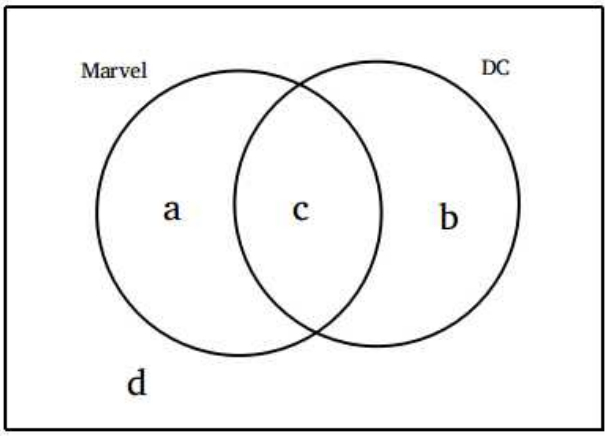
Answer: D

Explanation:



100 students do not like DC comics. So, a + d = 100 .....(i)

134 students do not like Marvel comics. So, b + d = 134 .....(ii)

Difference between the number of students who like both and the number of students who like none is 24.

=> |c - d| = 24 .....(iii)

Adding (i), (ii) and (iii), we get

a + b + c + d = 258 .....(iv)

a + c + 3d - b =258 .....(v)

We have to find the value of (a + b)

By using these equations, we cannot find the value of (a + b).

Thus, the answer cannot be determined,

Hence, option D is the correct answer.

Question 24

A shrewd trader bought some rice. But while buying rice from a wholesaler, he cons him into selling 25% more rice than what he is paying for. He marks up the price by 20% and after giving a discount of 20% makes some profit/loss.

This profit/loss is the same as the profit he would have made if he sold all the rice he bought for Rs 'A' per kg. It is also known that 'A' is Rs 4 more than the rate he effectively got the rice for, after conning the wholesaler. What is the price of rice per kg?

A Rs 125

B Rs 25

C Rs 20

D Cannot be determined

Answer: B

Explanation:

Let the price of 100kg be Rs x. This means price per kg is x/100.

So, in the first transaction, the trader buys 125 kg for Rs x. This means cost price per kg for the trader is x/125, i.e. a-4.
The marked up price is x/100 X 1.2 per kg
The selling price is x/100 X 1.2 X 0.8 per kg = 24x/2500 per kg
The cost price for the trader is 20x/2500 per kg.
=> Per kg profit is 4x/2500 per kg.
Since in the second transaction the quantity bought and the profit is same, 4x/2500 should be equal to Rs 4.
=> x=2500

Thus, the price is Rs 2500 for 100 kg or Rs 25/kg.

Question 25

A shopkeeper makes a profit on the sale of a material by marking the price 20% more than cost price on a normal day. On a particular day, while buying he gets 10% extra material for a given price. If he gives 25% discount on the marked prices, what is the profit or loss percentage on the transaction?

A 2% loss

B 1% loss

C 2% profit

D 1% profit

Answer: B

Explanation:
Assume the cost of material = Re 1/unit and normal marked price = 1.2/unit
Consider the amount of money spent on the given day = Rs. 100
Then the shopkeeper will get 110 units of material.
The marked price of 110 units = 110*1.2
After giving 25% discount, new selling price = 110*1.2*0.75 = 99
Hence on the whole transaction he makes 100-99=1% loss

Question 26

Salary of a person decreases by 50% every year. His expenses increase by 100% every quarter. The ratio of salary to expenses at present is x:1. If after two years, his salary becomes equal to his expenses, what is the value of x?

Answer:1024

Explanation:
Initially, let the expenditure be 1.

His expenses increased by 100% every quarter.

Then the expenditure after 1st quarter=$1(1+\frac{100}{100})= 2$

The expenditure after 2 year= $1(1+\frac{100}{100}\}^8=256$

Salary of a person is decreased by 50% every year.

After two years the salary will be 256.

Since the present expenses =1, hence the present salary = x

$x(1-\frac{50}{100})\}^2=256$

x=1024

The present the Salary and expense of the person are in ratio 1024:1

Question 27

An online seller sells books such that he gives Rs 5 more discount on each successive book purchased. For example, if the discount on 1st book is x, then the discount on the 2nd book will be x+5. The marked price of each book is 500 and the cost price is 300. If the discount on the 3rd book is 20, what is the maximum number of books that he can sell such that he still makes overall profit?

A 75

B 80

C 77

D 76

Answer: D

Explanation:
Since discount on the 3rd book is 20, discount on the first book will be 10.
Assuming he sells n number of books.
Total cost price = 300n, Selling price of all the books = 500n-(10+15+20.....10+(n-1)5)
Now since he makes overall profit.
500n-(10+15+.....10+(n-1)5)> 300n
=> (n/2)[20+(n-1)5]<200n
=> 20n+(n-1)5n<400n

=> 4n+n^2 - n < 80n

=> n(n-77)<0

=>0<n<77 Hence maximum value of n=76.

