Ssc Cgl Tier II Previous Year Question Paper Overview

Here, you can solve all the questions asked in Ssc Cgl Tier II Previous Year Question Paper on 2020-11-15 in the Morning exam. The detailed solutions are also provided for every previous year question and some of these questions can be asked again in your Ssc Cgl Tier II exam. There are 100 questions in the exam and 120 minutes are provided for the Ssc Cgl Tier II exam. The Cutoff of the exam was 140 marks hence you should try to score at least 150 marks.

Ssc Cgl Tier II Previous Year Question Paper : Questions and Solutions

Question 1 :

In â–³ABC, A = 90º, AD is the bisector of A meeting BC at D, and DE êž± AC at E. If AB = 10 cm and AC = 15 cm, then the length of DE, in cm , is:

Difficulty : Moderate   **Average Time : 49 Seconds**
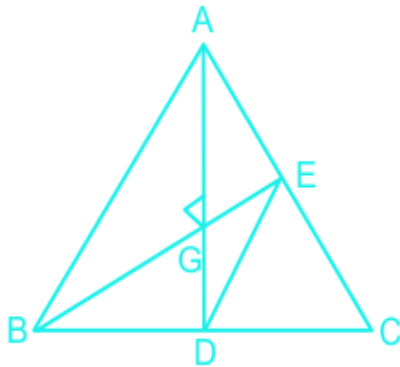
Options :

1. 8

2. 6

3. 6.25

4. 7.5

Solution :

The correct answer is **option 2** i.e. **6**

Concept

Usage of Similarity

Application

In EAD

AED + EAD + EDA = 180°

90° + 45° + EDA = 180°

EDA = 180° - 135° = 45°

Now,

EA = ED

Let ED be K, EA = K

EC = 15 - K

In CED and CAB (Applying Similiarity

C = C   (common)

CED = CAB = 90°

So, CED ~ CAB   (AA)

(ED)/(AB) = (CE)/(CA)

 x/10 = (15 - x)/15

15x = 10(15 - x)

upon solving

x = DE = 6cm

Question 2 :
A and B are solutions of acid and water. The ratio of water and acid in A and B are 4 : 5 and 1 : 2, respectively. If x liters of

A is mixed with y liters of B, then the ratio of water and cid in the mixture becomes 8 : 13. What is x:y?

Difficulty : Moderate

Average Time : 82 Seconds

Options :

1. 5 : 6
2. 2 : 5
3. 3 : 4
4. 2 : 3

Solution :

The correct answer is **option 3** i.e. **3 : 4**

Concept

Ratio

Application

Ratio of water and acid in A = 4 ∶ 5

Ratio of water and acid in B = 3 ∶ 6

Ratio of water and acid in the mixture = (4x + 3y)/(5x + 6y)

(4x + 3y)/(5x + 6y) = 8/13

52x + 39y = 40x + 48y

12x = 9y

x/y = 9/12

x/y = 3/4

Alternate Method
Using Alligation Method

Let's take the quantity of water in different mixtures

Mixture A   Mixture B

4/ 9   1 / 3

            Resultant Quantity

Using Alligation Method, upon solving, we will get 3 : 4 = x : y

Question 3 :

A can do a piece of work in 15 days. B is 25% more efficient than A, and C is 40% more efficient than B. A and C work together for 3 days and then C leaves. A and B together will complete the remaining work in :

Difficulty : Moderate   **Average Time : 95 Seconds**

Options :

1. 3 days

2. 2½ days

3. 4 days

4. 3½days

Solution :

The correct answer is **option 1** i.e. **3 days**

Concept

Time and efficiency show inverse relation

Application

Let efficiency of A = 4 units

Therefore efficiency of B = 4 x 125/100 = 5 units

Efficience of C = 5 x 140/ 100 = 7 units

Therefore efficiency ratio of A, B and C = 4 : 5 : 7

A completes the work in 15 days, it means total work done by A = 15 x 4 = 60 units

Work done by A & C together in 3 days = 3 x (4 + 7) = 33 units

work left = 60 - 33 = 27 units

Now c leaves

Remaining Work done by A & B together will be completed in = 27 / (4 + 5) = 27 / 9 = 3 days

Question 4 :

The sum of the present ages of a father and son is 52 years. Four years hence, the son's age will be ¼ that of the father. What will be the ratio of the ages of the son and father, 10 years from now?

Difficulty : Moderate

Average Time : 68 Seconds

Options :

1. 2 : 7

2. 2 : 5

3. 1 : 3

4. 3 : 8

Solution :

The correct answer is **Option 3** i.e. **1 : 3.**

Let the present age of the son be x years

The present age of the father is (52 – x) years

According to the question,

Age of son after 4 years = 1/4 × Age of father after four years

(x + 4) = 1/4 × (52 – x + 4)

(x + 4) × 4 = 56 – x

4x + 16 = 56 – x

5x = 40

x = 8 years

The present age of son = 8 years

The present age of father = 52 – 8 = 44 years

Age of son after 10 years = 8 + 10 = 18 years

Age of father after 10 years = 44 + 10 = 54 years

Ratio of their ages = 18 : 54 = 1 : 3

Question 5 :

Study the given graph and answer the question that follows. Break up for distribution (degree wise) of the employees working in five departments (A, B, C, D and E) in a company Total number of employees = 3000 The total number of

employees working in departments A and C exceeds the total number of employees working in departments B and D by x. The value of x lies between:

Difficulty : Moderate

Average Time : 74 Seconds

Options :

1. 36 and 44
2. 28 and 36
3. 44 and 52
4. 20 and 28

Solution :

The correct answer is **option 3** i.e. **44 and 52**

Solution

people working in A and C together = 64.2° + 72° = 136.2°

people working in B and D together = 73.8° + 57° = 130.8°

Difference = 136.2° - 130.8° = 5.4°

According to the question

5.4/360 × 3000 = 45

Question 6 :
In â–³ABC, the bisector of A intersects side BC at D. IF AB = 12 cm, AC = 15cm and BC = 18 cm, then the length of BD is:

Difficulty : Moderate

Average Time : 49 Seconds

Options :

1. 7.5cm
2. 8cm
3. 9.6cm
4. 9cm

Solution :

The correct answer is **option 2** i.e. **8cm**

Concept

Angle Bisector Theorem - An angle bisector divides the opposite side into two parts in the ratio of other two sides.

