How soon will the dog overtake the hare, and at what distance from the spot where the hare took flight?

8. If one walks @ 5kmph the distance from F.C road to M. G road one would be late for a matinee show by 15 minutes. If one travels by auto rickshaw at 20 kmph one would be early by  $\frac{1}{2}$  hour. How far is M.G road from F.C road?

9. A wire 1mm in diameter can be drawn out from a 14 cm bar of gold in 7 minutes. A wire 0.5 mm can be drawn out from a 20 cm bar of gold in 5 minutes. In how much time will the gold bars be of equal length?

10. A man leaves Bombay at 2.20 pm and reaches Lonavala at 4.10 p.m Another man leaves Lonavala at 2.40 p.m and reaches Bombay at 4.52 p.m. When do they pass one another? Give your answer to the closest one minute.

#### Answers

1. 18 sec, 100 mts.
2. 258 mts, 12  $\frac{6}{7}$  sec.
3. 2 kmph
4. 18 days
5. 20 kmph
6. 16 minutes 35 sec.
7. 4.5 minutes 1.1 m
8. 5 kms
9. 3 minutes
10. 3.29 pm

1. A man goes from Delhi to the village Chhappanpanjeri travelling 300 km by air, 60 km by rail, and 30 km by tonga taking altogether 3.5 hrs. his speed by air is ten times his speed by rail and the speed by rail is 4 times that by tonga. What is his speed by air?

2. A car after traveling for 25 km from a city increases its speed by one fourth its original speed and reaches his destination 40 minutes early. Had it increased its speed 10 km before, it would have reached its destination 5 minutes earlier. What is the distance traveled by the car?

3. A man started from his house to his workplace 8 km away @4kmph so as to reach just in time. After 5 minutes he realized that he had left some important documents at home, so he turned back, and now walking at an increased speed, still succeeded in reaching his workplace in time. What was his speed increased speed?

4. Dinky is picked up by his father by car from school everyday and they reach home at 5:00 pm. One day since school got over an hour earlier than usual, he started walking towards home at 3kmph. He met his father on the way and they reached home 15 minutes earlier than usual time, what is the speed of the car?

5. A train after travelling for a certain distance develops a snag and decreases its speed to

half its original speed and reaches his destination 45 minutes late. Had the snag occurred 30 km further on, it would have reached its destination 15 minutes earlier. What is the speed of the train?

Answers.

1. 600 kmph
2. 195 km
3.  $4\frac{8}{23}$  kmph
4. 21 kmph
5. 120 kmph

1. In 1760 meter race, A can beat B by 44 mts. while in a 1320 mts race, B can beat C by 30 mts. By what distance will A beat C in a 880 mts. Race?
2. A and B run a race. A gives B a start of 55 m and still beats him by 15 seconds. If A runs at 14.08 kmph, find B's rate in kmph.
3. In a km race, If A gives B 40mts start, A wins by 19 seconds, but if A gives B 30 seconds start, B wins by 40 m. Find the time that each takes to run a km.
4. At a game of chess Mohan can give Ramesh 20 points in 100 and Ramesh can give Dinesh 20 points in 100. How many points can Mohan give dinesh in a game of 100?
5. Three men A,B and C go around a circle 1760 mts in circumference at the rates of 160, 120 and 105 mts per minute respectively. If they all start together, when will they be together, when they 1st be together again?

Answers.

1. 41.5 mts.
2.  $13\frac{1}{5}$  kmph
3. A =125 secs, B 150 secs.
4. 36 points
5. 5 hrs 52 minutes.

1. At what time between 4 and 5 will the hands of watch:
  - i. Coincide?
  - ii. Be at right angles?
  - iii. Points in opposite directions?
  - iv. The minute hand be 13 minute spaces behind the hour hand.
  - v. The minute hand be 13 minute spaces ahead of hour hand?
  - vi. The two hands will be equidistant from the figure 5?
2. If the hands of a clock coincide every 66 minutes ( true time) how much does the clock gain or lose every hours?
3. Two clocks are set correctly at 10:00 a.m. on Friday. The first clock gains 2 minutes per hour and gains twice as much as the second. What time will the second clock register when the correct time is 2 p.m on the following Monday?



4. My watch, which gains uniformly, is 2 min. slow at noon on Saturday, and is 4 minutes 48 seconds fast at 12 p.m. on the following Sunday. When was it correct?