Question 28

A metal trader sells zinc, copper and iron. On a particular day, the cost price of iron is 25% more than copper which in turn has cost price 33.33% more than zinc. The profit booked on zinc, copper and iron is 50%, 40% and 30% respectively. If the overall profit is 40%, what should be the ratio of quantities of zinc and iron sold on that day assuming that every metal was traded?

A 5/3

B 3/5

C 5/4

D Cannot be determined

Answer: A

Explanation:
Assuming the cost price of zinc/kg = a
Hence the price of copper/kg = 4a/3
Hence the price of iron/kg =5a/3

Assuming a/3 = b, The price per kg for zinc, iron and copper be 3b, 4b and 5b respectively.
The profit made on zinc/kg = 3b*0.5 = 1.5b
Profit on copper/kg = 4b*0.4 = 1.6b
Profit on iron/kg = 5b*0.3 =1.5b

Now assuming the quantities for zinc, iron and copper be x, y and z respectively.

Overall profit = (1.5bx+1.6by+1.5bz)/(3bx+4by+5bz) = 40/100 =0.4

=> (1.5bx+1.6by+1.5bz) = 1.2bx + 1.6by + 2bz

=> 0.3x = 0.5z

=> x/z =5/3

Question 29

If the ratio of selling price of three items P, Q, R is 3:4:5. If a profit of 20% is realised on P, a profit of 20% on Q and a loss of 10% on R. Then the overall profit/loss percentage occurred during the transaction is

A profit of 10.73%

B loss of 5.37%

C profit of 5.37%

D loss of 10.73%

Answer: C

Explanation:

Let the selling price of P, Q, R be $3x, 4x, 5x$

After realization of 20% profit, the selling price of P is $3x$

Cost price of P = $3x * \frac{100}{120} = 2.5x$

After realization of 20% profit, the selling price of Q is $4x$

Cost price of Q =$4x * \frac{100}{120} = \frac{10x}{3}$

After realization of 10% loss, the selling price of R is $5x$

Cost price of R =$5x * \frac{100}{90} = \frac{50x}{9}$

Sum of the cost price = $205x/18$

Sum of the selling price = $12x$

Overall profit percentage = $\frac{12x - \frac{205x}{18}}{\frac{205x}{18}} * 100$

=5.37%

C is the correct answer.

Question 30

If a man saves Rs.916.66 every month , he can pay off a loan that is compounding annually in 1 year. However, if he wishes to pay off the loan in 2 years, he finds out that he should save Rs 504.16 every month. Find the rate of interest charged for the loan.

A 10%

B 12%

C 15%

D 16%

Answer: A

Explanation:

$P(1 + \frac{r}{100})^1 = 916.66 \times 12$

$P(1 + \frac{r}{100}) = 11000 - - - - - Eq(1)$

Similarly,

$P(1 + \frac{r}{100})^2 = 504.16 \times 24$

$P(1 + \frac{r}{100})^2 = 12100 - - - Eq(2)$

$P(1 + \frac{r}{100})(1 + \frac{r}{100}) = 12100$

$11000(1 + \frac{r}{100}) = 12100$

r=10

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Question 31

A fruit seller buys fresh grapes containing 80 percent water. It is known that the price per kg of grapes vary inversely to the square of the percent water content. The water content decreases with time. What can be the final percentage of water content if the fruit seller makes a loss of $\frac{100}{9}$ percent?

A 27

B 64

C 50

D 60

Answer: D

Explanation:

Assuming the initial quantity to be 1 kg and price per kg = $\frac{k}{y^2}$

where y is the percentage content of the water and k is the proportion constant.

Price of 1 kg grapes with 80 percent water= $\frac{k}{80^2}$

After losing the water content the weight of grapes with water content x (assume) price of 1 kg grapes become= $\frac{k}{x^2}$

Since the pulp mass remain constant, $0.2 = z \times \left(1 - \frac{x}{100}\right)$ (where z is the total mass of grape with x water content)

Hence, $z = \frac{20}{100-x}$ kg

Price for $\frac{20}{100-x}$ kg raisin= $\frac{20}{100-x} \times \frac{k}{x^2} = \frac{20k}{(100-x)x^2}$

Loss = $\frac{\frac{k}{80^2} - \frac{20k}{(100-x)x^2}}{\frac{k}{80^2}} = \frac{1}{9}$

$\Rightarrow 1 - \frac{20*80^2}{(100-x)x^2} = \frac{1}{9}$

$\Rightarrow \frac{20*80^2}{(100-x)x^2} = \frac{8}{9}$

$\Rightarrow x^3 - 100x^2 + 144000 = 0$

From the options, x=60 satisfies the given equation.