Application

AB / AC = BD / DC

12/15 = BD/DC

BD / DC = 4/5

BC = BD + DC

BC = 4 + 5 = 9 units

BC = 18 cm

9 units = 18 cm

1unit = 2 cm

BD = 2 x 4 = 8cm

Question 7 :

The height of a solid cylinder is 30 cm and the diameter of its base is 10 cm. two idendical conical holes each of radius 5 cm and height 12 cm are drilled out. What is the surface area (in cm2) of the remaining solid?

Difficulty : Moderate

Average Time : 59 Seconds

Options :

1. 430

2. 230

3. 330

4. 120

Solution :

The correct answer is **option 1** i.e. **430**

Concept

Remaining surface area = Surface Area of the figure + No. of Area of new surface drilled out

Application

$l^2 = h^2 + r^2$

$l^2 = 12^2 + 5^2$

$l^2 = 144 + 25$

$l = 13$ cm

Since there are two new cones drilled out and we can surely touch them. The surface are of the remaining firgure can be calculated as

The surface area of the remaining figure = surface area of cylinder + 2 × surface area of the cone

2rh + 2rl

2r(h + l)

2 × 5(30 + 13)

430

Question 8 :
On selling an article for Rs 123.40, the gain is 20% more than the amount of loss incurred on selling it for Rs 108. If the article is sold for Rs 120.75, then what is the gain /loss per cent?

Difficulty : Moderate

Average Time : 83 Seconds

Options :

1. Loss 2.5%

2. Loss 5%

3. Gain 2.5%

4. Gain 5%

Solution :

The correct answer is **option 4** i.e. **Gain 5%**

Concept

Profit = S.P - C.P

Loss = C.P - S.P

Application

Let the cost price be x

selling price = Rs. 108

Loss = (x - 108)

Other selling price = Rs. 123.40

Gain = (123.40 - x)

According to the question

(123.4 - x) = (x - 108) × (120/100)

1234 - 10x = 12x - 1296

22x = 2530

Upon solving

x = cost price = Rs 115

According to the question

Selling price = 120.75

Profit = 120.75 - 115

Profit = 5.75

Profit % = (5.75/115) × 100

Profit% = 5%

Question 9 :
The value of 3 ÷ 18 of 3 × 6 + 21 × 6 ÷ 18 - 3 ÷ 2 + 3 - 3 ÷ 9 of 3 × 9 is:

Difficulty : Moderate

Average Time : 65 Seconds

Options :

1. $\frac{29}{6}$

2. $\frac{41}{9}$

3. $\frac{35}{9}$

4. $\frac{47}{6}$

Solution :

The correct answer is **option 4** i.e. $\frac{47}{6}$

Concept

BODMAS

Application

3 ÷ 18 of 3 × 6 + 21 × 6 ÷ 18 - 3 ÷ 2 + 3 - 3 ÷ 9 of 3 × 9

3 ÷ 54 × 6 + 7 - 3 ÷ 2 + 3 - 3 ÷ 27 × 9

1/3 + 7 - 3/2 + 3 - 1

10 + 1/3 - 5/2

(60 + 2 - 15)/6

47/6

Question 10 :
If 27 (x + y)3 - 8(x - y)3 = (x + 5y) (Ax2 + By2 + Cxy), then what is the value of (A + B - C)?

Difficulty : Moderate   **Average Time : 55 Seconds**

Options :

1. 18

2. 16

3. 13

4. 11

Solution :
The correct answer is **option 2** i.e. **16**

Concept

$a^3 - b^3 = (a - b) (a^2 + b^2 + ab)$

Application

$27(x + y)^3 - 8(x - y)^3 = [3(x + y)]^3 - [2(x - y)]^3$

$[3(x + y) - 2(x - y)] \ [(3x + 3y)^2 + (2x - 2y)^2 + 3(x + y) \times 2(x - y)]$

$(x + 5y) (19x^2 + 7y^2 + 10xy)$

Upn comparing, we get

A = 19, B =7, C = 10

Therefore, A + B - C = 19 + 7 - 10 = 16

Question 11 :

If $\frac{45}{53}=\frac{1}{a+\frac{1}{b+\frac{1}{c-\frac{2}{5}}}}$, where a, b and c are positive integers, then what is the value of (4a - b + 3c)?

Difficulty : Moderate   **Average Time : 66 Seconds**

Options :

1. 6

2. 4

3. 5

4. 7

Solution :

The correct answer is **option 3** i.e. **5**

$\frac{45}{53}=\frac{1}{a+\frac{1}{b+\frac{1}{c-\frac{2}{5}}}}$

$\Rightarrow \frac{1}{1+\frac{8}{45}}=\frac{1}{a+\frac{1}{b+\frac{1}{c-\frac{2}{5}}}}$

$\Rightarrow \frac{1}{1+\frac{1}{5+\frac{5}{8}}}=\frac{1}{a+\frac{1}{b+\frac{1}{c-\frac{2}{5}}}}$

$\Rightarrow \frac{1}{1+\frac{1}{5+\frac{1}{2-\frac{2}{5}}}}=\frac{1}{a+\frac{1}{b+\frac{1}{c-\frac{2}{5}}}}$

On comparing both sides

We get, a = 1, b = 5 and c = 2

Putting them in (4a - b + 3c) = (4 × 1 - 5 + 3 × 2) = (4 - 5 + 6) = 5

Question 12 :

Remi earns a profit of 20% on selling an article at a certain price, If she sells the articles for Rs 8 more, she will gain 30%. What is the original cost price of 16 such articles?

Difficulty : Moderate   **Average Time : 64 Seconds**

Options :
1. Rs 1,152

Rs 1,120

3. Rs 1,280

4. Rs 1,200

Solution :

The correct answer is **option 3** i.e. **Rs 1,280**

Concept

Statement Based

Application

Let the CP of the article = 100x

Original Selling Price = 120x

New Selling Price = 130x

According to question

130x -120x = 8

10x = 8

x = 8/10

Original C.P of 1 article = 0.8 x 100 = Rs. 80

C.P of 16 Articles = 80 x 16 = Rs.1,280

Question 13 :

The are of the base of a right circular cone is 81 cm2 and its height is 12 cm. What is the curved surface area (in cm2) of the cone?

