CHAPTER - 1
RATIO AND PROPORTION, INDICES, LOGARITHMS

UNIT I: RATIO

TYPES OF RATIO

Continued ratio is the relation (or compassion) between the magnitude of three or more Quantities of the same kind. The continued ratio of three similar quantities a, b, c is written as a : b : c

A ratio compounded of itself is called duplicate ratio a2 : b2 is the duplicate ratio of a:b

Similarly the triplicate ratio a : b is a3 : b3.

The sub-duplicate ratio of a : b is a : b and the sub-triplicate ratio of a : b is a 1 /3 : b1/3

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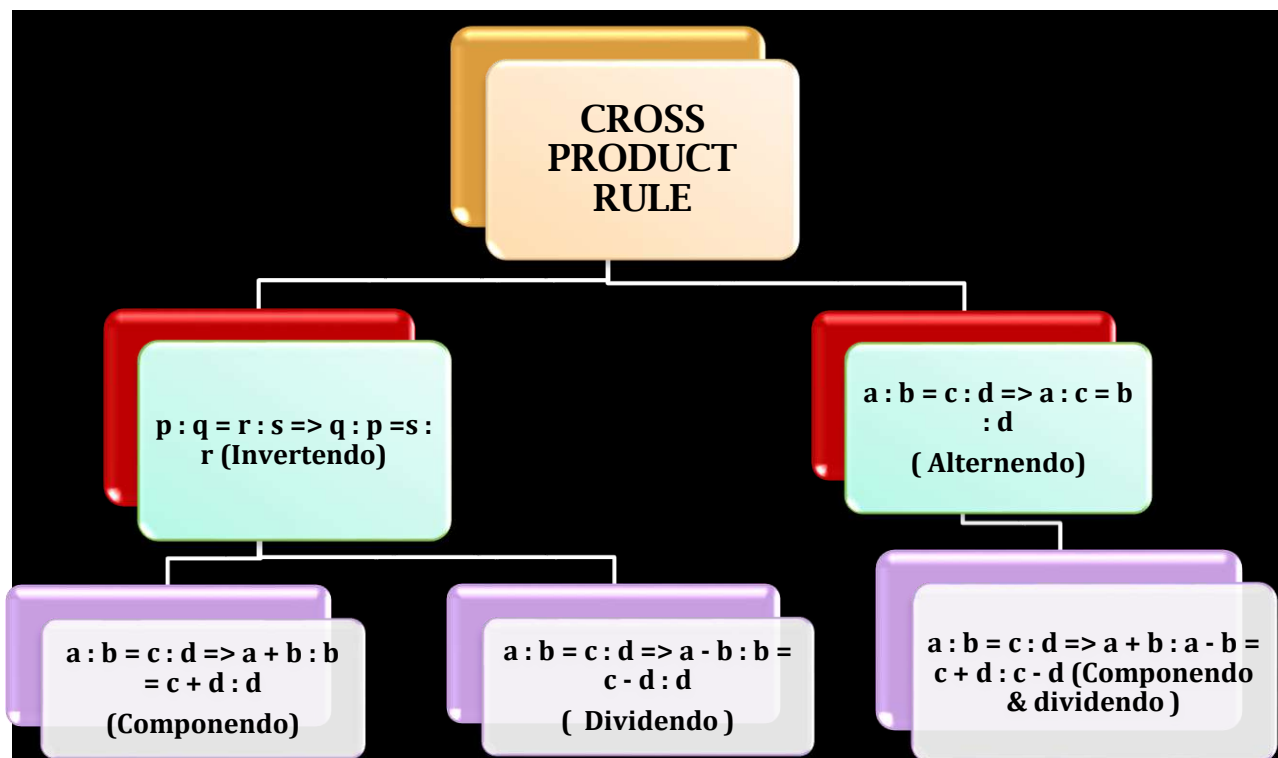
RATIO	A ratio is a comparison of the sizes of two or more
	If a and b are two quantities of the same kind (in same units). Then the fraction a/b is called the ratio of a to b. it is written as a: b. Thus, the ratio of a to b = a/b or a: b. The quantities a and b are called the terms of the ratio, a is called the first term or antecedent and b is called the second term or consequent

UNIT II: PROPORTIONS

MEANING	An equality of two ratios is called a proportion. Four quantities a, b, c, d are said to be in proportion if a : b = c : d.
TERMS OF PROPORTION	The quantities a, b, c, d are called terms of the proportion a, b, c, and d are called its first, second, third and fourth terms respectively. First and fourth terms are called extremes (or terms), secondand third terms are called means (or middle term).

CROSS PRODUCT RULE

p : q = r : s => q : p = s : r (Invertendo)

a : b = c : d => a : c = b : d (Alternendo)

a : b = c : d => a + b : b = c + d : d (Componendo)

a : b = c : d => a - b : b = c - d : d (Dividendo)

a : b = c : d => a + b : a - b = c + d : c - d (Componendo & dividendo)

UNIT III : INDICES

PROPERTIES	This is called product rule.
	Three quantities a, b, c of the same kind (in same units) are said to be in continuous proportion if a: b = b:c, i.e. $a/b = b/c$ i.e. $b^2 = ac$
	If a, b, c is in continuous proportion, then the middle term b is called the mean proportion between a and c, a is the first proportional and c is the third proportion.
	Thus, if b is mean proportional between a and c, then $b^2 = ac$ i.e. $\sqrt{ac}$
	If a: b = c: d then d is called fourth proportional.
	If a: b = c: d is in proportion then $a/b = c/d$ i.e. ad = bc

	i.e. product of extreme = product of means.

Laws and Properties.

1.	$a^m \times a^n = a^{m+n}$, when m and n are positive integers (base must be same)
2.	$a^m/a^n = a^{m-n}$ when m and n are positive integers and m > n
3.	$(a^m)^n = a^{mn}$ where m and n are positive integers
4.	$(ab)^n = a^n \cdot b^n$ when n can take all of the values.
5.	$a^0 = 1$
6.	$a^{-m} = 1/a^m$ and $1/a^{-m} = a^m$

UNIT IV: LOGARITH

LOGARITHM.

- The two equations ax = n and x = logan are only transformations of each other and should be remembered to change one form of the relation into the other.

- The logarithm of 1 to any base is zero. This is because any number raised to the power zero is one.

- Since a0 = 1 , loga1 = 0

- The logarithm of any quantity to the same base is unity. This is because any quantity raised to the power 1 is that quantity.

- Since a1 = a , loga a = 1

FUNDAMENTAL LAWS OF LOGARITHM

1.	$\log_a mn = \log_a m + \log_a n$
2.	$\log_a m/n = \log_a m - \log_a n$
3.	$\log_a m^n = n \log_a m$
4.	$\log_a a = 1, a = 1$
5.	$\log_a 1 = 0$

6.	$\log_b a \times \log_a b = 1$
7.	$\log_b a \times \log_c b = \log_c a$
8.	$\log_b a = \log a / \log b$
9.	$\log_b a = 1/\log_a b$

Question 1
Ratio between 150 gm and 2 kg
(a) 3: 40   (b) 3: 41
(c) 6: 12   (d) None of these
Answer: A
Explanation:
Ratio between 150 gm and 2000 gm =150/2000 = 3/40 = 3:40

Question 2
a: b = c: d, then b: a = d: c
(a) Alternendo   (b) Dividend
(c) Invertendo   (d) Componendo
Answer: C
Explanation:
Invertendo properties pf proportion is a: b = c: d then b: a= d:c

Question 3
The monthly incomes of two persons are in the ratio 4:5 and their monthly expenditure are in the ratio7:9. If each save Rs. 50 per month, find their monthly incomes.

(a) 600 and 100   (b) 500 and 400
(c) 900 and 700   (d) 400 and 500
Answer: D
Explanation:
Let the monthly incomes of oneperson be Rs. 4x and that of the other be Rs. 5x
Let the monthly expenses of one person be 7y and that of other be 9y
According to the question,
4x – 7y = 50   .... (1)

5x – 9y = 50   .... (2)
On solving both equations, we get
Y = 50
X = 100
Therefore,
Monthly income of one person
= 4 × 100 = 400
Monthly income for the other person
= 5 × 100 = 500
So, the sum of their monthly incomes
= 400 + 500 = 900
Hence, the monthly incomes of the two persons are Rs. 4 × 100 and Rs. 5× 100 i.e. Rs. 400 and Rs. 500.

Question 4
Shivani weights 56.7 kg. If he reduces his weight in the ratio 7: 6, find his new weight.
(a) 486.96kg   (b) 48.6kg
(c) 486kg   (d) 4.86kg
Answer: B
Explanation:
Original weight of Shivani = 56.7 kg He reduces his weight in the ratio 7 : 6
His new weight = (6×56.7)/7= 6×8.1 =48.6 kg

Question 5
Find the value of x if 10/3: x = 5/2: 5/4
(a) 5/3   (b) 3/5
(c) 9/5   (d) 5/9
Answer: A
Explanation:
10/3: x = 5/2 : 5/4
Using cross product rule, x × 5/2 = (10/3) × 5/4
Or, x= (10/3) × (5/4) × (2/5) = 5/3

Question6
Find the third proportion to 2.4 kg, 9.6 kg.
(a) 384kg   (b) 38.4 kg
(c) 3804kg   (d) 3.84 kg
Answer: B
Explanation:

Let the third proportion to 2.4 kg, 9.6 kg be x kg. Then 2.4 kg, 9.6 kg and x kg are in continued proportion since
$b^2 = ac$ so, 2.4/9.6 = 9.6/x or, x = (9.6 × 9.6)/2.4 = 38.4

Question7
The inverse ratio of 11:15 is:
(a) 15: 11   (b) 11: 11
(c) 15: 15   (d) $\sqrt{11} : \sqrt{15}$
Answer: A
Explanation:
One ratio is the inverse of another if their product is 1. Thus a: b is the inverse of b: a and vice – versa.

Question8
If a: b = c: d = e: f = ……………, then each of these ratios is equal
(a) (a + c + e + …….): (b + d +f + ……) is equal to each ratio
(b) (a + c + e +…….): (b + d +f + ……) is greater to each ratio
(c) (a + c + e + ……): (b + d + f + ……) is zero ratio
(d) None
Answer: A
Explanation:
Due to addendo property.