Question 32

A faulty machine records the price and number of goods purchased but reverses the digits of the number of goods when computing the bill. At the end of the day when the accountant was tallying the number of goods left,he found that the number of goods recorded by the machine was 63 less than the actual number of goods and that the value of the recorded goods was Rs.696. What is the actual price of a good? (Assume that the price and the number of goods are two-digit numbers and that the price of each good is the same).

A 24

B 12

C 29

D 58

Answer: A

Explanation:

Let the faulty value of the number of goods be ab

Let actual value of number of goods be ba.

ba-ab=63

10*b+a-(10*a+b)=63

9(b-a)=63

b-a=7

So we have the following possibilities (9,2),(8,1)

So the possible values are 92,29,18,81

Among the above values only 29 divides 696.

So the number of goods as shown by the faulty machine=29

Price of each good= $\frac{696}{29}$

=24

A is the correct answer.

Question 33

A milkman bought 15 litres of milk and mixed it with 3 litres of mineral water (which is not free). He claims to his customers, who do not know about mixing, that he is making a profit of 10% only. However, his actual profit is 20%. What is the ratio of the cost of milk/litre and water/litre.

A 2:3

B 3:4

C 2:1

D 3:2

Answer: C

Explanation:
Let the CP of milk be Rs. 100/litre
As he is claiming 10% profit, SP of the total mixture = Rs. [(15 + 3) * 110] = Rs. 1980
Actual profit = 20%
Let actual CP be Rs. x.
Then, x + 20% of x = Rs. 1980
Solving for x, we get x = Rs. 1650
So, Actual CP = Total CP of milk + Total CP of water
Or, Total CP of water = Rs. 1650 - (15 * 100) = Rs. 150
Or, CP of water = Rs. 50/litre
Required ratio = 100:50 = 2:1
Hence, option C is correct.

Question 34

A shopkeeper marks up the price of the article by n% and then offers a discount of n%. He ends up making a loss of Rs. 100. Had he marked up the price of the article by 2n% and offered a discount of n%, he would have made a profit of Rs.100. How much will the shopkeeper earn if he marks up the price by 3n% and offers a discount of 2n%?

A A profit of Rs. 600

B A profit of Rs. 300

C A loss of Rs. 600

D A loss of Rs.300

Answer: D

Explanation:
Let the cost price of the article be 'x'.
When the shopkeeper marks up the price of the article by n% and offers a discount of n%, he incurs a loss of Rs. 100.
$(1+n)(1-n)x = x - 100$
$x - xn^2 = x - 100$
=> $xn^2 = 100$.---(1)

When the shopkeeper marks up the price by 2n% and offers a discount of n%, he makes a profit of Rs. 100.
$(1+2n)(1-n)x = x + 100$
$(1-n+2n-2n^2)x = x + 100$
$x + nx - 2n^2x = x + 100$
Substituting (1), we get,
$nx - 200 = 100$
$nx = 300$ -------(2)

Dividing (1) by (2), we get,
$n = \frac{1}{3}$ and $x = 900$

When the shopkeeper marks up the price by 3n% and offers a discount of 2n%, the selling price of the article will be
$(1+3n)(1-2n)x$
$(1+3n)(1-2n)x = (1+n-6n^2)x$
$= x + nx - 6n^2x$
$= 900 + 300 - 600$
$= 600$
=> Loss = $900 - 600$ =Rs.300.
Therefore, option D is the right answer.

Question 35

A fruit seller gives 10% discount on the marked price and sells apples. He also gives 15 apples (per dozen) to a regular customer to reward his loyalty. If he still ends up making a 20% profit on the apples, how much % above the cost price are the apples listed?

A 33.33%

B 50%

C 66.67%

D 80 %

Answer: C

Explanation:
Let the MP of 12 apples be 100 Rupees.
He gives 10% discount on it i.e. he sells 12 apples at Rs 90.
But instead of giving 12 apples he gives 15 apples i.e. he sells 15 apples at Rs. 90.
SP of 1 apple = Rs 6.

$$\frac{6 - CP}{CP} = \frac{1}{5}$$

He still ends up with 20% profit i.e.

i.e. CP of 1 apple = Rs 5.
CP of 12 apples = Rs. 60.
MP of 12 apples = Rs. 100

$$\text{Therefore, \% Markup} = \frac{100 - 60}{60} = 66.66\%$$

Hence, option C is the correct answer.