Difficulty : Moderate   **Average Time : 54 Seconds**

Options :

1. 126

2. 135

3. 108

4. 144

Solution :

The correct answer is **option 2** i.e. **135**

Concept

CSA of cone = x r x l

Application

Area of Base = x r^2 = 81

r^2 = 81

r = 9cm

Height = 12 cm

Slant Height = (r^2 + h^2)

Putting the values of r and h

l = (81 + 144)

l = 15 cm

CSA of cone = x r x l

x 9 x 15 = 135

Question 14 :

A certain number of students from school X appeared in an examination and 30% students failed . 150% more students than those from school X, appeared in the same examination from school Y. If 80% of the total number of students who appeared from X and Y passed, then what is the percentage of students who failed from Y ?

Difficulty : Moderate   **Average Time : 86 Seconds**

Options :

1. 24

2. 20

3. 16

4. 18

Solution :

The correct answer is **option 3** i.e. **16**

Concept

Basic Percentage

Application

Let the number of students in school X = 100K

No of students from school Y who appeared in the same examination = 250K

According to the question

Students failed in school X = 30K

Total students failed from X and Y together = 350 K x 20/ 100 = 70K

Students failed from school Y = 70 K - 30K = 40K

% failed from Y = 100 x 40 K/ 250K = 16%

Question 15 :

Surekha borrowed a sum of money and returned it in two equal annual installments of Rs. 5,547 each. If the rate of interest was 7- 1/2% p.pa compounded yearly, then the total interest paid by her was

Difficulty : Moderate   **Average Time : 59 Seconds**

Options :

1. Rs 1,144

2. Rs1,096

3. Rs 1, 126

4. Rs 1,134

Solution :

The correct answer is **option 4** i.e. **Rs 1,134**

Concept

$P = [(\text{Installment})/(1 + R/100)^1 + (\text{Installment})/(1+R/100)^2]$

Application

$P = [5547/(43/40)^1 + 5547/(43/40)^2]$

$P = 5547(40/43 + 1600/1849)$

P = 5547(3320/1839)

 P = Rs. 9960

Total Installment = 5547 × 2 = Rs. 11094

Total Interest = Rs(11094 - 9960) = Rs. 1134

Question 16 :
In â–³PQR, O is the incentre and P = 42⁰. Then what is the measure of QOR?

Difficulty : Moderate

Average Time : 47 Seconds

Options :
1. 138⁰
2. 132⁰
3. 111⁰
4. 121⁰

Solution :
The correct answer is **option 3** i.e. **111⁰**

Concept

QOR = 90 + P / 2

Application

QOR = 90 + P / 2

Putting the value of P = 42⁰

QOR = 90 + 42⁰ / 2

QOR = 90 + 21⁰

QOR = 111⁰

Question 17 :
A sold a watch to B at a profit of 20%. B sold it to C at 30% profit. C sold it to D at 10% loss. If B's profit is Rs 80 more than that of A, then D bought it for:

Difficulty : Moderate

Average Time : 54 Seconds

Options :

   Rs 700

2. Rs 680

3. Rs 652

4. Rs 702

Solution :

The correct answer is **option 4** i.e. **Rs 702**

Concept Used

Selling price = cost price + profit

Selling price = cost price - loss

Application

Let the C.P of the article for A = Rs. 100x

A sells to B at a profit of 20%

Selling Price of A = 100 x 120 / 100 = Rs 120x

Profit of A = 120 - 100 = 20x

B sold this to C at a profit of 30% = 120 x 130 / 100 = Rs.156x

Profit of B = 156 - 120 = 36x

C sold this to D at a loss of 10% = 156 x 90 /100 = 140.4x

Difference Between B's profit and A's profit = 36x - 20x = Rs 80

16x = 80

x = 5

Cost Price for D = 140.4 x 5 = Rs. 702

Question 18 :

Study the given graph and answer the question that follows. In which year was the revenue $33\frac{1}{3}$% more than the average expenditure of the company during 2014 to 2019?

Difficulty : Moderate   **Average Time : 69 Seconds**

Options :

   2015

2. 2016

3. 2018

4. 2017

Solution :

The correct answer is **option 3** i.e. **2018**

Concept

Sum of observation / No. of observation

Application

Average expenditure of the company from 2014 to 2019 = (130 + 150 + 175 + 200 + 165 + 170) / 6 = 165

  According to the question

 = 165 × 4/3 = 220

2018 year has the 220 as its revenue

Question 19 :
Study the given graph and answer the question that follows. Break up for distribution (degree wise) of the employees working in five departments (A, B, C, D and E) in a company Total number of employees = 3000 The number of employees in department B is what per cent of the total number of employees working in departments D and E ?

Difficulty : Moderate   Average Time : 56 Seconds

Options :

   1. 50.4

   2. 45.8

   3. 48.6

   4. 49.2

Solution :

The correct answer is **option 4** i.e. **49.2**

Solution

The number of employees in department B = 73.8°

The number of employees in department D and E = 57° + 93° = 150°

Required percentage = (73.8°/150°) × 100 = 49.2%

Question 20 :
Rishu saves x% of her income. If her income increases by 26% and the expenditure increases by 20%, then her savings increase by 50%. What is the value of x?

Difficulty : Moderate

Average Time : 45 Seconds

Options :
1. 25
2. 30
3. 20
4. 10

Solution :
The correct answer is **option 3** i.e. **20**

Concept

Using Alligation Method

Application

Increase in Expenditure

Increase in Saving

Increase in Income

Ratio of Expenditure

Ratio of Saving

Putting the values

20

50

26

(50 - 26 = 24)

(26 - 20 = 6)

Expenditure / Saving = 24 / 6 = 4: 1

Total Income = Expenditure + Saving = 5 units

Saving = 100 x (1 / 5) = 20%

Question 21 :
If a + b + c = 6, a3 + b3 + c3 - 3abc = 342, then what is the value of ab + bc + ca ?