Question9
If a: b = c: d = 2.5: 1.5, what are the values of ad: b c and a + c: b + d?
(a) ad: b c and a +c: b + d are 2:1 and 8:3
(b) ad: b c and a + c: b + d are 1: 1 and 5: 3
(c) ad: b c and a + c: b + d are 1:1 and 5: 5
(d) None.
Answer: B
Explanation:
In the given proportion a: b and c: d, applying cross product rule, we get
ad = bc
Dividing by bc on both sides, we get
$$\frac{ad}{bc} = 1$$
$$\frac{ad}{bc} = \frac{1}{1}$$
ad: bc = 1: 1
Given: a: b = c: d = 2.5: 1.5 --------- (1)
In the given proportion a: b and c: d applying the property addendo, we get

a: b = c: d = (a+b) : (c+d) ---------- (2)
From (1) and (2) we get
(a+b) : (c+d) = 2.5: 1.5
(a+b) : (c+d) = (2.5 × 10) : (1.5 × 10)
(a+b) : (c+d) = 25: 15
(a+b) : (c+d) = (25/5) : (15/5)
(a+b) : (c+d) = 5: 3

Question10
Simplify 2x ½ 3x⁻¹ if x = 4

(a) 3   (b) 6
(c) 0.3   (d) 30

Answer: A

Explanation:
We have $2x^{½} 3x^{-1}$
$= 6x^{½} x^{-1} = 6x^{½-1}$
$= 6x^{½}$
$=3$

Question11
Find the value of k form $(\sqrt{9})^{-7}$ x $(\sqrt{3})^{-5}$ 3^{k}

(a) 19/2   (b) 19/3
(c) -19/3   (d) -19/2

Answer: d

Explanation:
$$\left(\sqrt{9}\right)^{-7} \times \left(\sqrt{3}\right)^{-5} = 3^{k}$$
$$\Rightarrow \left\{(3^{2})^{\frac{1}{2}}\right\}^{-7} \left\{(3)^{\frac{1}{2}}\right\}^{-5} = 3^{k}$$
$$\Rightarrow 3^{-7} \times 3^{\frac{-5}{2}} = 3^{k}$$
$$\Rightarrow 3^{-7\frac{-5}{2}} = 3^{k}$$
$$\Rightarrow 3^{\frac{-14-5}{2}} = 3^{k}$$
$$\Rightarrow 3^{\frac{-19}{2}} = 3^{k}$$
$$\Rightarrow k = \frac{-19}{2}$$

Question12
$\log_{2} 1$ =?

(a) 0   (b) 1
(c) x   (d) m

Answer: A

Explanation:
According to properties of logarithm $\log_a 1 = 0$

Question13
log 6 +log 8 is expressed as
(a) log 11   (b) log 48
(c) either a or b   (d) log 14
Answer: B
Explanation:
According to properties of logarithm i.e., $\log_a m + \log_a n = \log_a mn$

Question14
A and B together have Rs. 1210. If $\frac{4}{15}$ of A's amount is equal to $\frac{2}{5}$ of B's amount, how much amount does B have?
(a) Rs. 460   (b) Rs. 484
(c) Rs. 550   (d) Rs. 664
Answer: B
Explanation:
Rs484.
The logarithm of 16 to the base 2 is equal to 4
$\frac{4}{15} A = \frac{2}{5} B$
➔ A = $\left(\frac{2}{5} \times \frac{15}{4}\right)$ B
➔ A = $\frac{3}{2}$ B
➔ $\frac{A}{B} = \frac{3}{2}$
A: B = 3: 2
B's share = Rs.$[1210 \times \frac{2}{5}]$

Question15
A sum of Rs. 312was divided among 100 boys and girls in such a way that the boy gets Rs. 3.60 and each girl Rs. 2.40 the number of girls is
(a) 35   (b) 40
(c) 45   (d) 50
Answer: B
Explanation:
Step (I): Let x be the numbers of boys and y be the number of girls.
Given total number of boys and girls = 100
X + y=100 --------- (I)

Step (ii): A boy gets Rs. 3.60 and a girl gets Rs. 2.40
The amount given to 100 boys and girls = Rs. 312
3.60x + 2.40y = 312 ------------- (ii)

Step (iii):
Solving (i) and (ii)
3.60x + 3.60y = 360 --------Multiply (I) by 3.60
3.60x + 2.40y = 312 ----------- (ii)
1.20y = 48
Y = 48 / 1.20
= 40
➔ Number of girls = 40

Question16
Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:
(a) 2 :5   (b) 3: 5
(c) 4 :5   (d) 6 : 7
Answer: C
Explanation:
Let the third number be x.
$$\text{Then, first number} = 120\% \text{ of x} = \frac{120x}{100} = \frac{6x}{5}$$
$$\text{Second number} = 150\% \text{ of x} = \frac{150x}{100} = \frac{3x}{2}$$
Ratio of first two numbers = $\left(\frac{6x}{5} : \frac{3x}{2}\right)$ = 12x: 15x = 4: 5.

Question17
Seats for mathematics, physics and biology in a school are in the ratio 5:7:8, There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
(a) 2:3:4   (b) 6:7:8
(c) 6:8:9   (d) None of these
Answer: A
Explanation:
Originally, let the number of seats for mathematics, Physics and biology be 5x, 7x and 8x respectively.
Number of increased seats are (140% of 5x), (150% of 7x) and (175% of 8x)
$$\left(\frac{140}{100}x \times 5x\right), \left(\frac{150}{100}x \times 7x\right) \text{ and } \left(\frac{175}{100}x \times 8x\right)$$
7x, $\frac{21x}{2}$ and 14x

∴ The required ratio = $7x, \frac{21x}{2} : 14x$

→ 14x: 21x: 28x

→ 2: 3: 4

Question18

A sum of money is to be distributed among A, B, C and D in the proportion of 5: 2: 4: 3. If c gets Rs. 1000 more than D, what is B's share?

(a) Rs. 500   (b) Rs. 1500
(c) Rs. 2000   (d) None of these

Answer: C

Explanation:

Let the shares of A, B, C and D be Rs. 4x and RS.3X Respectively.

Then, 4x – 3x = 1000

➔ x = 1000.

➔ B's share = Rs. 2x = Rs. (2× 1000) = Rs. 2000.

$\left(\frac{140}{100} \times \frac{x}{5x}\right), \left(\frac{150}{100} \times \frac{x}{7x}\right), \left(\frac{175}{100} \times \frac{x}{8x}\right)$

$7x, \frac{21x}{2}$ and 14x

14x : 21x : 28x

2:3:4

Question19

Salaries of Ravi and Sumit are in the ratio 2:3. If the salary of each is increased by Rs. 4000, the new ratio between 40: 57. What is Sumit's salary?

(a) Rs. 17,000   (b) Rs. 20,000
(c) Rs. 25,500   (d) Rs. 38,000

Answer: D

Explanation:

Let the original salaries of Ravi and Sumit be Rs. 2x and Rs. 3x respectively.

Then $\frac{2x+4000}{3x+4000} = \frac{40}{57}$

➔ 57(2x + 4000) = 40(3x + 4000)

➔ 6x = 68,000

➔ 3x = 34,000

Sumit's present salary = (3x +4000) = Rs. (34000+4000) = Rs. 38,000.

Question20

The ratio of the number of boys and girls in a college is 7:8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?

(a) 8: 9   (b) 17: 18
(c) 21: 22   (d) None

Answer: C
Explanation:
Their increased number is (120% of 7x) and (110% of 8x).
Originally, let the number of boys and girls in the college be 7x and 8x respectively.
$(\frac{120}{100} \times 7x)$ and $(\frac{110}{100} \times 8x)$
$\frac{42x}{5}$ and $\frac{44x}{5}$
The required ratio = $\left(\frac{42x}{5} : \frac{44x}{5}\right)$ = 21:22

Question21
If 0.75: x=5: 8, then x is equal to:
(a) 1.12   (b) 1.2
(c) 1.25   (d) 1.30
Answer: B
Explanation:
0.75: x:: 5: 8
$\Rightarrow \frac{0.75}{x} = \frac{5}{8}$
$\Rightarrow$ x = $0.75 \times \frac{8}{5}$
$\Rightarrow 1.2$

Question22
The sum of three numbers is 98. If the ratio of the first to second is 2:3 and that of the second to the third is 5:8, then the second number is:
(a) 20   (b) 30
(c) 48   (d) 58
Answer: B
Explanation:
Let the three parts be A, B, C, Then,
A: B = 2: 3 and B: C = 5: 8 = $\left[5 \times \frac{3}{5}\right] : \left[8 \times \frac{3}{5}\right]$ 3:$\frac{24}{5}$
$\Rightarrow$ A: B: C = 2:3:$\frac{24}{5}$ = 10: 15: 24
$\Rightarrow$ B = $\left[98 \times \frac{15}{49}\right]$ = 30

Question23
If Rs. 782 be divided into three parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, then the first part is:
a) Rs. 182   b) Rs. 190
c) Rs. 196   d) Rs. 204
Answer: D

Explanation:

Given ratio = $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$, = 6:8: 9 .... Multiplying by 12

1st part = Rs. $\left[782 \times \frac{6}{23}\right]$

= Rs.204

Question24

The salaries A, B, C are in the ratio 2:3:5. If the increments of 15%. 10% and 20% are allowed respectively in their salaries, then what will be new ratio of their salaries?

(a) 3:3: 10   (b) 10:11: 20
(c) 23:33: 60   (d) None of these

Answer: C

Explanation:

Let A = 2k, B = 3k and C = 5k.

A's new salary = $\frac{115}{100}$ of 2k = $\left(\frac{115}{100} \times 2k\right) = \frac{23k}{10}$

B's new salary = $\frac{110}{100}$ of 3k = $\left(\frac{110}{100} \times 3k\right) = \frac{33k}{10}$

$\left(\frac{110}{100} 3k\right) \frac{120}{100}$ of 5k = $\left(\frac{120}{100} \times 5k\right)$ = 6K

New ratio $\left(\frac{23k}{10} : \frac{33k}{10} : 6k\right)$

= 23: 33: 60

Question25

If 40% of a number is equal to two-third of another number, what is the ratio of first number the second number?