Question 36

An amount was lent at a certain rate of interest compounded annually. Had the amount been lent at simple interest, the amount of interest would have been Rs 5400 less for initial two years and 17820 for initial three years, then the amount lent is equal to

A 72000

B 40000

C 80000

D 60000

Answer: D

Explanation:
Assuming the amount =P the rate of interest = R% and R/100 = a

For two years difference between compound and simple interest = $P(1+a)^2$-P-2Pa = Pa^2=5400.....(1)

Now for three years, the difference = $P(1+a)^3$-P-3Pa = Pa^3+3Pa^2=17820.....(2)

Putting the value of Pa^2 in (2), we get 5400a+3*5400=17820 => a=3/10

Now, on putting a=3/10 in (1), we get P*9/100 = 5400 => P =60000

Question 37

A wholesaler buys an equal number of pens and pencils. The cost price of a pen and a pencil are in ratio 3:2.The total cost price for all the pencils is a. He sells all the pencils for Rs 144 at a profit of$a$%. If the profit on all the pencils and all the pens is the same, what is the overall profit percentage after selling all the pens and pencils?

A 80%

B 64%

C 40%

D 48%

Answer: B

Explanation:
The cost price of all pencils =a, the profit percentage = a

$\frac{144-a}{a} = \frac{a}{100}$

=> $a^2 + 100a - 14400 = 0$

=> a=-180,80

a=-180 is rejected

Then the profit of pens = 144-80=64

Cost price of pens = 120

Now cost price = 120+80 = 200

Profits = 64*2 =128

=> The overall profit percentage =128/200= 64%

Question 38

A fruit seller buys 60 oranges and 50 bananas such that price of 5 bananas is equivalent to price of 4 oranges. If he sells equal number of bananas and oranges at the loss of 20 percent and remaining at the profit of 40 percent such that his overall profit is 18.4 percent. What is the total number of oranges and bananas that he sold at profit?

A 80

B 70

C 50

D 60

Answer: B

Explanation:
Price of 5 bananas = Price of 4 oranges

5x=4y =>x/y=4/5

Assume cost price of 1 banana = 4a and the price of 1 orange = 5a,

Overall price = 60*5a+50*4a=500a

Also the number of bananas sold = x, the number of oranges sold=x

Selling Price of fruits sold at loss = (x*4a+x*5a)0.8 = 7.2ax

Selling price of remaining fruits = ((60-x)*5a+(50-x)*4a)*1.4 = 700a-12.6ax

Overall selling price = 7.2ax + 700a-12.6ax = 500a*(1+0.184*500)

=>700a-5.4ax=592a =>108a=5.4ax => x=20

Total number of oranges and bananas that he sold at profit = 60-20+50-20 = 40+30=70

Question 39

The ratio of cost of a notebooks and a pads for the shopkeeper is in the ratio 3:2. For every 5 notebooks sold, the shopkeeper gives 1 pad for free. The profit margin for each notebook is 50%. If the profit realized by the shopkeeper when a customer buys 10 notebooks is ₹231, what is the total cost of a notebook and a pad ?

Answer:105

Explanation:
Let the cost price of the notebook and the pad be ₹$3x$ and ₹$2x$ respectively.

the profit percent on a notebook is 50%.

The selling price of a notebook =(1+50/100)*3x =4.5x

When a customer buys 10 notebooks,

Cost price for the shopkeeper = 10*3x +2*2x = 34x

Selling price for the shopkeepr = 10*(4.5x) = 45x

$\Rightarrow 45x = 34x + 231$

$\Rightarrow 11x = 231$

$\Rightarrow x = 21$

hence, the total cost of a notebook and a pad = 5x= 21*5= Rs105

Question 40

A takes 8 days and B takes N days to complete a job working alone. A and B work on the job on alternate days. If they take exactly the same time irrespective of who starts the job, what is the maximum integral value possible for N?

Answer:56

Explanation:
If B also takes 8 days, then it does not matter who starts the job first.

There can also be other solutions such that the part of the work done in two days, $\frac{1}{8} + \frac{1}{N}$, is of the form $\frac{1}{x}$ where x is a positive integer. The work will be completed in $2x$ days.

$\frac{1}{8} + \frac{1}{N} = \frac{1}{x}$

So, $\frac{1}{N} = \frac{1}{x} - \frac{1}{8}$

So, $\frac{1}{N} = \frac{8-x}{8x}$

Or, $N = \frac{8x}{8-x}$

This will be maximized when $x = 7$ and equals 56

Question 41

Two trains, Garibrath express and Durunto express are moving towards each other on parallel tracks. The speed of Garibrath and Durunto express are 72 km/hr and 54km/hr respectively. Ram is sitting near the front end of Garibrath and Shyam is sitting near the rear end of Durunto express. As soon as the trains start crossing each other, Ram starts moving towards the rear end of Garibrath at the speed of 3 m/s and Shyam starts to move towards the front end of Durunto at the speed of 4 m/s. If the lengths of Garibrath and Durunto express are 120 m and 180 m respectively. After how much time(in seconds) from the instant that trains start crossing each other, will Ram and Shyam cross each other?