Answers-

- I. 21 9/11 minutes past 4
- II. at 5 5/11 min. past 4 and again at 38 2/11 past.
- III. 54 6/11 minute past 4
- IV. 7 7/11 past 4
- V. 36 minutes past 4
- VI. 27 9/13 min. past 4

- 1. gave above
- 2. 60/121
- 3. 3 hours 16 minutes
- 4. the watch was correct at 12 pm on Monday.

- 1. Which is a better investment? 35 stock at 86 or 4% stock at Rs. 110.
- 2. A man invests equal sums in 3% stock at 80 and 5% stock at 120. If the total yearly income from both the stocks is Rs. 380, find his investment in each stock.
- 3. A man transfers his stock of Rs. 7600 from 5% at 105 to 45%. Thus he loses Rs. 2. find the market value of the other stock.
- 4. A man receives Rs. 10825.12 in a year as dividend and interest. He received dividend at the rate of 9.6% which is equal to 75% of his income. He got average interest on his saving at 6.4% which is equal to rest of the part of his income. Find his investment purchasing stock and his saving.
- 5. A company gives 8% dividend. Mohan has 500 shares each of face value Rs. 10 of this company. He sells these shares at 605 premium and purchases shares each of face value Rs. 5 of another company which are being sold at 20% discount. If the other company gives 5% dividend, then find the difference of his gains from the dividends.
- 6. A man transfers his stock from 3.5% at 63 1/8 to the 5% at 74 7/8. brokerage 1/8% is allowed on each transaction and thereby increases his annual income by Rs. 21. Find the original stock held by him.
- 7. Divide Rs. 5300 in two parts such that if one part is invested in the 3.5% at 98 and other in 4% at par, the resulting incomes are equal.
- 8. A man invests Rs. 2490. He puts in Rs. 900 in 3.5% stock at 75 Rs. 850 in 3% at 68 and the remainder in 6% stock. Total yield from his investment is 5%. At what price does he buy 6% stock?

Answers.

- 1. Rs. 3.5 approx, Rs 3.6 approx  
It is more advantageous to invest money in the second stock.
- 2. Rs. 4800

3. Rs.95
4. Rs 84571.25, Rs.42285.62
5. Rs 100
6. Rs 3000
7. Rs. 2800, Rs. 2500
8.  $98 \frac{2}{3}$

. The sum of 7 nos. is 235. the average of 1st three nos. is 23 and the average of last three is 42. find the 4th number.

3. A man purchased 5 cows @ Rs 1500 each. 6 cows @ Rs 2000 each and 9 cows @ Rs 2500 each. Find the average cost of cows.
4. The average marks of 500 students in an examination are 45. Among them the average marks of the last 150 are 25 and that of the top 150 students are 75. what are the average marks of the remaining 200 students.
5. The average age of 25 boys of a class is 13 yrs. If 5 such students are admitted to this class, whose average age is 14.5 years, then find the average age of total number of boys.
6. The average temperature of Monday, Tuesday and Wednesday was 60 degrees. The average temperature of Tuesday, Wednesday and Thursday was 65 degree The temperature of Thursday was 62 degrees. Find the temperature on Monday.
7. The average temp of Monday, Tuesday, Thursday and Wednesday is 62 degrees. The average temperature of Monday and Tuesday is 56 degrees. The ratio of temperature of Wednesday and Thursday is 15:19. find the temp of Wednesday and Thursday.
8. The average weight of 4 persons A, B,C and D is 67 kgs. When the 5th man E joins them , the average weight is reduced by 2kgs. A is then replaced by another Man F , whose weight is 4 kg more than E's and consequently the average weight comes down to 64 kg. find the weight of A.
9. A bats man has a certain average runs for 16 innings. In the 17th inning , he made a score of 87 runs thereby increasing his average by 3. what is his average after 17th inning?
10. In a cricket match, 6 players had a certain average of their runs. 7th player makes a score of 112 runs, thereby increasing the average of their runs by 10. find the average after of the 1st 6 players.

Answers.