(a) 2: 5   (b) 3:4
(c) 5: 3   (d) 7: 3

Answer: C

Explanation:

Let 40% of A = $\frac{2}{3}$ B

Then, $\frac{40A}{100} = \frac{2B}{3}$

➔ $\frac{2A}{5} = \frac{2B}{3}$

➔ $\frac{A}{B} = \left(\frac{2}{3} \times \frac{5}{2}\right) = \frac{5}{3}$

A: B = 5: 3

Question26
The fourth proportional to 5, 8, 15 is:
(a) 18   (b) 24
(c) 19   (d) 20
Answer: b
Explanation:
Let the fourth proportional to 5, 8, 15 be x.
Then, 5:8:15: x
➔ 5x = (8×15)
X = $\frac{(8×15)}{5}$ = 24
View Answer Discuss in forum workspace Report

Question27
Two number are in the ratio 3: 5. If 9 is subtracted from each, the new numbers are in the ratio 12:23. The smaller number is:
(a) 27   (b) 33
(c) 49   (d) 55
Answer: B
Explanation:
Let the numbers be 3x and 5x.
Then, $\frac{3x-9}{5x-9} = \frac{12}{23}$
➔ 23(3x-9) = 12(5x-9)
➔ 9x = 99
➔ x = 11
The smaller number = (3 × 11) = 33

Question28
In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1:2: 3. If there is Rs. 30 in all, how many 5 p coins are there?
(a) 50   (b) 100
(c) 150   (d) 200
Answer: C
Explanation:
Let the number of 25 p, 10 p and 5 p coins be x, 2x, 3x respectively.
Then, sum of their values = Rs. $[\frac{25x}{100} + \frac{10x2x}{100} + \frac{5x3x}{100}]$
∴ $\frac{60x}{100}$ = 30 ➔ $\frac{30×100}{60}$ = 50
Hence, the number of 5 p coins = (3×50) = 150

Question29

$a^{\log b - \log c} \cdot b^{\log c - \log a} \cdot c^{\log a - \log b}$ **has a value of**

(a) 1   (b) 0
(c) -1   (d) None

Answer: A

Explanation:

Let x = $a^{\log b - \log c} \cdot b^{\log c - \log a} \cdot c^{\log a - \log b}$

Taking log both the sides, we get

logx = log ($a^{\log b - \log c} \cdot b^{\log c - \log a} \cdot c^{\log a - \log b}$)

= $\log a^{\log b - \log c}$ + $\log b^{\log c - \log a}$ + $\log c^{\log a - \log b}$

= (logb - logc) loga + (logc – loga) logb + (loga – logb) logc

= 0

Log x = 0

⇒ x = e^0

⇒ 1

Question30

If loga = $\frac{1}{2}$ logb = $\frac{1}{5}$ logc, the value of a⁴ b³ c⁻² is

(a) 1   (b) 0
(c) -1   (d) None

Answer: A

Explanation:

Let loga = $\frac{1}{2}$ logb = $\frac{1}{5}$ logc = k

Then log a = k ➜ a = e^k

$\frac{1}{2}$logb = k ➜ logb = 2k

➜ b = e^{2k}

$\frac{1}{5}$logc= k ➜logc = 5k

➜ c = e^{5k}

$a^4 b^3 c^{-2}$= $e^{4k} \cdot e^{6k} \cdot e^{-10k}$

= e^0 = 1

Question31

The ratio of market prices of wheat and paddy is 2:3 and the ratio of quantities consumed in a family is 5:4. Find the ratio expenditure of wheat and paddy.

(a) 6:5   (b) 5:6
(c) 1:1   (d) 8:15

Answer: B

Explanation:

Expenditure = Price × Quantity

$\dfrac{Wheat\ price}{paddy\ price} = \dfrac{2}{3}$ and $\dfrac{Wheat\ quantity\ consumed}{paddy\ quantity\ consumed} = \dfrac{5}{4}$

Multiplying both ratios

Wheat price × Wheat quantity consumed = 2×5

Paddy price × paddy quantity consumed = 3×4

$\dfrac{Wheat\ Expenditure}{paddy\ Expenditure} = \dfrac{5}{6}$

Question32

If A: B = 2:3, B:C = 4:5 and C: D = 6:7, then find the value of A: B:C:D

(a) 15:24:30:35   (b) 16:24:30:35

(c) 17:24:30:35   (d) 18:24:30:35

Answer: B

Explanation:

Given a: b = 2: 3, b: c = 4: 5, c: d = 6: 7

a: b = 2 × 8: 3 × 8 = 16: 24

b: c = 4 × 6: 5 × 6 = 24: 30

c: d = 6 × 5: 7 × 5 = 30: 35

So, a: b: c: d = 16: 24: 30: 35

Question33

The value of $\log_2 (\log_5 625)$ is:

(a) 2   b) 5

(c) 10   (d) 15

Answer: A

Explanation:

Let $\log_5 625 = x$.

Then. $5^x = 625 = 5^4$ or x= 4

Let $\log_2 4 = y$ or $2y = 4 = 2^2$ or y = 2

$\log_2 (\log_5 625) = 2$

Question34

In a library, he ratio of number of story books to that of non - story books was 4:3 and total number of story books was 1248. When some more story books were bought, the ratio became 5:3. Find the number of story books bought.

(a) 312   (b) 321

(c) 936   (d) 1560

Answer: A

Explanation:

Given

The total number of story books in a library is 1248 when the ratio of the number of story books of that of non-story books was 4 : 3

To find:

The number of story books bought.

Solution:

The given ratio of the number of story books to that of non-story books was 4 : 3 when the total number of story books in a library is 1248.

Let 4x be the total number of storybooks.

⇨ 4x = 1248

⇨ X = $\frac{1248}{4}$ = 312

The number of non-story books = 3x = 3 × 312 = 936

When some more story books were bought the ratio becomes 5 : 3

Let y no of storybooks added to the library

⇨ $\frac{(1248+y)}{936}$ = $\frac{5}{3}$

⇨ 1248+y = $\frac{(5×936)}{3}$

⇨ 1248 + y = 1560

⇨ Y = 1560 – 1248

⇨ Y = 312

∴ 312 more books were bought and added to the library.

Question35

Log144 is equal to:

(a) 2log4+ 2log2   (b) 4 log 2 + 2log3

(c) 3log2 + 4log3   (d) 3 log2 × 4log3

Answer: B

Explanation:

Log 144

log $(2^4× 3^2)$

log 2^4 + log 3^2

4 log 2 + 2log3

Question36

Price of each article of type P, Q AND R is Rs. 300, Rs. 180 and Rs. 12 Respectively. Suresh buys articles of each type in the ratio 3:2:3 in Rs. 6480. How many articles of type Q did he purchase?

(a) 8   (b) 14

(c) 20   (d) None of the above

Answer: A

Explanation:

Let the common factor be k.
Hence, the number of articles of type P, Q and R will be 3k,2k and 3k respectively
Also,
Unit price of article x Number of articles = Total amount for the articles
300 x 3k + 180 x 2k + 120 x 3k = 6480
K = 4
Number of articles of type Q = 2k = 8

Question37
Ajay and Raj together have Rs. 1050. On taking Rs. 150 from Ajay will have same amount as what Raj had earlier. Find the ratio of amounts with Ajay and Raj initially.
(a) 3:4   (b) 7:1
(c) 1:3   (d) 4:3
Answer: D
Explanation:
Let initially money with Ajay be A and with Raj be R
So, A+R = 1050   .... (1)
Also, money is taken from Ajay, so
A-150 = R
A-R = 150   .... (2)
Adding both equations
2A = 1200
A = Rs. 600 = Initial money with Ajay
R = 1050 - 600 = Rs. 450 = Initial money with Raj

$$\frac{\text{Amount with Ajay}}{\text{Amount with Raj}} = \frac{600}{450} = \frac{4}{3}$$

Question38
The three numbers are in the ratio ½: 2/3: ¾. The difference between greatest and smallest numbers is 36. Find the numbers.
(a) 72, 84, 108   (b) 60, 72, 96
(c) 72, 84, 96   (d) 72,96, 108
Answer: A
Explanation:
Let the common factor be k
So the three numbers are $\frac{k}{2}$, $\frac{2k}{3}$, $\frac{3k}{4}$
Also, we know that, greatest – smallest = 36

$$\frac{3k}{4} - \frac{k}{2} = 36$$

K = 144

The numbers are $\frac{k}{2} = \frac{144}{2} = 72$

$\frac{2k}{2} = \frac{2 \times 144}{2} = 84 : \frac{3k}{4} = \frac{3 \times 144}{4} = 108$

Question39

If $\log_3 y = 100$ and $\log_3 x = 10$, then the value of y is:

(a) 3^{10} (b) 3^{100}

(c) 3^{1000} (d) 3^{10000}

Answer:C

Explanation:

$\text{Log}_3 x = 10$

Hence, $x = 3^{10}$

$\text{Log}_x y = 100$

$y = x^{100} = (3^{100}) = y = 3^{1000}$

Question40

The third proportional between $a^2 – b^2$ and $(a + b)^2$ is

(a) $\frac{a+b}{a-b}$ (b) $\frac{a-b}{a+b}$

(c) $\frac{(a+b)^3}{a-b}$ (d) $\frac{(a+b)^3}{(a-b)^3}$

Answer: C

Explanation:

Let x be required third proportional, then

$(a^2 – b^2):(a + b)^2:: (a + b)^2 : x$

➔ $\frac{a^2 – b^2}{(a+b)^2} = \frac{(a+b)^2}{x}$

➔ $x(a^2 – b^2) = (a+ b)^4$ i.e. $x (a – b)(a + b) = (a + b)^4$

➔ $x = \frac{(a+b)^3}{a-b}$

Question41

A sum of Rs. 53 is divided in such a way that A gets Rs. 7 more than what b gets and b gets Rs. 8 more than what C gets. The ratio of their share is. …………

(a) 25:18:10   (b) 25:18:1

(c) 2:18:10   (d) 25:8:10

Answer: A

Explanation:

Let the share of c = Rs. X.

Then share of B = Rs. (x+8) and share of A = Rs. (x + 8 +7)
Therefore x + (x+8) + (x+15) = 53
➔ 3x = 30 i.e. x = 10
Hence ratio
A: B: C = 25:18: 10

Question42
Fourth proportion to 4, 6, 8 is:
(a) 12   (b) 32
(c) 48   (d) None
Answer: A
Explanation:
Let x be the required fourth proportional. Then 4,6,8, x are in proportion.
4: 6 :: 8:x or 4/6, 8/x
= 4x = 48
X = 12

Question43
The mean proportion between 64 and 81 is
(a) 72   b) 62
(c) 48   d) None
Answer: A
Explanation:
Let x be the mean proportional then 64:x:: x: 81
➔ $\frac{64}{x} = \frac{x}{81}$
➔ $x^2 = 5184$
➔ x = 72

Question44
The ratio of numbers of girls and boys participating in sports of a school is 4:5. If the number of girls is 212, determine the number of boys participating in the sports.
(a) 256   (b) 265
(c) 251   (d) 263
Answer: b
Explanation:
Let the number of girls 4x
But number of girls 212
So,
4x = 212
x = $\frac{212}{4}$

x = 53 .... (1)
number of boys = 5x
put the value of x
= 5 × 53 = 265

Question45
Income ratio of Ramesh and Suresh is 5:6. Their spending ratio is 7:9, Ramesh saves 4000 and Suresh saves 3000. Income and spending respectively of Ramesh and Suresh are

(a) Ramesh – 25000, 21000, Suresh – 30000, 27000

(b) Ramesh – 36000, 32000; Suresh - 30000,27000

(c) Ramesh – 30000, 27000;