Difficulty : Moderate   **Average Time : 89 Seconds**

Options :

1. 5

2. 8

3. -7

4. -5

Solution :
The correct answer is **option 3** i.e. **-7**

Concept

Identity used

$a^3 + b^3 + c^3 - 3abc = (a + b + c) [(a + b + c)^2 - 3 (ab + bc + ca)]$

Application

$a^3 + b^3 + c^3 - 3abc = (a + b + c) [(a + b + c)^2 - 3 (ab + bc + ca)]$

Putting the values

$342 = (6) [(6)^2 - 3 (ab + bc + ca)]$

57 = 36 - 3 (ab + bc + ca)

21 = - 3 (ab + bc + ca)

-7 = (ab + bc + ca)

Question 22 :
Study the graph and answer the question that follows. The number of patients aged 10 or more years but below 40 years is what per cent less than the number of patients aged 50 or more years but below 80 years?

Difficulty : Moderate   **Average Time : 65 Seconds**

Options :

30.2

2. 25

3. 34

4. 27.5

Solution :

The correct answer is **option 4** i.e. **27.5**

Solution

Age of person between 10 to 40 years = 14 + 20 + 24 = 58

Age of person between 50 to 80 years = 32 + 26 + 22 = 80

percentage = (80 − 58)/80 × 100

percentage = 22/80 × 100 = 27.5%

Question 23 :
Find the value of '?' {(4/5) × (8/6)2 × 252 × 45} ÷ {128 × 52 × 25} = ?

Difficulty : Moderate   **Average Time : 38 Seconds**

Options :

1. 3

2. 2

3. 1

4. $\frac{1}{2}$

Solution :

The correct answer is **option 4** i.e. $\frac{1}{2}$

$\{(4/5) × (8/6)^2 × 25^2 × 45\} ÷ \{128 × 5^2 × 25\}$ = ?

{(4/5) × (64/36) × 625 × 45} ÷ {128 × 25 × 25} = ?

{40000} ÷ {80000} = ?

? = 1/2

Question 24 :

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In a circle with centre O, a diameter AB is produced to a point P lying outside the circle and PT is a tangent to the circle at the point C on it. If BPT = 36º, then what is the measure of BCP?

Difficulty : Moderate   **Average Time : 51 Seconds**
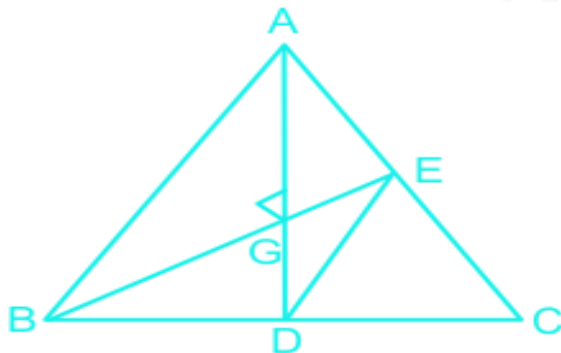
Options :

1. 24º
2. 18º
3. 36º
4. 27º

Solution :

The correct answer is **option 4** i.e. **27º**

Concept

Chord and Tangent intersect to create a 90º

Application

In triangle OCP

OCP + COP + OPT = 180°

90° + COP + 36° = 180°

COP = 180° - 126° = 54°

OB = OC (Radius of circle)

In triangle OCB

OCB + OBC + COB = 180°

Let OCB = OBC = K°

According to the question

K + K + 54 = 180

2K = 126°

K = 63°

Chord is perperdicular to the tangent PT

OCP = 90°

OCP = OCB + BCP

90° = 63° + BCP

BCP = 90° - 63° = 27°

Question 25 :
In â–³ABC, C = 90⁰. Point P and Q are on the sides AC and BC, respectively, such that AP : PC = BQ : QC = 1 : 2. Then , $(AQ^2 + BP^2) / (AB)^2$ is equal to:

Difficulty : Moderate

Average Time : 84 Seconds

Options :

1. $\frac{8}{3}$

2. $\frac{4}{3}$
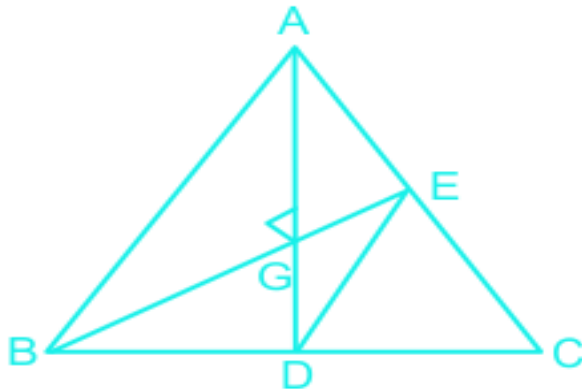
3. $\frac{13}{9}$

4. $\frac{4}{9}$

Solution :
 The correct answer is **option 3** i.e. $\frac{13}{9}$

Concept

Pythagoras theorem

Application

AP : PC = BQ : QC = 1 : 2

In CAQ

$CA^2 + CQ^2 = AQ^2$

$AQ^2 = (3x)^2 + (2x)^2$

$AQ^2 = 13x^2$

$BP^2 = 13x^2$ (Similary)

In ABC

$AC^2 + BC^2 = AB^2$

$AB^2 = (3x)^2 + (3x)^2 = 18x^2$

Putting the respective values of $(AQ^2 + BP^2) / (AB)^2$

$(13x^2 + 13x^2) / 18x^2$

$26x^2/18x^2$

13 / 9

Question 26 :
In â–³ABC, A -B = 33⁰, B - C = 18⁰ What is the sum of the smallest and the largest angles of the triangle?