Answer:5

Explanation:
Speed of Garibrath express = 72 km/hr = 20m/s
Speed of Durunto express = 54 km/hr = 15m/s
When the trains start to cross each other, Ram is at front end of Garibrath express and Shyam is at rear end of Durunto express. So the initial distance between them is equal to the length of Durunto express.
Hence initial distance between them = 180m
Shyam is moving in the same direction as the train so his effective speed is 15+4 = 19 m/s
Ram is moving in the direction opposite to the train, so his effective speed is 20-3 =17 m/s.
Hence with reference to the train Ram and Shyam are moving in the same direction but with reference to ground they are moving in the opposite direction with relative speed of 19+17 = 36 m/s
Total distance to be covered = 180 m
Hence required time = 180/36 = 5 seconds

Question 42

Ten men and eight women working for 12 days can complete a piece of work which can be completed by twelve men working for 16 days. If eight men and six women are currently working, the number of additional women required to complete the work in 9.6 days is

Answer:10

Explanation:
Consider the work done by 1 man in 1 day = M units and that by a woman in 1 day = W units

Hence, (10M + 8W)*12 = 12M*16

120 M + 96W = 192M

96W = 72M

4W = 3M

Total work = 12M *16 = 192M

Let x be the number of additional women to be employed.

(8M + 6W+xW)9.6 = 192 M

(8M + 6* $\frac{3M}{4}$ +x* $\frac{3M}{4}$)9.6 = 192 M

(8M + $\frac{18M}{4}$ + $\frac{3xM}{4}$)9.6 = 192 M

$(\frac{50}{4} + \frac{3x}{4}) = 20$

x = 10

10 is the correct answer.

Question 43

Ram and Shyam can complete a work together in 24 days. Ram is 50 percent more efficient than Shyam. They started working and Ram took rest every 2nd day and Shyam every 3rd day. On which day will the work get completed?

A 51

B 40

C 43

D 40

Answer: C

Explanation:
Assume the work = 120 units

Work done by both in 1 day = 120/24= 5 units

Now, 1.5x+ x =5 units

Work done by Ram in a day =3 units

Work done by Shyam in a day = 2units

It is given that Ram took rest every 2nd day and Shyam every 3rd day.

Work done by them on 1st day, 2nd day, 3rd day, 4th day, 5th day and 6th day = 5,2,3,2,5,0 = 17 units

This pattern will repeat every 6 days. Hence, after 42 days total work done = 17*(42/6) = 119 units

Hence the work will be finished on 43rd day.

Question 44

Rinesh can work for 5 hours non-stop but he rests for 1 hour after that. Similarly his wife can work for 2 hours 15 minutes non-stop and rests for 45 minutes after that. His son can work for 2.5 hours non stop and rests for 30 minutes after that. What is the minimum number of integral hours taken by three of them to complete a work which requires 60 man-hours? Assume all are equally skilled in their work

A 25

B 24

C 23

D 26

Answer: A

Explanation:
Total work=60 man-hours.
Work completed by Rinesh in 6 hrs=5 man-hours(Since he rests for 1hr)
Work completed by his wife in 3 hours=2.25 man-hours.
Work completed by his son in 3 hours=2.5 man-hours.
Total work done by them in 6 hours= 5+2.25*2+2.5*2=14.5
Work done by them in 1 hr=14.5/6=2.41
Work done by them in 24 hrs= 14.5*4=58

The remaining 2 man-hours gets completed in next 0.66 hrs

So the integral number of hours is 24+1 = 25 hours

Question 45

Three men can build a wall in 5 days. The total money of the job is 150000. If the efficiency of the three people is in the ratio 4:5:6, what is the difference in amount received by the person receiving the most and the person receiving the least amount of money?

A 15000

B 20000

C 60000

D 75000

Answer: B

Explanation:
Let the people be A,B,C.

Let the amount of work done per day by A,B,C be $4x$,$5x$ and $6x$ units

Thus, total work done in 1 day = $4x + 5x + 6x = 15x$ units

Total work of the wall = $15x \times 5 = 75x$ units

Total amount of money for the construction of wall = 150000

The most amount of money will be earned by C as his efficiency is the most and therefore will also do the most amount of work. The least amount of money will be earned by A as his efficiency is the least and therefore will also do the least amount of work.

Money paid to C = $\frac{6}{4+5+6} \times 150000 = 60000$

Money paid to A = $\frac{4}{4+5+6} \times 150000 = 40000$

Difference in amount = 60000 - 40000 = 20000

Question 46

A, B and C can do a work in 20 days, 15 days and 12 days respectively. They all started the work together, but C left the job three days before its completion, and B left the job two days before C. In how many days, did the work get completed?