(d) None of the above

Answer: A
Explanation:
Income ratio = Ramesh: Suresh = 5:6 = $\frac{5}{6}$;
Common factor helps in finding actual values easily
So,Take 'A' as common factor
Income of Ramesh = 5A: Income of Suresh = 6A
$$\frac{\text{Spending of ramesh}}{\text{spending of Suresh}} = \frac{\text{Ramesh income}}{\text{Suresh income}} = \frac{7}{9}$$
$$\frac{5A - 4000}{6A - 3000} = \frac{7}{9}$$
9(5A-4000) = 7(6A-3000)
A = 5000
Income of Ramesh = 5A = 25000;
Income of Suresh = 6A = 30000
Spending of Ramesh = 25000-4000=21000
Spending of Suresh = 30000 – 3000 = 27000
Ramesh – 25000, 21000; Suresh – 30000, 27000

Question46
Find A: B: C: D when A: B = 2:3; B:C = 7:9; C:D = 5:7
(a) 70:105:135: 189   (b) 105:115:236: 189
(c) 70:124:155: 201   (d) 12:78:256: 189
Answer: A
Explanation:
A: B = 2:3; B:C = 7:9; C:D = 5:7
a = 2
b = 3
c = 7

d = 9
e = 5
f = 7
A: B:C:D = [2 × 7 × 5]: [3 × 9 × 5]: [3 × 9 × 7]
A: B: C: D = 70:105:135:189

Question47
Find the mean proportional between 7 and 63?
(a) 35   (b) 21
(c) 27   (d) 30
Answer: B
Explanation:
In a : b: c, mean proportion = b
a: b : c can be written as a : b :: b : c
a : b :: b : c = $\frac{a}{b} = \frac{b}{c} = b^2 = ac$
Here, a = 7; c = 63
b = $\sqrt{7 \times 63} = 21$

Question48
It was intended that Rs. 585 be divided among P, Q and R in the ratio of 4:3:2 , but by mistake the distribution was made in the proportion of 1/4 : 1/3 : 1/2. How much does 'R' gain by the error?
(a) Rs. 99   (b) Rs. 126
(c) Rs. 140   (d) Rs. 152
Answer: C
Explanation:
Total amount = Rs. 585
On dividing it in the ratio of 4:3: 2
Share of P = 4/9 * 585 = Rs. 260
Share of Q = 3/9 * 585 = Rs. 195
Share of R = 2/9 * 585 = Rs. 130
But the amount has been divided in the proportion of 1/4: 1/3: 1/2 i.e. 3: 4: 6
Share of P = 3/13* 585 = Rs. 135
Share of Q = 4/13* 585 = Rs. 180
Share of R = 6/13* 585 = Rs. 270
Therefore, gain for R By Virtue of error = Rs. 270 – Rs. 130 = Rs. 140

Question49
By giving Rs. 50 to M, A would have the amount equal to what M had earlier. If the sum of the amounts with A and M is Rs. 650. What is the ratio of the amount with A to that with M earlier?

(a) 7 : 4   (b) 5 : 3
(c) 2 : 1   (d) 7 : 6
Answer: D
Explanation:
Let the amounts with A and M be Rs. ''x'' and Rs. ''y'' respectively.
Thus, we have, x + y = 650
X – 50 = y
X – y = 50.
Hence, x = 350 & y = 300
Thus the required ratio is 350: 300 = 7: 6

Question50
A housewife wishes to purchase three articles A, B and C from a sum of Rs. 200. The unit prices of the articles A, B and C are Rs.20 Rs. 35 and Rs. 25 respectively. If she spends the entire amount by purchasing 5 numbers of articles of type C, what is the ratio of the number of articles purchased of type A to that of type, B?
(a) 1 : 2   (b) 2 : 1
(c) 1 : 1   (d) None of these
Answer: B
Explanation:
After spending Rs. 125 (25 *5) for article of type C, the housewife is left with Rs. 75(200-125). Since this amount has to be spent in totality, she must have purchased 2 articles of type A equivalent to Rs. 40) and 1 article of type B (equivalent to Rs. 35) Thus, the required ratio is 2: 1.

Question51
In what ratio should the profit be divided if M, N, O invests capital in ratio 2:3:5 and their timing of their investments are in the ratio 4:5:6.
(a) 8:15:30   (b) 5:18:28
(c) 4:5:6   (d) 2:3:5
Answer: A
Explanation:
P1:P2: P3 = (2*4): (3*5): (5*6)
= 8:15: 30

Question52
If a flat costs Rs. 4500per sq. ft., and a commercial space costs Rs. 9500 per sq. ft., then what is the ratio of their areas if the total cost of both are the same?
(a) 9:19   (b) 19:9
(c) 15:28   (d) 28:15
Answer: B

Explanation:
Let A1 be the area of flat and A2 be that of the commercial space
Total cost = area * rate
Therefore, cost of flat = A1*4500; cost of commercial space = A2*9500
Both the above costs are same
A1*4500 = A2*9500
A1:A2 = 9500:4500 = 19:9

Question53
In what ratio should the profit of Rs. 8000 be divided if x starts a business with an investment of Rs. 20000, y invests Rs. 7500 for 4 months and z invests Rs. 15000 after 3 months from the start of the business?
(a) 16:2:3   (b) 8:3:6
(c) 16:2:9   (d) 6:9:1
Answer: C
Explanation:
Let the profit of x be P1, that of Y be P2 and of Z be P3.
P1:P2: P3 = 20000*12: 7500*4: 15000*9 = 240: 30: 135 = 80: 10: 45
= 16: 2: 9

Question54
The third proportional to x^2-y^2, x - y is?
(a) x + y   (b) x – y
(c) x – y/(x + y)   (d) 1
Answer: C
Explanation:
A simple problem involving geometric progression (G.P)
In each term, a term of (x +y) is divided.
Hence the third term becomes x-y/ (x + y)

Question55
If the ratio of present ages of jeet and jay is 5:7 and after 6 years the ratio will be 3:4, what is the present age of jay?
(a) 42   (b) 30
(c) 36   (d) None of these
Answer: A
Explanation:
As the present age of jeet and jay are in the ratio 5: 7, let their ages be 5x and 7x respectively.
Therefore, their ages after 6 years will be (5x + 6) and (7x + 6) respectively.

Now, it is given that $\frac{(5x+6)}{(7x+6)} = \frac{3}{4}$

4× (5x + 6) = 3× (7x + 6)

20x + 24 = 21x + 18

⇒ 6 = x

⇒ x= 6

Present age of jay = 7x = 7 × 6 = 42

Question56

What is the fourth proportional to the numbers 2, 5, 8?

(a) 40   (b) 20

(c) 15   (d) 10

Answer: B

Explanation:

2/5 = 8/x: x = 40/2 = 20

Question57

The ratio between the speeds of two trains is 7:8. If the second train runs 400kms. In 5 hours, the speed of the first train is:

(a) 10 km/hr.   (b) 50 km/hr.

(c) 70 km/hr.   (d) None of these

Answer: C

Explanation:

Speed = Distance/Time

2ND train: speed = 400 / 5

= 80 km/hr.

1st train speed = (80/8) ×7 km/hr.

= 70 km/hr.

Question58

If (5x-3y)/ (5y-3x) = ¾, the value of x: yis:

(a) 2:9   (b) 7:2

(c) 27:29   (d) none of these

Answer: C

Explanation:

(5x – 3y) / (5y – 3x) = 3/4

Cross multiplying the numbers in the left and right,

4 (5x – 3y) = 3 (5y – 3x)

Opening the brackets,

20x – 12y = 15y – 9x

Grouping like terms to one side,

20x + 9x = 15y +12y

29x = 27y
➔ 29* x = 27 * y
➔X/y = 27 / 29
➔X: y = 27:29

Question59
A number consist of three digits of which the middle one is zero and the sum of the other digit is 9. The number formed by interchanging the first and third digit is more than the original number by 297. Find the number:
(a) 405   (b) 306
(c) 504   (d) 103
Answer: B
Explanation:
Let ''x0y'' be the required three-digit number. (As per the given information, middle digit is zero)
'' The sum of the other digits is 9'' ---> x+ y = 9 ---- (1)
''Interchanging the first and third digits '' ----->y0x
From the information given in the question we can have
Y0x – x0y = 207
(100y + x) – (100x +y) = 297
100y + x – 100x – y = 297
-99x + 99y = 297
-x + y = 3 ----- (2)
Solving (1) & (2), we get x = 3 and y = 6
So,
X0y = 306
Hence the required number is 306.

Question60
Show that $\left(\frac{x^a}{x^b}\right)^{1/ab} \times \left(\frac{x^b}{x^c}\right)^{1/bc} \times \left(\frac{x^c}{x^a}\right)^{1/ca}$ reduce to:
(a) 1   (b) 3
(c) 0   (d) 2
Answer: A
Explanation:
$\left(\frac{x^a}{x^b}\right)^{1/ab} \times \left(\frac{x^b}{x^c}\right)^{1/bc} \times \left(\frac{x^c}{x^a}\right)^{1/ca}$

$\frac{x^a \times \frac{1}{ab}}{x^b \times \frac{1}{ab}} \times \frac{x^b \times \frac{1}{bc}}{x^c \times \frac{1}{bc}} \times \frac{x^c \times \frac{1}{ca}}{x^a \times \frac{1}{ca}}$

$\frac{x^{\frac{1}{b}}}{x^{\frac{1}{a}}} \times \frac{x^{\frac{1}{c}}}{x^{\frac{1}{b}}} \times \frac{x^{\frac{1}{a}}}{x^{\frac{1}{c}}}$

= 1

Question61

If $5= \sqrt{x + \sqrt{x + +\sqrt{x} \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. \infty}}$ then value of x is

(a) 10   (b) 20
(c) 5   (d) ∞

Answer: B

Explanation:

$5 = \sqrt{x + \sqrt{5}}$
$5 = \sqrt{x + 5}$
$25 = x + 5$
$25 - 5$
X = 20

Question62

$\dfrac{1}{\log a/b^{(x)}} + \dfrac{1}{\log b/c^{(x)}} + \dfrac{1}{\log c/a^{(x)}}$ is equal to:

(a) 0   (b) 1
(c) 3   (d) -1

Answer: B

Explanation:

By the Circular motion

$\dfrac{1}{\log a/b^{(x)}} + \dfrac{1}{\log b/c^{(x)}} + \dfrac{1}{\log c/a^{(x)}} = 1$

Question63

If $\log_x y = 100$ and $\log_z x = 10$ then the value of y:

(a) 2^{10} (b) 2^{100}
(c) 2^{1000} (d) 2^{10000}

Answer: C

Explanation:

$\log_z x = 10 \rightarrow \log_2 x = 10$
$\log_x y = 100$
$Y = x^{100}$
$Y = (2^{10})^{100}$(put value of x)
$Y = 2^{1000}$

Question 64

A computer software company wishes to start the production of floppy disks. It was observed that the company had to spend a Rs. 2 lakhs for the technical information's. The costs of setting up the machine is Rs. 88,000 and the cost

of producing each unit is Rs. 30, while each floppy could be sold at Rs. 45. Find:

(i) The total cost function for producing x floppies; and

(ii) The break - even point

(a) C(x) = 45x +200000, 198000   (b) C(x) = 30x+200000,19200

(c) C(x) = 30x + 288000, 19200   (d) None of these

Answer: C

Explanation:

(i) Cost of floppy + cost on technical information + Cost of setting up

30x+200000+88000

30x+288000

(ii) By the option Method

45= 864000 = 19200

30+288000, 19200

So, if the owner sells 19200 units of floppy, then only, he will be on BEP

Question65

Division of Rs. 324 between x and y is in the ratio 11:7. X and y would get Rupees:

(a) (208,120)   (b) (200,124)

(c) (180,144)   (d) (198,126)

Answer: D

Explanation:

Ratio of division is 11:7 so,

X share = 11a and y is 7a

Total 11a + 7a = 18a

18a = 324

a = 18

x share = 11a = Rs. 198

y share = 7a = Rs. 126

Question66

If $\frac{a}{4} = \frac{b}{5}$ then:

(a) $\frac{a+4}{a-4} = \frac{b+4}{b-4}$ (b) $\frac{a+4}{a-4} = \frac{b+5}{b-5}$

(c) $\frac{a-4}{a+4} = \frac{b+5}{b-5}$ (d) None of these

Answer: B

Explanation:

By ComponendoDividendo: -

a /4 = b/5 => a/4 +1 => (a + 4) / (b + 5) = 4/5

a/4 = b/5 => a/4 – 1= b/5 – 1 => (a - 4)/ (b – 5) = 4/5

$$\frac{a+4}{a-4} = \frac{b+5}{b-5}$$

PREPARE FOR WORST

Question 1
$(1331)^{-(2/3)}$ **B**

(a) $-\frac{1}{11}$

(b) $-\frac{11}{121}$

(c) $-\frac{1}{121}$

(d) $-\frac{121}{11}$

Question 2
$$\frac{(32)^{(n/5)} \times 2^{2n+}}{4^n \times 2^{n-1}}$$

(a) 4

(b) 8

(c) 2^n

(d) 2^{n+1}

Question 3
[;'[."

(a) 132

(b) 177

(c) 185

(d) 225

Question 4
If $2^{\times} 8^{(1/4)} = 2^{(1/4)}$ then find the value of x

(a) $-\frac{1}{2}$

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) $-\frac{1}{4}$

Question 5
If $9^x - 9^{x-1} = 648$, then find the value of x^x

(a) 4

(b) 9

(c) 27

(d) 64

Question 6
If $4^{(x-y)} = 64$ and $4^{(x+y)} = 1024$, then find the value of x.

(a) 3

(b) 1

(c) 6

(d) 4

Question 7
If a and b are whole numbers such that $a^b = 121$, then find the value of $(a-1)^{b+1}$

(a) 0

(b) 10

(c) 10^2

(d) 10^3

Question 8
$\log_2 64$

(a) 6

(b) 8

(c) 16

(d) 32

Question 9

$$log_7 \left[\frac{1}{2401}\right]$$

(a) 7   (b) -3
(c) -4   (d) 9

Question 10

$49log_7 4$

(a) 7   (b) 14
(c) 16   (d) 18

Question 11

Simplify $\left[\frac{1}{log_{ab}(abc)} + \frac{1}{log_{bc}(abc)} + \frac{1}{log_{ac}(abc)}\right]$

(a) 0   (b) 1
(c) 2   (d) abc

Question 12

Simplify: $log_4 3 \times log_{243} 64$

(a) 3/5   (b) 2/5
(c) 3/4   (d) 1/3

Question 13

If $x^a = y^b$ then

(a) $\frac{logx}{logy} = \frac{a}{y}$ (b) $\frac{logx}{logy} = \frac{b}{a}$

(c) $\frac{log}{log} = \frac{x}{y}$ (d) None of these

Question 14

Find the value of x which satisfies the given expression [log10 2 + log (4x + 1) = log (x + 2) + 1]

(a) 6   (b) 7
(c) -6   (d) -9

Question 15

A bag contains 50 P, 25 P and 10 P coins in the ratio 5: 9: 4, amounting to Rs. 206. Find the number of coins of each type respectively

Question 16

Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

Question 17

Salaries of Ravi and Sumit are in the ratio 2:3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40:57. What is Sumit's salary?

Question 18

A sum of Rs.312 was divided among 100 boys and girls in such a way that the boy gets Rs.3.60 and each girl Rs. 2.40 the number of girls is:

Question 19
If Rs. 782 be divided into three parts, proportional to 12:23:3412:23:34, then the first part is?

Question 20
A mixture contains alcohol and water in the ratio 4 : 3. If 5 liters of water is added to the mixture, the ratio becomes 4: 5. Find the quantity of alcohol in the given mixture

Question 21
The compounded ratio of (2: 3), (6: 11) and (11 :2) is

Question 22
 If 0.75: x:: 5:8, then x is equal to:

Question 23
The third proportional to x^2-y^2 and x-y is:

Question 24
Seats for Mathematics, Physics and Biology in a school are in the ratio 5:7:8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

Question 25
A sum of Rs. 427 is to be divided among A, B and C such that 3 times A's share, 4 tunes B's share and 7 times C's share are all equal. The share of C is:

Question 26
If 76 are divided into four parts proportional to 7, 5, 3, 4, then the smallest part is:

Question 27
Alloy A contains 40% gold and 60% silver. Alloy B contains 35% gold and 40% silver and 25% copper. Alloys A and B are mixed in the ratio of 1:4. What is the ratio of gold and silver in the newly formed alloy is?

Question 28
If the ratio of the ages of two friends A and B is in the ratio 3: 5 and that of B and C is 3: 5 and the sum of their ages is 147, then how old is B?

Question 29
The concentration of petrol in three different mixtures (petrol and kerosene) is 1/2, 3/5 and 4/5 respectively. If 2 litres, 3 litres and 1 litre are taken from these three different vessels and mixed. What is the ratio of petrol and kerosene in the new mixture?

Question 30
The wages of labourers in a factory increases in the ratio 22:25 and there was a reduction in

the number of labourers in the ratio 15:11. Find the original wage bill if the present bill is Rs. 5000?

Question 31
Vinod have 20 rupees. He bought 1, 2, 5 rupee stamps. They are different in numbers by the reason of no change; the shop keeper gives 3 one rupee stamps. So how many stamps Vinod have?

Question 32
A and B invests Rs.8000 and Rs.9000 in a business. After 4 months, A withdraws half of his capital and 2 months later, B withdraws one-third of his capital. In what ratio should they share the profits at the end of the year?

Question 33
The incomes of two persons A and B are in the ratio 3: 4. If each saves Rs.100 per month, the ratio of their expenditures is Rs. 1: 2. Find their incomes.

Question 34
Three cats are roaming in a zoo in such a way that when cat A takes 5 steps, B takes 6 steps and C takes 7 steps. But the 6 steps of A are equal to the 7 steps of B and 8 steps of C. what is the ratio of their speeds?

Question 35
In a competitive exam, the number of passed students was four times the number of failed students. If there had been 35 fewer appeared students and 9 more had failed, the ratio of passed and failed students would have been 2: 1, then the total number of students appeared for the exam?

Question 36
In MaaYatri Temple every devotee offers fruits to the orphans. Thus every orphan receives bananas, oranges and grapes in the ratio of 3:2:7 in terms of dozens. But the weight of a grape is 24 gm and weight of a banana and an orange are in the ratio of 4:5, while the weight of an orange is 150gm. Find the ratio of all the three fruits in terms of weight, that an orphan gets

Question 37
In a class of 39 students the ratio of boys and girls is 2: 1. Radhika ranks 15th among all the students from top and 8th among girls from bottom. How many boys are there below Radhika?

Question 38
The ratio of students in a coaching preparing for B. tech and MBA is 4: 5. The ratio of fees collected from each of B. tech and MBA students is 25: 16. If the total amount collected from all the students is 1.62 lakh, what is the total amount collected from only MBA aspirants?

Question 39
Two solutions have milk & water in the ratio 7:5 and 6:11. Find the proportion in which these two solutions should be mixed so that the resulting solution has 1 part milk and 2 parts waters?

Question 40
The ratio of the angles of a triangle is 3: 4: 5. The three angles of a quadrilateral is equal to three angles of this triangle. What is the sum of the largest angle and second smallest angle of the quadrilateral?

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- **WEBSITE :** WWW.KITest.IN
- **KITest APP**

PAST EXAMINATION QUESTIONS
2018 – MAY

Question 1
If p: q is the sub – duplicated ratio of p-x^2: q-x^2, then x^2 is:

(a) $\frac{p}{p+q}$ (b) $\frac{q}{p+q}$

(c) $\frac{pq}{p+q}$ (d) None

Answer: C

Explanation:

Sub duplicate ratio of $(p-x^2) : (q-x^2) = \sqrt{p-x^2} : \sqrt{q-x^2}$

$p:q = \sqrt{p-x^2} : \sqrt{q-x^2}$

$\frac{p}{q} = \sqrt{\frac{p-x^2}{q-x^2}}$

An squaring both side

$\frac{p^2}{q^2} = \frac{p-x^2}{q-x^2}$

$P^2(q-x^2) = q^2(p-x^2)$

$P^2q - q^2p = p^2x^2 - q^2x^2$

$X^2 = \frac{pq(p-q)}{(p+q)(p-q)}$

$X^2 = \frac{pq}{(p+q)}$

Question 2
The value of the expression:

$a^{log_a^b . log_b^c . log_c^d . log_d^t}$

(a) t   (b) abcdt
(c) (a+b+c+d+t)   (d) None

Answer: A
Explanation:
$a^{log_a^b . log_b^c . log_c^d . log_d^t}$

$a^{\frac{log^b}{log^a} . \frac{log^c}{log^b} . \frac{log^t}{log^d} . \frac{log^d}{log^c}}$

$a^{\frac{log^t}{log^a}}$

$a \, log_a^t$

= t

Question3
The mean proportional between 24 and 54 is:
(a) 33   (b) 34
(c) 35   (d) 36

Answer: D
Explanation:
$b^2 = ac$
$b^2 = 24 \times 54$
$b = \sqrt{1296}$
$b = 36$

Question 4
$\dfrac{2^n + 2^n - 1}{2^{n+1} - 2^n}$

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$

(c) $\frac{2}{3}$ (d) $\frac{1}{3}$

Answer: B
Explanation:
$\dfrac{2^n + 2^{n-1}}{2^{n+1} - 2^n} = \dfrac{2^n + 2^n . 2^{-1}}{2^n . 2^{+1} - 2^n}$

$\dfrac{2^n + (1 + 2^{-1})}{2^n . (2 - 1)}$

$\dfrac{\left(1 + \frac{1}{2}\right)}{1}$

$\dfrac{\frac{3}{2}}{1}$

$= \frac{3}{2}$

2018 – NOV

Question 5

$\frac{3X-2}{5X++6}$ is the duplicate ratio of $\frac{2}{3}$ then find the value of x:

(a) 2   (b) 6
(c) 5   (d) 9

Answer: B

Explanation:

$\frac{3X-2}{5X+6}$ is the duplicate ratio of $\frac{2}{3}$

i.e., $\frac{3X-2}{5X+6} = \frac{2^2}{3^2}$

$\frac{3X-2}{5X+6} = \frac{4}{9}$

27x-18 = 20x+24

27x-20x = 24+18

7x = 42

X = 6

Question 6

If x: y: z = 7:4:11 then $\frac{x+y+z}{z}$ is:

(a) 2   (b) 4
(c) 3   (d) 5

Answer: A

Explanation:

If x: y: z = 7:4:11

Let x=7k, y=4k, z=11k

$\frac{x+y+z}{z} = \frac{7k+4k+11k}{11k} = \frac{22k}{11k} = 2$

Question 7

$\log_2 \log_2 \log_2 16 = ?$

(a) 0   (b) 3
(c) 1   (d) 2

Answer: C

Explanation:

$.\log_2 \log_2 \log_2 16$

$\log_2 \log_2 \left(\log \frac{2^4}{2} \right)$

$\log_2 \log_2 \frac{4}{2} \log_2 \frac{2}{2}$

$Log_2 log\frac{4}{2}$

$log\frac{2}{2} log\frac{2}{2}$

$1*1$

1

2019 – MAY

Question 1

If the ratio of two numbers is 7: 11. If 7 is added to each number, then the new ratio will be 2: 3 then the number are.