Difficulty : Moderate   **Average Time : 87 Seconds**

Options :
   1. 125⁰

   2. 143⁰

92º

4. 108º

Solution :

The correct answer is **option 1** i.e. **125º**

Concept

Sum of interior angles of a triangle = 180º

Application

In triangle ABC,

A + B + C = 180º

According to the question

A - B = 33º (Given)

A = 33º + B

B - C = 18º

C = B - 18º

Putting the value of A and C

33º + B + B + B - 18º = 180

3B = 165º

B = 55º

A = 55º + 33º = 88º

C = 55º - 18º = 37º

Sum of largest and smallest angles = 88º + 37º = 125º

Question 27 :

A person divided a certain sum between his three sons in the ratio 3 : 4 : 5. had he divided the sum in the ratio (rac{1}{3}): (rac{1}{4}): (rac{1}{5}), the son, who got the least share earlier, would have got Rs 1,188 more. The sum (in Rs) was:

Difficulty : Moderate   **Average Time : 83 Seconds**

Options :

<p style="color:green">6,768</p>

2. 5,640

3. 7,008

4. 6,,840

Solution :

 The correct answer is **option 1** i.e. **6,768**

Concept

Use of Ratio

Application

Initial ratio of money division = 3x : 4x : 5x

Here total 12x units---------- (1)

New ratio of division = 1/3 âˆ¶ 1/4 âˆ¶ 1/5

To find out the actual new ratio, let's take the LCM = 60

Therefore new ratios

20x : 15x : 12x = Total 47 x units--------(2)

Since money is same in both cases, the units needs to be same

Multiplying (2) with 12 and (1) with 47

New Ratio - 240x : 180x : 144x

Old Ratio - 141x : 188x: 235x

The difference between the minimum of old ratio and maximum of new ratio = 1188

According to the question

240x - 141x = 1188

99x = 1188

x = 12

Total Sum = 12 x 12 x 47

= 6768

Question 28 :

If the 5-digit number 535ab is divisible by 3, 7 and 11, then what is the value of (a2 - b2 + ab)?

Difficulty : Moderate   **Average Time : 72 Seconds**

Options :

1. 77

2. 89

3. 95

4. 83

Solution :

The correct answer is **option 3** i.e. **95**

Concept

If a number is divisible by 3, 7 and 11, it must be divisible by 231.

Application

Let the highest number be 53599.

When divided by 231, it leaves a remainder as 7.

Thus, the number should be 53592 to be completely divisible by 231.

Thus, on comparing a and b with 53592, we get a = 9 and b = 2.

Putting the values of a and b in (a^2 - b^2 + ab)

(81 - 4 + 18) = 95

Question 29 :

Study the given graph and answer the question that follows. In how many years was the profit (Revenue - Expenditure) as a percentage of the revenue, more than 25%?

Difficulty : Moderate   **Average Time : 57 Seconds**

Options :

1. 4

2. 2

1

4. 3

Solution :

 The correct answer is **option 2** i.e. **2**

Solution

Profit of company in 2014 = Rs. 20 cr

Percentage Revenue of company in 2014 = 20/150 × 100 = 13.33%

Profit of company in 2015 = Rs. 60 cr

Percentage Revenue of company in 2015 = 60/210 × 100 = 28.57%

Profit of company in 2016 = Rs. 25 cr

Percentage Revenue of company in 2016 = 25/200 × 100 = 12.5%

Profit of company in 2017 = Rs. 40 cr

Percentage Revenue of company in 2017 = 40/240 × 100 = 16.67%

Profit of company in 2018 = Rs. 55 cr

Percentage Revenue of company in 2018 = 55/220 × 100 = 25%

Profit of company in 2019 = Rs. 85 cr

Percentage Revenue of company in 2019 = 85/255 × 100 = 33.33%

Number of years in which profit is more than 25% = 2 i.e 2015 and 2019

Question 30 :
A person has to cover a distance of 160 km in 15 hours. If he covers $\frac{4}{5}$ of the distance in $\frac{2}{3}$ of the time, then what should be his speed (in km/h) to cover the remaining distance in the remaining time?

Difficulty : Moderate

Average Time : 75 Seconds

Options :

1. 6

2. 8

3. 6.4

6.5

5. 7.5

Solution :

The correct answer is **option 3** i.e. **6.4**

Concept

Distance = Speed x Time

Application

Total distance to be covered = 160 km

He covered 4 / 5 of the distance, distance left to be covered = 1/ 5

= 160 x 1/ 5 = 32 km

Time taken by him alread 2 / 3 of the total time, he needs to cover the remaining distance in 1 / 3 of the total time

= 15 x 1 /3 = 5 hours

Therefore his speed should be = 32 / 5 = 6.4 km/h

Question 31 :

If the radius of the base of a right circular cylinder is increased by 20% and the height is decreased by 30%, then what is the percentage increase/decrease in the volume?

Difficulty : Moderate

Average Time : 56 Seconds

Options :

1. Decrease 0.8%

2. Increase 2%

3. Increase 0.8%

4. Decrease 2%

Solution :

The correct answer is **option 3** i.e. **Increase 0.8%**

Concept

Volume of cylinder = $\pi \times r^2 \times h$

Application

Let the initial radius of cylinder = 5 units

New radius = 6 units

Let the initial height of cylinder = 10 units

New height = 7 units

Volume of initial cylinder = $x r^2 x h$ = $x 5^2 x 10$ = 250

Volume of new cylinder = $x r^2 x h$ = $x 6^2 x 7$ = 252

Percentage increase in volume = 100 x (252 - 250) / (250) = 0.8%

Question 32 :
When 1062, 1134 and 1182 are divided by the greatest number x, the remainder in each case is y. What is the value of (x - y)?

Difficulty : Moderate   **Average Time : 63 Seconds**

Options :

1. 17

2. 18

3. 16

4. 19

Solution :
 The correct answer is **option 2** i.e. **18**

Concept

We need to find HCF. HCF can be calculated by taking the difference of the numbers when they leave same remainder when divided by same number. When A, B and C are divided by a greatest number 'K' and leaves the same remainder each time, then the value of K can be calculated by (A - B) (B - C) and (A - C)

Application

We need to take the differences of each number to calculate HCF

= (1134 - 1062), (1182 - 1134) and (1182 - 1062)

1134 - 1062 = 72

1182 - 1134 = 48

1182 - 1062 = 120

Upon Prime Factorization

$72 = 2^3 \times 3^2$

$48 = 2^4 \times 3$

$120 = 2^3 \times 3 \times 5$

To calculate HCF, we need to take numbers which are common in each of the numbers

Thus we get = $2^3 \times 3 = 24$

Therefore, the greatest number or x = 24

When we divide 1134 by 24, we get remainder as 6 which is y

Therefore = x - y

= 24 - 6 = 18

Question 33 :
X and Y enter into a partnership with capital in the ratio 3 : 5. After 5 months X adds 50% of his capital, while Y withdraws 60% of his capital. What is the share (in lakhs) of X in the annual profit of Rs 6.84 lakhs?