A $8\frac{11}{12}$ days

B $7\frac{11}{12}$ days

C $6\frac{11}{12}$ days

D $5\frac{11}{12}$ days

Answer: B

Explanation:
Let the total work be 60 units (LCM of 15, 20 and 12)
A can complete the work in 20 days.
=> A's 1 day's work = 3 units
B can complete the work in 15 days.

=> B's 1 day's work = 4 units
C can complete the work in 12 days.
=> C's 1 day's work = 5 units
Let the total time required to complete the work be x days.
Then, A worked for x days, C worked for (x - 3) days, and B worked for (x - 5) days.
Therefore, 3*x + 4 * (x - 5) + 5 * (x - 3) = 60
On solving, we get x = $\frac{95}{12}$ days = $7\frac{11}{12}$ days
Hence, option B is the correct answer.

Question 47

A cistern is connected to 10 pipes. Some pipes fill the tank while the rest empty the tank. The capacity of each pipe is the same (both filling and emptying pipes). If all the pipes that fill the tank are opened and all the pipes that empty the tank are closed, an empty tank will be full in 20 minutes. If all the pipes that empty the tank are opened and all the pipes that fill the tank are closed, a half-full tank will be emptied in 15 minutes. If all the pipes that fill the tank and half the pipes that empty the tank are opened in an empty tank, the time in which the tank will be filled (in minutes) is

Answer:30

Explanation:
Let the number of pipes that fill the tank be x.
=> Number of pipes that empty the tank = 10-x.
Let us assume the capacity of each pipe to be 1 unit/minute.

The tank will be full in 20 minutes if all the pipes that fill the tank are opened and all the pipes that empty the tank are closed.
=> Capacity of the tank = 20*x -----(1)

If all the pipes that empty the tank are opened and all the pipes that fill the tank are closed, a half-full tank will be emptied in 15 minutes. Therefore, a full tank will be emptied in 30 minutes if all the tanks that empty the tank are opened and all the tanks that fill the tank are closed.

=> Capacity of the tank = 30*(10-x) -----(2)

Equating (1) and (2),
20x = 300 - 30x
50x = 300
x = 6

The number of pipes that fill the tank is 6 and the number of pipes that empty the tank is 4.
If all the pipes that fill the tank and half the pipes that empty the tank are opened, then 6-2 = 4 pipes will be filling the tank.

Capacity of the tank is 20x = 20*6 = 120 units.
=> Time taken = 120/4 = 30 minutes.

Therefore, 30 is the right answer.

Question 48

Two workers can complete a job in 24 days while working together. First one of the two workers works alone for 16 days then the other worker works for 24 days alone. If it is known that only 20% of assigned work is left after 40 days, then find out the time (in days) taken by the slower worker to complete the remaining work.

Answer:12

Explanation:
Let 'x' be the total amount of work.
Let 'a' and 'b' be the amount of work completed by 1st and 2nd worker in one day.
Then we can say that $24a + 24b = x$ ... (1)

Also $16a + 24b = \frac{4x}{5}$ ... (2)

From equations (1) and (2),

$8a = \frac{x}{5}$

$x = 40a$ ... (3)

Hence we can say that 1st worker will take 40 days to complete the entire work alone.

From equations (1) and (3),

$x = 60b$

Hence, we can say that 2nd worker will take 60 days to complete the entire work alone.

We can see that among two workers 2nd worker is the slower one. He can complete the entire work in 60 days hence we will take 12 days to complete remaining work.

Question 49

If $|\log_{(6x+4)}(3x-2)|$=1. What is the number of possible values of x?

A 1

B 2

C 3

D 0

Answer: A

Explanation:

$|\log_{(6x+4)}(3x-2)|$=1

$3x - 2 > 0$

$x > 2/3$.....(1)

$\log_{(6x+4)}(3x-2) = \pm 1$

Case 1

$\log_{(6x+4)}(3x-2) = 1$

$\therefore 6x + 4 = 3x - 2$

$x = -2$

which is not possible according to the equation 1

Case 2

$\log_{(6x+4)}(3x-2) = -1$

$\therefore \frac{1}{6x+4} = 3x - 2$

$(6x + 4)(3x - 2) = 1$

$18x^2 = 9$

$x = \pm \frac{1}{\sqrt{2}}$

$1/\sqrt{2} > 2/3$

thus only one value of x i.e. $1/\sqrt{2}$ can satisfy the equation.