 (a) 49, 77   (b) 42, 45

 (c) 43, 42   (d) 39, 40

Answer: A

Explanation:

$\frac{7x+7}{11x+7} = \frac{2}{3}$

3(7x+7) = 2(11x+7)

21x+21 = 22x+14

21-14 = 22x-21x

X = 7

7x = 7 × 7 = 49

11x = 11× 7= 77

Question 2

$\log_{2\sqrt[3]{2}}(512): \log_{3\sqrt{2}} 324=$

 (a) 128 : 81   (b) 2: 3

 (c) 3 : 2   (d) None

Answer: C

Explanation:

$= \frac{\log_{2\sqrt[3]{2}}(512)}{\log_{3\sqrt{2}} 324}$

$= \frac{\frac{\log 512}{log\, 2\sqrt[3]{2}}}{\frac{\log 324}{\log\, 3\sqrt{2}}}$

$= \frac{\frac{2.7106}{0.4514}}{\frac{2.5116}{0.6275}}$

$\frac{6}{4} = \frac{3}{2}$

Question 3

If $2^{x^2} = 3^{y^2} = 12^{x^2}$ then

(a) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

(b) $\frac{1}{x^2} + \frac{2}{y^2} = \frac{1}{z^2}$

(c) $\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

(d) None

Answer: C

Explanation:

$2x^2 = k$

$\log 2x^2 = \log k$

$x^2 = \frac{\log k}{\log 2}$, $y^2 = \frac{\log k}{\log 3}$, $z^2 = \frac{\log k}{\log 12}$

$\frac{2}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$

Question 4

Then value of $\log_5[1 + \frac{1}{5}]+ .... + \log_s[1 + \frac{1}{624}] =$

(a) 2

(b) 3

(c) 5

(d) 0

Answer: B

Explanation:

$\log_5^{\frac{6}{5}} + \log_5^{\frac{7}{6}} + \log_5^{\frac{8}{7}} ....\log_5^{\frac{625}{624}}$

$\log_5{}^a + \log_5{}^b + \log_5{}^c = \log_s(a.b.c.d)$

$\Rightarrow \log_5 = (\frac{6}{5} \times \frac{7}{6} \times \frac{8}{7} \times \frac{625}{624})$

$\Rightarrow \log_5\left(\frac{625}{5}\right) = 125$

$\Rightarrow \log_5(125)$

$\Rightarrow \log_5 5^3$

$\Rightarrow 3$

Question 5

If $4x^3+8x^2$-x-2 = 0 then value of 2x – 3

(a) -4,2,-7

(b) -4,-2,-7

(c) 4,2,7

(d) $\frac{1}{2}, \frac{1}{2}, -2$

Answer: B

Explanation:

$4x^3+8x^2-x-2 = 0$

$4x^2 (x+2) – 1 (x+2) = 0$

$(x+2) (4x^2 – 1) = 0$

x = -2, ½, -1/2

Then the value of 2x + 3 at x = -2

2 × (-2) +3 = -4+3= -1

at x = ½

$2 \times (-1/2) +3-1+3=2$

2019 – NOV

Question 1
The ratio of two numbers are 3:4. The difference of their squares is 28 Greater no is:

  (a) 8   (b) 12
  (c) 24   (d) 64

Answer: A

Explanation:

Let the two numbers bee x and y

Greater no. y

Smaller no x

According to questions,

$\frac{x}{y} = \frac{3}{4}$ ....Eq1   and $y^2 – x^2 = 28$ ----Eq2

Further solving Eq 1

$X = \frac{3}{4}y$ ------Eq3

Put Eq 3 in Eq 2

$Y^2 - \left(\frac{3}{4}y\right)^2 = 28$

$\frac{y^2}{1} - \frac{9y^2}{16} = 28$

$\frac{7y^2}{16} = 28$

$Y^2 = \frac{28 \times 16}{7}$

$Y^2 = 64$

=> y = 8   (square root both sides)

So, the greater number i.e. y is equal to 8.

Question 2
The price of scooter and moped are in the ratio 7:9. The price on moped is Rs. 1,600 more than that of scooter. Then the price of moped is:

  (a) 7,200   (b) 5, 600
  (c) 800   (d) 3700

Answer: A

Explanation:

$\frac{\text{price of scooter}}{\text{price of moped}} = \frac{7}{9}$

Let; the price of scooter = 7x and price of moped = 9x

According to question

$9x = 7x + 1600$

$2x = 1600$

$X = Rs\,800$

So; the price of moped $= 9x = 9\,(800) = Rs.\,7200$

Question 3

$\log_{0.01} 10,000 =?$

  (a) 2   (b) -2

  (c) 4   (d) -4

Answer: B

Explanation:

$\log_{0.01}$

$= \log\left(\dfrac{1}{100}\right)$

$= \log\left(\dfrac{1}{10^2}\right)$

$= \log 10^{-2} \rightarrow$ use property $x^{-n} = \dfrac{1}{x^n}$

$= -2 \log 10 \rightarrow$ use property $\log_b x^n = n\log_b x$

$= -2\,(1) \rightarrow \log 10 = 1$

$= -2$

Question 4

Value of $\left[9^{n\frac{1}{4}} \dfrac{\sqrt{3.3^n}}{3.\sqrt{3^n}}\right]^{\frac{1}{4}}$

  (a) 9   (b) 27

  (c) 81   (d) 3

Answer: B

Explanation:

$= \left[9^{n\frac{1}{4}} \dfrac{\sqrt{3.3^n}}{3.\sqrt{3^n}}\right]^{\frac{1}{4}}$

$= \left[\dfrac{(3^2)^{\frac{4n+1}{4}} \sqrt{3^{n+1}}}{3.\sqrt{3^{-n}}}\right]^{\frac{1}{n}}$

Since $\dfrac{a^m}{a^n} = a^{m-n}$

$\Rightarrow \left[\dfrac{3^{\frac{4n+1}{2}}}{3} \cdot \dfrac{(3^{n+1})^{\frac{1}{2}}}{(3^{-n})^{\frac{1}{2}}}\right]^{\frac{1}{n}}$

$\Rightarrow \left[(3)^{\frac{4n+1}{2}-1} \times (3)^{\frac{n+1}{2}-\frac{(-n)}{2}}\right]^{\frac{1}{n}}$

$\Rightarrow \left[3^{\frac{4n-1}{2}} \times (3)^{\frac{2n+1}{2}}\right]^{\frac{1}{n}}$

Since $a^m \times a^n\ a^{m+n}$

$$\Rightarrow \left[3^{\frac{4n-1}{2}+\frac{2n+1}{2}}\right]^{\frac{1}{n}}$$

$$\Rightarrow \left[(3)^{\frac{6n}{2}}\right]^{\frac{1}{n}}$$

$$\Rightarrow \left[3^{3n}\right]^{\frac{1}{n}}$$

$$\Rightarrow (3)^3$$

$$\Rightarrow 27$$

DEC - 2020

Question 1

Find the value of 'a' from the following

$$\left(\sqrt{9}\right)^{-5} X \left(\sqrt{3}\right)^{-7} = \left(\sqrt{3}\right)^{-a}$$

(a) 13   (b) 11
(c) 15   (d) 17

Answer: D

Explanation:

$$\left(\sqrt{9}\right)^{-5} X \left(\sqrt{3}\right)^{-7} = \left(\sqrt{3}\right)^{-a}$$

$$\left(\sqrt{3^2}\right)^{-5} X \left(\sqrt{3}\right)^{-7} = \left(\sqrt{3}\right)^{-a}$$

$$\left(\sqrt{3}\right)^{-10} X \left(\sqrt{3}\right)^{-7} = \left(\sqrt{3}\right)^{-a}$$

$$\left(\sqrt{3}\right)^{-10+(-7)} = \left(\sqrt{3}\right)^{-a}$$

= -a = - 17

= a = 17

Question 2

If $log_a\left(\sqrt{3}\right) = \frac{1}{6}$ find the value of 'a'

(a) 81   (b) 9
(c) 27   (d) 3

Answer: C

Explanation:

$$\log_{27} \sqrt{3} = \frac{1}{6}$$

$$\Rightarrow a^{\frac{1}{6}} = \sqrt{3}$$

$$\Rightarrow a = \left(3^{\frac{1}{2}}\right)^6$$

$$\Rightarrow a = 3^3$$

$$\Rightarrow a = 27$$

Question 3
Log 9 + log 5 is expressed as ___

 (a) log (9/5)   (b) log 4
 (c) log (5/9)   (d) log 45

Answer: D

Explanation:
log 9 + log 5 = log 9×5
log = 45.

Question 4
The ratio of no. of boys and the no. of girls in a school is found to be 15: 32. How many boys and equal no. of girls should be added to bring the ratio to 2/3?

 (a) 20   (b) 19
 (c) 23   (d) 27

Answer: B

Explanation:
By option
$$\frac{15x + 19}{32x + 19} = \frac{2}{3}$$
45x+ 57 = 64x+38
19x= 19
x= 19

Question 5
If a: b = 9:4 then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$=?

 (a) 2/3   (b) 3/2
 (c) 6/13   (d) 13/6

Answer: D

Explanation:
a: b = 9:4 $\frac{a}{b} = \frac{9}{4}$
$$\frac{3}{2} + \frac{2}{3} = \frac{9 + 4}{6} = \frac{13}{6}$$

Question 6
If a: b = 3: 7 then 3a + 2b: 4a + 5b =?