1. 65
2. 40
3. Rs. 2100
4. 37.5
5. 13.25 yrs
6. 47 degrees
7. 60,70 degrees
8. 66kg

9. 39  
10. 42

1. In a class of boys and girls, the average age of 40 boys is 13.5 years and that of girls is 13 years. The average age of whole class is 13.4 years. Find the number of girls in the class.
2. The average weight of boys in a class is 43 kg. later four boys, whose weights are respectively 42 kg, 36.5 kg, 39 kg and 42.5 kg. the average now becomes 42.5 kg. Find the original number of boys in the class.
3. The average age of 8 men increases by 2 years when two women are included in a place of two men of ages 20 years and 24 years. Find the average age of the women.
4. The average salary per head of the entire staff of an office including the officers and clerks is Rs. 90. The average salary of the officers is Rs. 600 and that of the clerks is Rs. 84. If the number of officers is 12, find the no. of clerks in the office.
5. A man had 7 children. When their average age was 12 years, the child who was 6 years of age, died. What was the average of the surviving children 5 years after the death of his child?
6. Of the three number the 1st is twice the second and the second is twice the third. The average of 3 nos. is 35. find the numbers.
7. In each row of a hand written book of 180 pages, there are 12 words on a n average and each page consists of 16 rows on a n average. After printing, in each row of the book these are 18 words on average and each page contains 20 rows on an average. Find the number of pages of the printed books,
8. Visitors to a show were charged Rs 15 each on the 1st day, Rs. 7.5 on the 2nd , Rs 2.5 on the 3rd and the total attendance of 3 days were in the ratio 2:5:13 respectively. Find the average charge per person for the whole show.
9. A table is made of mean monthly temperature for the first six months in a year. The temperature of January is  $\frac{8}{9}$  that of April, that of February is  $\frac{11}{10}$  of January, of march is the same as that of February. The average temperature of April and June is 4 degrees more than the average temperature of all six months. The average temperature of march and may is equal to the average temperature of 6 months. The average temperature of January and May is equal to the temperature of march. The temperature of may is 48 degrees. Find the average temperature of 6 months and the temperature of June.
10. A ship, 40 km from shore, springs a leak which admits  $3\frac{3}{4}$  tones of water in 12 minutes. 60 tonnes would suffice to sink her, but the ship's pumps can throw out 12 tonnes of water in one hour. Find the average rate of sailing, so that she may reach the shore just she begins to sink.

Answers.

1. 10
2. 20
3. 30yrs

4. 1020
5. 18 yrs.
6. 15.30.60
7. 96pages
8. Rs. 5
9. 46 degrees ,55 degrees
10. 4.5 kmph

1. A alone can do a piece of work in 6 days and B alone can do it in 8 days. How long would it take for A and B to finish the work?
2. Mohan can do  $\frac{1}{2}$  of a work in 8 days while Sohan can do  $\frac{1}{3}$  of the same work in 6 days. How long would it take for Mohan and Sohan to finish the work?
3. A can do a piece of work in 45 days. He works at it for 5 days and then B completes it in 20 days. How long will A and B together take to complete the work?
4. Mohan does a work in 12 days and Sohan does the same work in 20 days. Mohan alone started the work and after 4 days, sohan began to do work with Mohan. Find

I. How much work did Mohan do in 4 days?

II. The balance work

III. In how many days did both together finish the balance work?

5. Ram finished  $\frac{3}{5}$  of a work in 9 days and the remaining work he finished in 4 days with the assistance of Shyam. Find in how many days Shyam alone can finish that work?
6. A can do a piece of work in 120 days and B can do it in 150 days. They work together for 20 days. Then B leaves and A continues the work alone, 12 days after C joins A and the work is completed in 48 days more. In how many days can C do it if he works alone?
7. A and B can do a piece of work in 12 days, B and C together do it in 15 days. If A is twice as good a workman as C, find in what time B alone will do it?
8. A and b could do a piece of work in 40 days; after working for 10 days they are assisted by C, and the work is finished in 20 days more. If C does as much work in 2 days as B does in 3 days, in how many days could each of them do the same work alone?
9. 3 taps empty a cistern in 3 hrs. First tap alone can empty it in 6 hrs. and second tap alone can empty it in 9 hrs.. How many hours would third tap alone take to empty the cistern?
10. Two pipes A and B would fill a cistern in 37.5 minutes and 36 minutes respectively. Both pipes being opened, find when the 2nd pipe must be turned off, so that the cistern may be filled in half an hour?