Difficulty : Moderate   **Average Time : 92 Seconds**

Options :
1. 3.72
2. 3.6
3. 4.2
4. 3.12

Solution :
 The correct answer is **option 1** i.e. **3.72**

Concept

Profit is divided into the ratio of their investment

Application

Let the initial investment made by X = 30 units

Let the initial investment of Y = 50 units

For 5 months, X 's captial = 30 x 5 = 150 units

For remaining 7 months, X add 50% more of original invesmention

= 45 x 7 = 315 units

Total investment of A for whole year = 150 + 315 = 465 units

Now,

Y keeps his investment for 5 months = 50 x 5 = 250 units

He withdraws 60% of the original investment

For 7 months he keeps = 20 x 7 = 140 units

Total investment of Y = 250 + 140 = 390 units

Ratio of X and Y = 465 : 390 = 31 : 26

According to the question

31 + 26 = 57 units

57 units = 6.84 lakhs

1 unit = 6.84 / 57 = 0.12

X's share = 31 x 0.12 = 3.72

Question 34 :
The compound interest on a sum of Rs 5,500 at 15% p.a. for 2 years, when the interest is compounded 8 monthly, is:

Difficulty : Moderate

Average Time : 69 Seconds

Options :
1. Rs 1,850

2. Rs 1,880

3. Rs 1,820.50

4. Rs 1,773.75

Solution :

The correct answer is **option 3** i.e. **Rs 1,820.50**

Concept

Amount = $P(1 + R/100)^n$

Application

Rate of Interest for 8 months = $(15/12) \times 8 = 10\%$

Cycle of 8 months in 2 years = $24/8 = 3$

Principal = 5500

Amount = $P(1 + R/100)^n$

Putting the values

Amount = $5500(1 + 10/100)^3$

Amount = $5500(11/10)^3$

Upon solving

Amount = 7320.5

C.I = Amount - Principal

7320.5 - 5500 = Rs. 1820.5

Question 35 :
The average of three numbers a, b and c is 2 more than c. The average of a and b is 48. If d is 10 less than c, then the average of c and d is:

Difficulty : Moderate   **Average Time : 58 Seconds**

Options :

1. 38

2. 35

3. 36

4. 40

Solution :

The correct answer is **option 4** i.e. **40**

Concept

Average = Sum of observation / No of observations

Application

Average of a, b, c = (a + b + c) / 3

According to the question

(a + b + c) / 3 = c + 2

Average of a and b = 48

It means sum of a and b = 48 x 2 = 96

Putting the value of a + b = 96 in (a + b + c) / 3 = c + 2

a + b + c = 6 + 3c

96 + c = 6 + 3c

2c = 90

c = 45

d = 45 - 10 = 35

Average of c and d = (45 + 35) / 2 = 40

Question 36 :
A and B start moving towards each other from places X and Y, respectively, at the same time on the same day. The speed of A is 20% more than of B. After meeting on the way, A and B take p hours and 7$\frac{1}{5}$ hours, respectively, to reach Y and X, respectively. What is the value of p?

Difficulty : Moderate

Average Time : 70 Seconds

Options :
1. 4.5

2. 5

3. 5.5

6

Solution :

The correct answer is **option 2** i.e. **5**

Concept

We know that in the condition when two objects move towards each other and then time taken by them to reach respective destinations is related to their speed by the following formula :

(Speed of A/Speed of B)^2 = Time taken by B/Time taken by A

Application

Let the speed of B = 5x

Therefore, speed of A = 5x × 120/100 = 6x

According to the question

(Speed of A/Speed of B)^2 = Time taken by B/Time taken by A

Putting the values

$(6x/5x)^2 = (36/5p)$

Upon solving

p = 5

Question 37 :

Study the given graph and answer the question that follows. Break up for distribution (degree wise) of the employees working in five departments (A, B, C, D and E) in a company Total number of employees = 3000 If 20% of the employees working in department E are transferred to department A, then the difference between the number of employees in A and 124% of the employees working in department C is:

Difficulty : Moderate

Average Time : 77 Seconds

Options :

1. 54

2. 50

3. 60

4. 64

Solution :

The correct answer is **option 1** i.e. **54**

Solution

Employees in department E = 93°

Employees in department E = (93°/360°) × 3000 = 775

20% of Employees of department E = (20/100) × 775 = 155

Employees in department A = 64.2°

Employees in department A = (64.2°/360°) × 3000 = 535

Now, 20% of the employees working in department E are transferred to department A

Employees in department A = 535 + 155 = 690

Employees in department C = 72°

Employees in department E = (72°/360°) × 3000 = 600

124% of Employees in department C = (124/100) × 600 = 744

Required difference = 744 − 690 = 54

Question 38 :

In a circle with centre O, BC is a chord. Points D and A are on the circle, on the opposite side of BC, such that DBC = 28º and BD = DC. What is the measure of BOC?

Difficulty : Moderate

Average Time : 65 Seconds
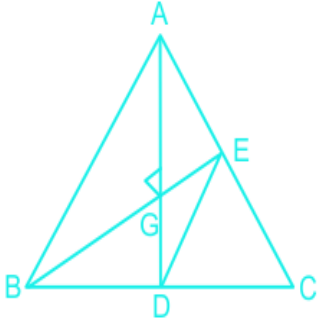
Options :

1. 98º

2. 84º

3. 112º

4. 96º

Solution :

The correct answer is **option 3** i.e. **112º**

Concept

Angle formed by the arc is double the angle formed by the arc on the perimeter

Application

In PBC,

PBC + PCB + BPC = 180°

Since BP = PC

PBC = PCB = 28°

28° + 28° + BPC = 180°

56° + BPC = 180°

 BPC = 180° − 56°

BPC = 124°

Angle formed by the arc is double the angle formed by the arc on the perimeter

BOC = 2 x 124° = 248°

Complete angle = 360°

Inverse of BOC = 360° - 248° = 112°

Question 39 :
The sides BA and DE of a regular pentagon are produced to meet at F. What is the measure of EFA?