 (a) 27 : 43   (b) 23 : 47
 (c) 24 : 51   (d) 29 : 53

Answer: B

Explanation:
$$\frac{a}{b} = \frac{3}{7}$$

Let a = 3x and b = 7x
∴ 3a + 2b = 3 × 3x + 2 × 7x = 23x
4a + 5b = 4 × 3x + 5 × 7x = 47x
∴ $\frac{3a+2b}{4a+5b} = \frac{23x}{47x} = 23:47$

JAN - 2021

Question 1

Find the value of $\frac{3t^{-1}}{t^{-1/3}}$

(a) $\frac{3}{t^{2/3}}$ (b) $\frac{3}{t^{32}}$

(c) $\frac{3}{t^{1/3}}$ (d) $\frac{3}{t^2}$

Answer: A

Question 2

If $\log_a(ab)$ **= x, then** $\log_b(ab)$ **is**

(a) $\frac{1}{x}$ (b) $\frac{x}{1+x}$

(c) $\frac{x}{x-1}$ (d) None of these

Answer: C
Explanation:
We have,
$\log_a(ab)=x$
$\log_a a+\log_a b=x$ $[\log_a mn=\log_a m+\log_a n]$
$1+\log_a b=x$ $[\log_a a=1]$
$\log_a b=x-1$ ......(1)
Since,
$=\log_b(ab)$
$=\log_b a + \log_b b$
$=\log_b a+1$

$$= \frac{1}{\log_a b} + 1 \left[\frac{1}{\log_n m} = \log_m n\right] \frac{1}{x-1} + 1 \frac{1+x-1}{x-1}$$

$= \frac{x}{x-1}$

Question 3

In a certain business, A and B received Profit in a certain ratio; B and C received profits in the same ratio. If A gets Rs. 1,600 and C gets Rs. 2,500, then how much does B get?

(a) Rs. 2,000   (b) Rs. 2,500

(c) Rs. 1,000   (d) Rs. 1,500

Answer: A
Explanation:
let the ratio of profit of A and B is a:b
∴Ratio of profit of B and C = a:b
A:B B:C
a×a:b×a a×b: b×b
Note: Value of B would be same in both cases
A: B: C
a^2 : ab : b^2
According to the question,
a^2 = 1,600
a= 40
Similarly
b^2 = 2,500
b = 50
Amount received by B = ab = 40×50 = 2000

Question 4
The ratio of two quantities is 15:17. If the consequent of its inverse ratio is 15, then the antecedent is.
  (a) 15   (b) $\sqrt{15}$
  (c) 17   (d) 14
Answer: C
Explanation:
If consequent is 15
i.e., 15 so 17 will be answer
It's just a inverse

Question 5
The salaries of A, B and C are in the ratio 2:3:5. If increments of 15%, 10% and 20% are allowed respectively to their salaries, then what will be the new ratio of their salaries?
  (a) 3 : 3 : 10   (b) 10 : 11 : 20
  (c) 23 : 33 : 60   (d) Cannot be determined
Answer: C
Explanation:
Let A=2k, B=3k and C=5k.
A's new salary
$\frac{115}{100} of\ 2k$

$\left(\frac{115}{100} \times 2k\right) = \frac{23}{10}$

B's new salary

$\frac{110}{100}$ of $3k$

$\left(\frac{110}{100} \times 3k\right) = \frac{33}{10}$

C's new salary

$\frac{120}{100}$ of $5k$

$\left(\frac{120}{100} \times 5k\right) = 6k$

$\therefore$ New ratio

$= \frac{23k}{10} : \frac{33k}{10} : 6k$

$= 23 : 33 : 60$

JULY – 2021

Question 1

If xy + yz + zx = -1, the value of $\left(\frac{x+y}{1+xy} + \frac{Z+y}{1+zy} + \frac{x+z}{1+zx}\right)$ is

(a) xyz

(b) $\frac{-1}{yz}$

(c) $\frac{1}{xyz}$

(d) $\frac{1}{x+y+z}$

Answer: Options (c)

Explanation:

Xy + yz + zx = 1

Z(x + y) = 1 – xy

$\frac{x+y}{1-xy} = \frac{1}{z}$ -> Equation (1)

$\frac{y+z}{1-yz} = \frac{1}{z}$ -> Equation (2)

$$\rightarrow \frac{x+y}{1-xy} + \frac{y+z}{1-yz} + \frac{z+x}{1-zx}$$

$= \frac{1}{z} + \frac{1}{x} + \frac{1}{y}$

$= \frac{xy+yz+zx}{xyz}$

$= \frac{1}{xyz}$

Question 2

If $\log_4 x + \log_{16} x + \log_{64} x + \log_{256} x = 25/6$ then the value of x is

(a) 64   (b) 4

(c) 16   (d) 2

Answer: Options (c)

Explanation:

$\log_4 x + \log_{16} x + \log_{64} x + \log_{256} x = \dfrac{25}{6}$

$\rightarrow \dfrac{1}{\log_x 4} + \dfrac{1}{2\log_x 4} + \dfrac{1}{3\log_x 4} + \dfrac{1}{4\log_x 4} = \dfrac{25}{6}$

➔ $\dfrac{1}{\log_x 4}\left(1 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4}\right) = \dfrac{25}{6}$

➔ $\log_4 x \left(\dfrac{12+6+4+3}{12}\right) = \dfrac{25}{6}$]

➔ $\log_4 x \left(\dfrac{25}{12}\right) = \dfrac{25}{6}$

Inverse the fraction both side

➔ $\log_4 x \dfrac{25}{25} = \dfrac{12}{6}$

➔ $\log x = (4)^2$

➔ $x = 16$

Question 3

The salaries of A, B and C are of ratio 2:3:5. If the increments of 15%, 10% and 20% are done their respective salaries, then find the new ratio of the salaries.

(a) 23:33:60   (b) 33:23:60

(c) 23:60:33   (d) 33:60:23

Answer: Options (a)

Explanation:

Let the constant be x

Then, Salaries of A, B, C are 2x, 3x, 5x respectively.

Increments in Salary of A = 15%

Therefore A's new salary = Rs. $(2x + \dfrac{15}{100} \times 2x) = $ Rs. $\dfrac{230x}{100}$

Increment in B's new salary = Rs. 10%

Therefore, B's new salary = Rs. $(3x + \dfrac{10}{100} \times 3x) = $ Rs. $\dfrac{330x}{100}$

Increment in C's salary = 20%

Therefore C's new salary = Rs. $(5x + \dfrac{20}{100} \times 5x) = $ Rs. 6x

Therefore our ratio is 23: 33: 60

DEC – 2021

Question 1

Let a = (√5+√3) (√5-√3) and b= (√5-√3) (√5+√3). What us the value of a² + b²

(a) 64   (b) 62

(c) 62   (d) 254

Answer: b

Explanation:

$a = \dfrac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} = \dfrac{3.9681}{0.5040} = 7.8732$

$a = \dfrac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} = \dfrac{0.5040}{3.9681} = 0.1270$

a²+b² = (7.8732)² + (0.1270)² = 62

Question 2

Income of R and S are in the ration 7:9 and their expenditures are in the ratio 4:5 Their expenditures are in the ratio 4:5. Their total expenditure is equal to income of R. What is the ratio of their savings?

(a) 23:36   (b) 21:43

(c) 28:41   (d) 35:46

Answer: d

Explanation:

Let the incomes of R and S be7x and 9x respectively, and their expenditures be 4y and 5y respectively.

Savings of R = 7x-4y

Savings of S = 9x-5y

Also, it given that their total expenditures is equal to the income R.

Therefore, 4y+5y = 7x

= 9y = 7x

$x = \dfrac{9y}{7}$ …Eq. (1)

Ratio of their expenditures $\dfrac{7x-4y}{9x-5y}$

Putting the value of $x = \dfrac{9y}{7}$ from Eq 1

Above:

$\dfrac{7\left(\dfrac{9y}{7}\right) - 4y}{9\left(\dfrac{9y}{7}\right) - 5y}$

$= \dfrac{5y}{\dfrac{81y}{7} - 5y}$

$\dfrac{5y}{\dfrac{81y - 35y}{7}}$

$$\frac{7 \times 5y}{46y}$$

$$\frac{35}{46}$$

Question 3

A bag contains 105 coins containing some 50 paise, and 25 paise coins. The ratio of the number of these coins is 4:3. The total value coins. The ratio of the number of these coins is 4:3. The total values (in Rs) in the bag id?

 (a) 43.25   (b) 41.25
 (c) 39.25   (d) 35.25

Answer: b

Explanation:

No. of 50 paise coins =

$\frac{4}{7} \times 105 = 60$

No. of 25 paise coins = $\frac{3}{7} \times 105 = 45$

Value of 1 50 paisa coin = Rs.0.50
Therefore, value of 60-50 paisa coins = 60× Rs.0.50 = Rs 30
Value of 1 25-paise coin = Rs0.25
Therefore, value of 45-25 paisa coins = 45× 0.25 = Rs = 11.25
Therefore, total value = Rs 30+Rs 11.25 = Rs. 41.25

Question 4

If Log$_{10}$ 3=x and log$_{10}$ 4 = y, then the value of log$_{10}$ 120 can be expressed as

 (a) x-y+1   (b) x+y+1
 (c) x+y-1   (d) 2x+y-1

Answer: b

Explanation:

Log$_{10}$ 120 = log$_{10}$ (3×4× 10)
= log$_{10}$ 3 +log$_{10}$ 4 + log$_{10}$ 10
=x+y+1

Question 5

Find the value of log(x^6), if log(x) +2 log(x^2) + 3 log(x^3) = 14

 (a) 3   (b) 4
 (c) 5   (d) 6

Answer: d

Explanation:

Log (x)+ 2log(x^2) +3log (x^3) = 14
Log x +(2× 2) log x + (3 × 3) log x = 14
Log x+ 4 log x + 9logx = 14

14 logx = 14

$\text{Log } x \frac{14}{14} = 1$

$\text{Log } (x^6) = 6 \log x = 6 \times 1 = 6$

Question 6

The value of $\frac{6^{n+4}3^{n+3} \times 2^{n+3}}{5 \times 6^n + 6^n}$ is

(a) 232   (b) 242

(c) 252   (d) 262

Answer: c

Explanation:

We can see that none of the option are in terms of n. This means that n is ultimately going to get cancelled out. Therefore, we can take any value and put it in place of n, and we'll get the same answer. For the sake of simplicity, let n=1.