Answers-

1.  $\frac{24}{7}$  days

2.  $8\frac{8}{17}$  days

3. 15 days
4. ...
- I.  $\frac{1}{3}$
- II.  $\frac{2}{3}$
- III. 5 days
  
5. 30 days
6. 240 days
7. 20 days
8. C = 80 days, B = 120 days, A = 60 days.
9. 18 hrs
10. after 9 minutes
  
1. A pipe can fill a bath in 20 minutes and another can fill it in 30 minutes. A person opens both the pipes simultaneously. When the bath should have been full, he finds that the waste pipe was open. He then closes the waste pipe and in 3 minutes more, the bath is full. In what time, would the waste pipe empty it?
2. A, B, C are employed to do a piece of work for Rs 529. A and B together are supposed to do  $\frac{19}{23}$  of the work and B and C together  $\frac{8}{23}$  of the work. What should A be paid?
3. A contractor receives every week a certain sum which he uses for paying wages. His capital together with weekly subsidy, would just enable him to pay 42 men for 52 weeks. If he had 60 men at the same wages, his capital together with the weekly subsidy, would just suffice for 13 weeks. How many men can be maintained for 26 weeks?
4. 2 taps can separately fill a cistern when the waste pipe is closed in 10 and 12 minutes respectively and when the waste pipe is open they together fill it in 15 minutes. How long does it take the waste pipe to empty the cistern, when the taps are closed.
5. A cistern can be filled by one of the two pipes in 30 minutes and the other in 36 minutes. Both pipes are opened for a certain time but being partially clogged, only  $\frac{5}{6}$  of the full quantity of water flows through the former and only  $\frac{9}{10}$  through the later. The obstructions, however, being suddenly removed, the cistern is filled in 15.5 minutes from that moment. How long was it before the full flow of water began?
6. A supply of water lasts for 200 days if 10 gallons leak off everyday, but only for 180 days if 16 gallons leak off daily. Find the total quantity of water in the supply.

Answers.

1. 48 minutes
2. Rs. 345
3. 48 men
4. 8 minutes 34 secs.
5. 1 minute
6. 9 minutes

1. The C. P. of 12 pens is equal to S.P of 10 pens, find the gain %.
2. In selling an article for Rs. 9, a man gets as much percent loss as is the prime cost?(C.P) of that article. Find the C.P. of that article.
3. A person purchases 50 dozen eggs at Rs. 4 per dozen. Of these , 40 eggs were found broken. At what price should he sell the remaining eggs in order to make a profit of 5%?
4. A man purchases 216 eggs @Rs 2 per dozen. Few of these r broken. The remaining eggs, he sell @Rs 2.28 per dozen. If he gets 20% profit, find the no. of broken eggs.
5. A merchant sold two radios for 120 each. One was sold at a loss of 25% of the cost and other was sold at a gain of 25% of the cost. Determine the total amount of gain/loss in the entire transaction.
6. A person purchases 90 clocks and sells 40 clocks at a gain of 10% and 50 clocks at a gain of 20%. Had he sold all of them at a uniform profit of 15%, he would have got Rs 40 less. Find the C.P. of each clock.
7. a man purchases some oranges @3 for Rs 4 and same quantity 2 5 for Rs 6. If he sells all the oranges @ 3 for Rs 5, find his gain or loss%.
8. A man sells 2 cars for Rs 19,550 each. On one he gains 15% and on the other he losses 15%. Find his total gain or loss and also his gain or loss%.
9. A merchant buys 40 bicycles and marks them at 25% above C.P. He allows a discount on the marked price at 10% for cash sales, and at 5% for credit sales. If 3/4th of the stock is sold for cash and the rest for credit, and if the total profit be Rs. 2025, what is the C.P of the Bicycle?
10. The catalogue price of a radio is Rs. 720. If it is sold at a discount of  $16\frac{2}{3}\%$  of the catalogue price, the gain is 25%. If it is sold for Rs. 160 below the catalogue price, find the gain or loss%

Answers.

1. 20%
  2. Rs 90 or Rs.10
  3. Rs 4.50/dz
  4. 36
  5. Rs.16
  6. Rs 80
  7. profit =Rs.31,  $11\frac{1}{19}\%$
  8. Rs. 900,  $2\frac{1}{4}\%$
  9. Rs. 360
  10.  $16\frac{2}{3}\%$  gain
1. If price of sugar falls by 12.5% a person can buy 9 kg more of sugar for Rs 126 than before. If the price had risen by 12.5%, how much sugar would he have bought for the same sum?
  2. A tradesman defrauds by means of a false balance to extent of 10% in buying