Question 50

If the value of $\frac{5}{2log_2 800^3} + \frac{1}{log_5 800^3}$ can be expressed as $\frac{a}{b}$, where a and b are co-primes, then $a^2 + b^2$ is

A 17

B 29

C 37

D 10

Answer: C

Explanation:

$\frac{5}{2log_2800^3} + \frac{1}{log_5800^3}$

$= \frac{5}{2*3log_2800} + \frac{1}{3log_5800}$

$= \frac{5log_{800}2}{2*3log_2800} + \frac{log_{800}5}{3}$

$= \frac{5log_{800}2}{2*3} + \frac{log_{800}25}{3}$

$= log_{800}2^{5/6} + log_{800}5^{1/3}$

$= log_{800}2^{5/6}5^{1/3}$

Now, $2^{5/6}5^{1/3} = 2^{5/6}5^{2/6} = 32^{1/6}25^{1/6} = 800^{1/6}$

Hence, $log_{800}2^{5/6}5^{1/3} = log_{800}800^{1/6} = 1/6$

Here, $\frac{a}{b} = \frac{1}{6}$

=> a=1, b=6

Therefore, $a^2 + b^2 = 1^2 + 6^2 = 37$

Question 51

Find the number of ordered pairs of integers (p,q), which satisfy the condition: $log_4(p+q) + log_4(p-q)$ **= 4.**

A 18

B 5

C 9

D 7

Answer: D

Explanation:

$log_4(p+q) + log_4(p-q) = 4 = log_4(p+q) * (p-q) = 4$

$=> (p+q)(p-q) = 4^4 = 256.$

Number of integral factors of 256 = 18.

Total of 9 positive and 9 negative factors.

But p+q, p-q > 0 (as log(-ve) is undefined) so, number of possible value = 9.

But among these 9 cases there will be 2 cases where p and q will not be integers.

For example if p+q = 256 and p - q = 1, p and q will not be integers. So this is not possible. So out of the given 9 cases, 2 cases won't be possible.

Question 52

$log_5xlog_5(yz) = 4 - log_5ylog_5z$**, where** x, y **and** z **are real numbers. If** $\frac{xz}{125} = \frac{125}{y}$**, then the value of** $(log_5x)^2 + (log_5y)^2 + (log_5z)^2$ **is**

A 24

B 30

C 28

D 32

Answer: C

Explanation:

We have, $log_5 x log_5 yz = 4 - log_5 y log_5 z$

=> $log_5 x(log_5 y + log_5 z) + \ log_5 y log_5 z = 4$

xz/125 = 125/y => xyz=125*125 => $log_5 x + log_5 y + log_5 z = 6$

Using $(a+b+c)^2 = a^2+b^2+c^2+ 2ab + 2bc + 2ca$

$(log_5 x)^2 + (log_5 y)^2 + (log_5 z)^2 = (log_5 x + log_5 y + log_5 z)^2 - 2(log_5 x(log_5 y + log_5 z) + \ log_5 y log_5 z)$

$= 6^2-2*4=28$

Question 53

If p, q and r are real numbers such that $p^{log_8 27} = 2$, $q^{log_{1/2} 9} = 0.25$ and $r^{log_{\sqrt{3}} 4} = 3$, then the value of $p^{(log_8 27)^2} + q^{(log_{1/2} 9)^2} + r^{(log_{\sqrt{3}} 4)^2}$ is

Answer:100

Explanation:

$p^{(log_8 27)^2} = (p^{log_8 27})^{log_8 27}$ $(p^{log_8 27} = 2)$

$= 2^{log_8 27} = 27^{log_8 2} = 3$

Similarly, $q^{(log_{1/2} 9)^2} = (q^{log_{1/2} 9})^{log_{1/2} 9} = (0.25)^{log_{1/2} 9} = 9^{log_{1/2} 0.25} = 81$

$r^{(log_{\sqrt{3}} 4)^2} = (r^{log_{\sqrt{3}} 4})^{log_{\sqrt{3}} 4} = 3^{log_{\sqrt{3}} 4} = 4^{log_{\sqrt{3}} 3} = 16$

Hence the required sum =3+81+16 =100

Question 54

If $q > 1$ and $p \geq q$, then $\log_p p + \log_q q$ can never be

A -1

B 3

C 2

D 4

Answer: A

Explanation:

$\log_p p + \log_q q$.

$=\log_p q - \log_p p + \log_q p - \log_q q$

$= \log_p q + \log_q p$ -2.....(1)

Both $\log_p q$ and $\log_q p$ are positive numbers as p and q are greater than 1

Using AM $\geq$ GM

log_q

$\log_p q + \log_q p \geq \sqrt{\log p * \frac{\log p}{\log q}}$

$\frac{\log_p q + \log_q p}{2} \geq$

$\log_p q + \log_q p \geq 2$

=> $\log_p q + \log_q p$ -2 $\geq$ 2-2

=> $\log_p \frac{q}{p} + \log_q \frac{p}{q} \geq$ 2-2 .....(From (1))

$\log_p \frac{q}{p} + \log_q \frac{p}{q} \geq 0$

A is the correct answer.