Difficulty : Moderate

Average Time : 76 Seconds

Options :
1. 60⁰
2. 36⁰

72⁰

4. 54⁰

Solution :
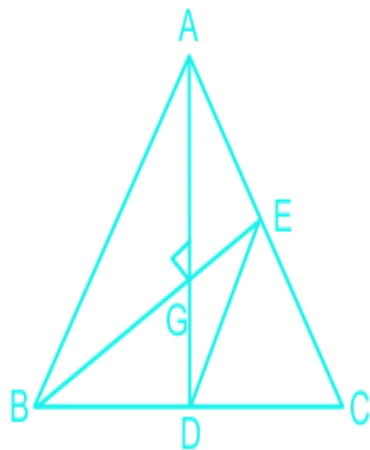
The correct answer is **option 2** i.e. **36⁰**

Concept

Interior Angle of a polygon = 360⁰ / No. of sides of polygon

Interior angle of pentagon = 360⁰ / 5 = 108⁰

Application

AF is a straight line.

BAE + EAF = 180°

EAF = 180° - 108°

EAF = 72°

Similarly

AEF = 72°

In triangle AEF

AEF + EAF + EFA = 180°

EFA = 180° - 72° - 72°

EFA = 36°

Question 40 :

Anuja owns $66\frac{2}{3}$% of a property. If 30% of the property that she owns is worth Rs 1,25,000, then 45% of the value (in RS) of the property is:

Difficulty : Moderate

Average Time : 65 Seconds

Options :

1. 2,70,000
2. 2,81,250
3. 2,25,000
4. 2,62,500

Solution :

The correct answer is **option 2** i.e. **2,81,250**

Concept

Let the total units of property = 300

Anuja owns = 300 x 2 / 3 = 200 units

Value of 30 % of property = 1,25,000

According to the question

(30 / 100) x 200 units = 1,25,000

Value of 300 units = 6,25,000

Value of 45% of total property = (45 / 100) x 6,25,000 = Rs. 2,81,250

Question 41 :

In â–³PQR, Q = 90⁰. If cot R = ($\frac{1}{3}$), then what is the value of secP(cosR+sinP) / cosecR(sinRcosecP)?

Difficulty : Moderate

Average Time : 46 Seconds

Options :

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

2. $-\frac{2}{3}$

- $-\frac{2}{7}$

4. $\frac{2}{3}$

Solution :

The correct answer is **option 3** i.e. $-\frac{2}{7}$

Concept

sec = H/B

cosec = H/P

cos = B/H

sin = P/H

cot = B/P

Application
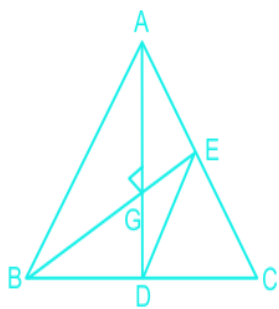
cotR = 1/3

P = 3, B = 1, H = 10

Calculating the different values. we get

secP = 10/3

cosR = 1/10

sinP = 1/10

cosecR = 10/3

sinR = 3/10

cosecP = 10/1

Putting the values in secP(cosR+sinP) / cosecR(sinRcosecP), we get

$(2/10) / (-7/10) = (- 2 / 7)$

Question 42 :

cosA(secA - cosA)(cotA + tanA) = ?

Difficulty : Moderate

Average Time : 71 Seconds

Options :

1. tan A

2. cot A

3. sec A

4. sin A

Solution :

The correct answer is **option 1** i.e. **tan A**

Concept

$1 - \cos^2 A = \sin^2 A$

$1 + \tan^2 A = \sec^2 A$

Application

cosA(secA - cosA) (cotA + tanA)

$(1 - \cos^2 A) (1/\tan A + \tan A)$

$\sin^2 A \times (1 + \tan^2 A)/\tan A$

$\sin^2 A \times \sec^2 A/\tan A$

$\tan^2 A / \tan A$

cosA (secA - cosA) (cotA + tanA) = tanA

Question 43 :

In a school, (rac{3}{8})of the number of students are girls and the rest are boys. One-third of the number of boys are below 10 years and (rac{2}{3})of the number of girls are also below 10 years. If the number of students of age 10 or more years is 260, then the number of boys in the school is:

Difficulty : Moderate

Average Time : 68 Seconds

Page No: 40

Options :

1. 312

2. 234

3. 300

4. 280

Solution :

The correct answer is **option 3** i.e. **300**

Application

Let the total no of students = 240 units

No of boys = 5 / 8 x 240 = 150 units

No of girls = 3 / 8 x 240 = 90 units

No.of boys below 10 = 1 / 3 x 150 units = 50 units

No of girls below 10 = 2 / 3 x 90 = 60 units

Total students below age 10 = 110 units

Total students above age 10 = 130 units

According to the question,

130 units = 260 students

1 unit = 2 student

150 unit = 2 x 150 = 300 students

No of boys = 300

Question 44 :

If $3x^2 - 5x + 1 = 0$, then the value of $(x^2 + 1/9x^2)$ is:

Difficulty : Moderate   **Average Time : 52 Seconds**

Options :

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

2. 1

   $1\frac{1}{3}$

3. $2\frac{1}{9}$

4. $2\frac{1}{3}$

Solution :

The correct answer is **option 3** i.e. $2\frac{1}{9}$

Concept

$(a + b)^2 = a^2 + b^2 + 2ab$

Application

$3x^2 - 5x + 1 = 0$

Diving the equation by 3x, we get

$x + 1/3x = 5/3$

Squaring both sides

$x^2 + 1/9x^2 + 2 \times (x) \times (1/3x) = 25/9$

$x^2 + 1/9x^2 = 25/9 - 2/3 = 2\frac{1}{9}$

Question 45 :

The graphs of the equations 3x - 20y - 2 = 0 and 11x - 5y + 61 = 0 intersect at P(a,b). What is the value of $(a^2 + b^2 - ab)/(a^2 - b^2 + ab)$?