- goods and to the same extent in selling goods. What % does he gain or lose on his outlay by defraud?
3. A merchant sells 90 quintals of wheat at a profit of 8% and 50 quintals at a profit of 10%. If he had sold the whole at a profit of 9%, he would have received Rs 60 more than he actually did. How much did the merchant pay for the wheat per quintal?
  4. A tradesman sells one kind of sugar at Rs 3 per Kg. and loses 20% and another kind of sugar @ Rs 5 per Kg. He mixes the two together in equal proportion and sells the mixture at Rs 6/kg. what is now the gain%?
  5. A publisher printed 2000 copies of a book at a cost of Rs 2400. He gave 500 copies free to the head of the institutions. He allowed a discount of 25% on the published price and gave one extra copy for every 24 copies bought at a time. He sold all the copies in that manner. If the published price is Rs 3.25, find his gain or loss%.
  6. A man purchases 5 horses and 10 cows for Rs 1000. He sells the horses at 15% profit and the cows at 10% loss. Thus he gets Rs. 375 as profit. Find the cost of 1 horse and 1 cow separately.
  7. A man buys goods and finds that cost of carriage is 4% of the cost of goods. He is compelled to sell at a loss of 5% on his total outlay, if however, he had received Rs 32.50 more than he did, he would have gained 2.5%. What was the original cost of the goods?
8. A manufacturer fixes the wholesale price of an article by adding together the cost of production, excise duty( which is 22% of the cost of production) and his profit (which is 18% of the cost of production). The wholesaler sells the articles to a retailer at a profit of 15%. The retailer marks the price at 25% above his cost price and allows 4% discount on the marked price of cash payment. Find the production cost of the article for which a customer makes a cash payment of Rs. 483 to the dealer.
  9. A manufacturer fixes the wholesale price of an electric appliance by adding cost of production, excise duty(which is 30% of the production cost) and profit (which is 20% of the production cost). The wholesaler sells the appliances to a retailer at a profit of 20%. The retailer in turn, sells the item to a customer for Rs 207, thereby earning a profit of 15%. Find the production cost and the excise duty on the appliance.
  10. An almirah is listed at Rs 1000. A retailer buys it with 2 successive discounts of 10% and 20% for cash. the other expenses are 10% of cost of the almirah. At what price should he sell to earn a profit of 15%?
  11. A pen is listed for Rs 12. originally a 15% discount was allowed. Later the wholesaler gave a 2nd discount thus bringing the net price down to Rs. 8.16. find the 2nd discount %.
  12. At the off season period a hotel offers a double bed room at a discount of 30%. If there is a successive discount of 10% to tourists in groups, a double bed room becomes available for Rs 189 per day. find the original room rent.
  13. A tradesman fixes the sale price of his articles 30% more than the C.P.. Half of the articles, he sells at this increased sale price and  $\frac{1}{4}$  portion, he sells at 15%

discount of this sale price. And the remaining , he sells at 30% discount of this sale price . what % profit did occur to the tradesman?

14. The purchase tax on an article is levied at the rate of  $66\frac{2}{3}\%$  of its wholesale price, while the retailer's profit amounts to 20% of the retail price of the article. Find the wholesale price of an article which is retailed at Rs 12.50

15. Two dealer offer an article at the same list price. The first allows a discount of 25% and offers further a rebate of 15% on the discounted price for cash payment. The other dealer offers a discount of 10% and allows a further concession of 30% on the discounted price of cash payment. What is the better offer to the buyer?

16. A bicycle costs Rs 260(including 4% sales tax) payable in 60 days. A discount of 6% on the selling price (excluding the sales tax) is given by the shopkeeper to a customer who makes cash payment on the spot. If a customer pays in 60 days, how much interest per annum is he paying on the transaction?

17. If a dealer were to diminish the selling price of his wares by 10% and thereby doubled his sale, he could make the same profit on the cost price as before. In what ratio would his profit be diminished if he were to increase the selling price by the same amount and thereby halve his sale.

18. At a cricket match , the contractor provided dinner for 24 persons, and fixed the price so as to gain 12.5% upon his total outlay. Three of the players being absent , the remaining 21 paid the fixed price for their dinner, and such the contractor lost one rupee. What was the charge for the dinner?

19. A family buys farm equipment with a list price of Rs.2114.75. The salesman tells them that he will sell it to them for Rs.1950 if they pay the full amount in cash. What % discount would they be getting?

Answers.

1. 56 kg

2.  $22\frac{2}{9}\%$

3. Rs. 150/qntt.

4.  $54\frac{26}{31}\%$

5. gain  $46\frac{1}{4}\%$

6. Rs 1100, Rs 450

7. Rs. 416.66

8. Rs 250

9. Rs.100 Rs. 30

10. Rs 910.80

11. 20%

12. Rs.300

13.  $15\frac{3}{8}\%$

14. Rs. 6

15. second one

16. Rs.90

17. 4:3

18. Rs.3

19.  $7\frac{6687}{8459}\%$