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Question 55

The value of $\log_3 3 + \log_3 27 + \log_3 243$..... **25 terms is**

A 125

B 625

C 600

D 900

Answer: B

Explanation:

$\log_3 3 + \log_3 27 + \log_3 243$..... 25 terms can be re-written as

$\log_3 3 + \log_3 3^3 + \log_3 3^5$..... 25 terms is

1+3+5+7.....25 terms

The above sequence is an Arthimetic progression with first term = 1 and common difference = 2

Sum of n terms of an Arithmetic progression = $\frac{n*[2a+(n-1)*d]}{2}$

$= \frac{25}{2} * [2*1+24*2]$

=625

B is the correct answer.

Question 56

If $'a'$ **is the smallest value of x which satisfies the equation** $4^x + \frac{35}{4^x}$ **=12. Then the value of** 16^a **is**

Answer:25

Explanation:

$4^x + \frac{35}{4^x}$=12.

Let 4^x=p

$p + \frac{35}{p}$ =12

$p^2 - 12p + 35$=0

p=5,7

The value of x= $log_4 5$, $log_4 7$

Since a is the smallest value which satisfies the equation, a= $log_4 5$

Let's find the value of 16^a

$=16^{log_4 5}$

$=4^{2*log_4 5}$

=25

25 is the correct answer.

Question 57

Number of digits in 3^{98} in base 9

A 49

B 50

C 48

D 51

Answer: B

Explanation:

Number of digits in 3^{98} in base 9 is given by GIF of $log_9 3^{98}$ + 1

$=log_9 3^{98}$

$= \frac{log 3^{98}}{log 9}$

$= \frac{98 log 3}{2 log 3}$

=49

Number of digits in 3^{98} in base 9= 49+1=50

Hence B is the correct answer.

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Question 58

If $log_3 x + log_3 y + log_3 z \geq 3$ where x, y, z are positive real numbers. Then the least value of $3(x + y + z)$ is

A 8

B 9

C 27

D 81

Answer: C

Explanation:

$log_3 x + log_3 y + log_3 z \geq 3$

$log_3 xyz \geq 3$

$xyz \geq 3^3$

As $\frac{x+y+z}{3} \geq \sqrt[3]{xyz}$

$\frac{x+y+z}{3} \geq 3$

$x + y + z \geq 9$

$3 * (x + y + z) \geq 27$

C is the correct answer.

Question 59

If p, q, r are whole numbers, how many distinct triplets satisfy the condition $plog_{21}^{7} + qlog_{21}^{3} + rlog_{21}^{2}$=10?

Answer:1

Explanation:
$plog_{21}^{7} + qlog_{21}^{3} + rlog_{21}^{2}$=10

$log(7^p * 3^q * 2^r)_{21}$=10 [∵ log a+log b=log ab]

$7^p * 3^q * 2^r$=21^{10}

$7^p * 3^q * 2^r$=$3^{10} * 7^{10}$

Since there is no power in 2,r=0

p=q=10

Number of distinct triplets=1
Hence 1 is the correct answer.

Question 60

If $\log_{12}(3^x + 3x - 81) = x(1 - \log_{12} 4)$ and x is positive, what is the value of x?

Answer:27

Explanation:
$\log_{12}(3^x + 3x - 81) = x(1 - \log_{12} 4)$
=>$\log_{12}(3^x + 3x - 81) = x(\log_{12} 12 - \log_{12} 4)$
=>$\log_{12}(3^x + 3x - 81) = x(\log_{12} 3)$
=>$\log_{12}(3^x + 3x - 81) = (\log_{12} 3^x)$
=>$3^x + 3x - 81 = 3^x$
=>$3x = 81$
=>$x = 27$
Hence, 27 is the correct answer.

How to prepare for Logical Reasoning for CAT

Question 61

If $7^x = 3^{\log_9 7} * 5^{\log_{25} 49}$ where x is positive, then the value of 20x is

Answer:30

Explanation:
$7^x = 3^{\log_9 7} * 5^{\log_{25} 49}$
=>$7^x = 7^{\log_9 3}_{1} * 49^{\log_{25} 5}_{1}$
=>$7^x = 7^{2}_{1} * 49^{2}$
=>$7^x = 7^{2}_{3} * 7$
=>$7^x = 7^{2}_{3}$
=>$x = 2$
=>$20x = 30$
Hence, 20 is the correct answer.

Question 62

If it is known that x and y are two positive numbers such that $log_3 x \geq \frac{4 * log_9 3 - 1}{log_9 3}$, what is the minimum value of $x + y$?