Now,

$$= \frac{6^{n+4}3^{n+3} \times 2^{n+3}}{5 \times 6^n + 6^n}$$

$$\frac{6^{1+4}3^{1+3} \times 2^{1+3}}{5 \times 6^1 + 1}$$

$$= \frac{6^5 + 3^4 \times 2^4}{5 \times 6 + 6}$$

$$= \frac{7776 + 81 \times 16}{30 + 6}$$

$$= \frac{7776 + 1296}{36}$$

$$= \frac{9072}{36}$$

$$= 252$$

Question 7

Ina department, the number if males and females are in the ratio 3:2. If 2 males and 5 females join the department, then the ratio becomes 1:1. Initially, the number of females in the department is

(a) 9   (b) 6

(c) 3   (d) 8

Answer: b

Explanation:

Let the initial number of males and females be 3x and 2x respectively.

As per the question, $\frac{3x+2}{2x+5} = \frac{1}{1}$

3x+2 = 2x+5

3x-2x=5-2

X=3
Therefore, initial number of females = 2×3 = 6

Question 8

If, $\left(\frac{3a}{2b}\right)^{2x-4} = \left(\frac{2b}{3a}\right)^{2x-4}$, for some a and , then the value of x is

  (a) 8   (b)6
  (c) 4   (d) 2

Answer: d

Explanation:

Looking at the options, you'll that if x is 2, then the powers of the LHS as well as RHS will become 0. Therefore, LHS and RHS both will be 1, and hence, be equal.

Question 9

The value of $\left(1 - \sqrt[3]{0.027}\left(\frac{5}{6}\right)\left(\frac{1}{2}\right)^2\right)$ is:

  (a) 11/16   (b) 13/16
  (c) 15/16   (d) 1

Answer: c

Explanation:

$$\left(1 - \sqrt[3]{0.027}\left(\frac{5}{6}\right)\left(\frac{1}{2}\right)^2\right)$$

$$\left(1 - \sqrt[3]{\frac{27}{1000}}\left(\frac{5}{6}\right)\left(\frac{1}{2}\right)^2\right)$$

$$\left(1 - \left(\frac{3}{10}\right)\left(\frac{5}{24}\right)\right)$$

$$\left(1 - \left(\frac{1}{2} \times \frac{1}{8}\right)\right)$$

$$1 - \frac{1}{16}$$

$$\frac{16 - 1}{16} = \frac{15}{16}$$

Alternatively,

On calculator, calculator $\sqrt[3]{0.027}$, or $(0.027)^{\frac{1}{3}}$. Follow the following steps.

First, enter 0.027 on the calculator, then press the square root button 12 times. You'll get 0.99911857266

Then, from this, subtract 1 i.e., press -1

You" get -0.00088142734.

Then, multiply this number with the power, i.e., 1/3. Press ×1 ÷3 =. You"ll get -

0.00029380911.
Then add 1 to it, i.e., press +1. You"ll get 0.99970619089.
Then press the button (× =) 12 times. You'll get 0.30010617315.
This is $(0.027)^{\frac{1}{3}}$

Now, multiply this number with $\left\{\frac{5}{6}\left(\frac{1}{2}\right)^2\right\}$

You'll get 0.625221194. Then press M+
This will save this number in the memory of your calculator.
Then press 1-MRC =. You'll get 0.9374778806.
This is your final answer.
Now, try the options.
Option (a) = 11/16
11/16 = 0.8125not equal to 0.9375
Option (b) = 13/16
13/16 = 0.8125 is not equal to 0.9375
Option c= 15/16
15/16 = 0.9375
So answer is (c)

JUNE – 2022

Question 1
$\log\left(\frac{p^2}{qr}\right) + \log\left(\frac{q^2}{qr}\right) + \log\left(\frac{r^2}{pq}\right)$ is :

  (a) pqr   (b) 0
  (c) 1   (d) None

Answer: Options (b)
Explanation:
$\log\left(\frac{p^2}{qr}\right) + \log\left(\frac{q^2}{qr}\right) + \log\left(\frac{r^2}{pq}\right)$ is :
$= \log\left(\frac{p^2}{qr} \times \frac{q^2}{pr} \times \frac{r^2}{pq}\right)$
$= \log\left(\frac{p^2}{p^2}\frac{q^2}{q^2}\frac{r^2}{r^2}\right)$
$= \log 1$
$= 0$

Question 2
log √3 = 6 base a, then 'a' will be:
  (a) 27   (b) 36
  (c) 15   (d) 1
Answer: Options (a)
Explanation:

Here log √3 a = 6

$\Rightarrow a = \left(\sqrt{3}\right)^{6}$

$\Rightarrow a = \left(3^{1/2}\right)^{6_3}$

a = 3^3

a = 27

Question 3

A box contains 25 paise coins and '10' paise coins and 5 paise coins in ratios 3:2:1 and total money is ₹ 40. How many '5' paise coins are there?

(a) 65   (b) 55

(c) 40   (d) 50

Answer: Options (c)

Explanation:

The ratio of No. fo 25p coins, 10p coins and 5p coins = 3:2:1

Let No. of 25p coins = 3x

No. of 10p coins = 2x

No. of 5p coins = x

Total value of all coins = 4000 paise

25p × 3x + 10p × 2x + 5p × x = 4000 p

(75x + 50x + 5x)p = 4000p

100x = 4000

x = $\frac{4000}{100}$

x = 40

No. f paise coins = x = 40

Question 4

If x: y = 4: 6 and z: x = 4: 6 find y?

(a) 4   (b) 6

(c) 16   (d) 1

Answer: Options (b)

Explanation:

If x:y = 4:6 and z:x = 4:1 find y

$\Rightarrow$ z:x = 1:4

so, y:x= 6:4 and x:z = 4:1

y:x:z = 6:4:1

so, y = 6

Question 5

If $\left(\sqrt{3}\right)^{18} = \left(\sqrt{9}\right)^{x}$, find x?

(a) 18   (b) 9

(c) 8   (d) 19
Answer: Options (b)
Explanation:
If $\left(\sqrt{3}\right)^{18} = \left(\sqrt{9}\right)^{x}$

$\left(3^{\frac{1}{2}}\right)^{18} = (3)^{x}$

3^{9} $= 3^{x}$
On comparing
9 = x

Question 6
log $\sqrt{2}$ 64 is equal to:
 (a) 12   (b) 6
 (c) 1   (d) 8
Answer: Options (a)
Explanation:

$\log_{\sqrt{2}} 64 = \dfrac{\log 64}{\log \sqrt{2}} = \dfrac{\log 2^{6}}{\log (2)^{\frac{1}{2}}} = \dfrac{6 \log 2}{\frac{1}{2} \log 2} = 6 \times 2 = 12$

DEC 2022

Question 1
If the roots of the equation x^{2}-px +q =0 are in the ratio 2:3, then
   a) p^{2} = 25 q   b) p^{2} = 6q
   c) 6 p^{2} = 5q   d) $6p^{2}$ = 25q
Answer: d
Explanation:
If the ratio of the quadratic equation
$X^{2} - Px + q = 0$
Roots: a , b
a : b = 2 : 3
$\dfrac{a}{b} = \dfrac{2}{3}$
∴ a = $\dfrac{2b}{3}$
a + b = -(-p) = p
ab = q
a + b = p
$\dfrac{2b}{3} + b = p$
$\dfrac{2b + 3b}{3} = p$

$$\frac{5b}{3} = p$$

ab = q

$$= \frac{2b}{3} b = q$$

$$= q = \frac{2b^2}{3}$$

$$= 6p^2 = 6\left(\frac{5b}{3}\right)^2$$

$$= 6 \times \frac{25b^2}{9}$$

$$= \frac{50b^2}{3}$$

$$= 25 \times \frac{25b^2}{3}$$

= 25q

Question 2

If $\log_{10} 2 = y$ and $\log_{10} 3 = x$, then the value of $\log_{10} 15$ is:

   a) x-y+1   b) x+y+1
   c) x-y-1   d) y-x+1

Answer: b

Explanation:

Let, x=log 60

∴x=log(2²·3·5)

∴x=log2²+log3+log10 /2   (logx.y= logx + logy)

∴x=2log2+log3+1−log2   ...(logxy= y logx)

∴x=log2+log3+1

∴x= x+y+1

Question 3

$\log_3 4 . \log_4 5. \log_5 6. \log_6 7. \log_7 8. \log_8 9$ equal to:

   a) 3   b) 2
   c) 1   d) 0

Answer: b

Explanation:

$\log_3 4 . \log_4 5. \log_5 6. \log_6 7. \log_7 8. \log_8 9$

$$= \frac{log4}{log3} \times \frac{log5}{log4} \times \frac{log6}{log5} \times \frac{log7}{log6} \times \frac{log8}{log7} \times \frac{log9}{log8}$$

$$= \frac{log9}{log3}$$

$$\frac{log3^2}{log3} = \frac{2\,log\,3}{log3} = 2$$

Question 4

A sum of money is to be distribution among A, B, C, D in the proportion of the 5:2:4:3. If C gets Rs. 1000 more than D, what is B's share?

    a) 2000   b) 1500

    c) 2500   d) 1000

Answer: a
Explanation:
let x be the ratio factor .
So, 5x+2x+4x+3x = total money.
So, we can say 5*x is the money given to A,
2×x is the money given to B,
4×x is the money given to C,
3×x is the money given to D.
now, it is said that C gets 1000 more than D.
ie difference between the amount C and D get is 1000.
So,
4×x-3×x=1000.
x=1000.
So we found the ratio factor to be 1000.
Now the amount of money B get is equal to 2×x = 2×1000= 2000.
Therefore the share of B is 2000.

Question 5

By simplifying $(2a^3b^4)^6/(4a^3b)^2 \times (a^2b^2))$, the answer will be

    a) $4a^2b^2$ b) $4a^2b^{2b}$

    c) $4a^{33}b^{33}$ d) $4\,a^{10}b^{20}$

Answer: d
Explanation:

$$\frac{(2a^3b^4)^6}{(4a^3b)^2} \times a^2b^2$$

$$\frac{2^6a^{18}b^{24}}{(4^2a^6b^2)a^2b^2}$$

$$\frac{64a^{18}b^{24}}{(16a^6b^2)a^2b^2}$$

$$\frac{4a^{18}b^{24}}{a^8b^4}$$

= 4 a^{10} b^{20}

Question 6
A group of 400 soldiers posted at border area had a provision for 31 days. After 28 days 280 soldiers from this group were called back. Find the number of days for which the remaining ration will be sufficient?

   a) 3   b) 6

   c) 8   d) 10

Answer: d
Explanation:
400 soldiers = 31 days
=> each day the garrison serves = 400 soldiers with 1 unit of ration Let's say each soldiers consumes 1 unit of ration. So total no. of ration units = 12400 units. In 28 days
-> units consumed = 400*28 = 11200 units.
Remaining units = 12400 - 11200 = 1200 units.
Remaining days = 3 days and revised soldiers
= 400-280 = 120 men.
No. of days = 1200 / 120
= 10 days.