Difficulty : Moderate   **Average Time : 65 Seconds**

Options :

1. $\frac{37}{35}$

2. $\frac{5}{7}$

3. $\frac{31}{41}$

4. $\frac{41}{31}$

Solution :

The correct answer is **option 3** i.e. $\frac{31}{41}$

Application

3x - 20y = 2

11x - 5y = - 61

Upon solving this equation

41x = -246

x = - 6

putting the value of x = -6 in any of the equation, we will get

y = -1

both the equations intersect each other at point P(a, b) = P(x. y)

a = -6 and b = -1

$(a^2 + b^2 - ab)/(a^2 - b^2 + ab) = (36 + 1 - 6)/(36 - 1 + 6)$

31/41

Question 46 :
A, B and C started a business. Twice the investment of A is equal to thrice the investment of B and also five times the investment of C. If the total profit after a year is Rs 15.5 lakhs, then the share of B in the profit is (in lakhs):

Difficulty : Moderate   **Average Time : 72 Seconds**

Options :
   1. 7.5

   2. 3

   3. 4.5

   4. 5

Solution :
 The correct answer is **option 4** i.e. **5**

Concept

Profit will be divided into the ratio of investment. We need to find the ratio of investment

Application

2 x A = 3 x B = 5 x c

Let total investment = 30 units

A = 15 units

B = 10 units

C = 6 units

According to the question

31 units = 15.5

1 unit = .5

B's share = .5 x 10

= 5

Question 47 :
The expression is equal to:

Difficulty : Moderate   **Average Time : 49 Seconds**

Options :
   1. 10(3 + 25)

   2. 5 + 22

   3. 5 (3+ 22)

   4. 5 - 25

Solution :
The correct answer is **option 3** i.e. **5 (3+ 22)**

Concept

Rationalization

Application

[15(10 + 5)] ÷ [(10 + 20 + 40 - 5 - 80)]

[15 × 5(2 + 1)] ÷ [5 × (2 + 4 + 8 - 1 - 16)]

[15 × (2 + 1)] ÷ [(2 + 2 + 8 - 1 - 4)]

[15 × (2 + 1)] ÷ [2(1 + 2) - 3]

$[15 \times (2 + 1)] \div [32 - 3]$

$[15 \times (2 + 1)] \div [3(2 - 1)]$

$[5 \times (2 + 1)] \div [(2 - 1)]$

By rationalizing

$[5(2 + 1)] / [(2 - 1)] \times [(2 + 1) / (2 + 1)]$

$[5(2 + 1)^2] / [(2 - 1)(2 + 1)]$

$[5(2 + 1 + 22)]$

$[5(3 + 22)]$

Question 48 :

The value of is (0.0203×2.92)/(0.7×0.0365×2.9) ÷ (12.12)2 - (8.12)2)/(0.25)2+(0.25)(19.99) :

Difficulty : Moderate   **Average Time : 64 Seconds**

Options :

1. 0.05

2. 0.5

3. 0.01

4. 0.1

Solution :

The correct answer is **option 1** i.e. **0.05**

Concept

Calculation

Identity $= (a - b)(a + b) = (a^2 - b^2)$

Application

$\{(203 \times 292 \times 1 / 10^6)/(7 \times 365 \times 29 \times 1 / 10^6)\} \div \{(12.12 - 8.12) / ((0.25)^2+(0.25)(19.99))\}$

$\{292/365\} \div \{(4) \times (20.24) / (0.25)(20.24)\}$

$= 0.8/16 = 0.05$

Question 49 :

A spherical metallic shell with 6 cm external radius weighs 6688 g. What is the thickness of the shell if the density of metal is 10.5 g per cm3? (Take = 22/7)

Difficulty : Moderate

Average Time : 55 Seconds

Options :

1. 4 cm
2. 2 ½ cm
3. 3 cm
4. 2 cm

Solution :

The correct answer is **option 4** i.e. **2 cm**

Concept

Volume = (Mass/Density)

If thickness is given then,

Volume of sphere = $(4/3)(R^3 - r^3)$

Application

Volume = (6688/10.5)

According to the question

$(6688/10.5) = (4/3) \times (22/7) \times (6^3 - r^3)$

$(6^3 - r^3) = (6688 \times 3 \times 7)/(22 \times 4 \times 10.5)$

$(6^3 - r^3) = 152$

$216 - r^3 = 152$

$r^3 = 216 - 152$

$r3 = 64$

r = 4

Now,

Thickness = R - r

= 6 - 4 = 2 cm

Question 50 :

A can do 20% of a work in 4 days, B can do 33(rac{1}{3})% of the same work in 10 days. They worked together for 9 days. C completed the remaining work in 6 days. B and C together will complete 75% of the same work in:

Difficulty : Moderate	**Average Time : 70 Seconds**

Options :

1. 9 days

2. 15 days

3. 10 days

4. 12 days

Solution :

The correct answer is **option 3** i.e. **10 days**

Concept

LCM approach to find total work.

Application

Time taken by A to complete 20% = 4 days

Time Taken by A to complete 100% work = 20 days

B can do $33\frac{1}{3}$% of the same work = 10 days

Time taken by B to do 100% work = 30 days

Therefore let total work = 60 units (LCM of 30 and 20)

A's efficiency = 3 units

B's efficieny = 2 units

Total work done by A and B in 9 days = 9 x (3+ 2)

= 45 units

Work Left = 60 - 45 = 15 days

It is completed by C in 6 days

C's efficient = 15 / 6 = 2.5 units

B & C will complete the 75 % of the work = (60 x 75) / 100 x 4.5 = 10 days

Question 51 :

The marked price of an article is 40% above its cost price. If its selling price is $73(\frac{1}{2})$% of the marked price, then the profit percentage is:

Difficulty : Moderate   **Average Time : 70 Seconds**

Options :

1. 2.4%

2. 2.9%

3. 3.1%

4. 2.7%

Solution :

The correct answer is **option 2** i.e. **2.9%**

Concept

Basic Profit and loss concept

Application

Let the C.P of the article = 100 units

M.P of the article = 100 x 140 / 100 = 140 units

Selling Price is 147 / 200 of the M.P

Therefore S. P = 147 / 200 x 140 = 102.9

Profit % = S.P - C.P / CP x 100

= 102 .9 - 100 / 100 x 100

= 2.9 %

Question 52 :

The base of a right pyramid is a square of side 10 cm. If its height is 10 cm, then the area (in cm2) of its lateral surface is:
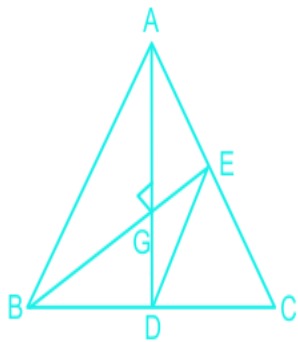
Difficulty : Moderate   **Average Time : 51 Seconds**

Options :

50 5

2. 100

3. 1005

4. 100(5 +1)

Solution :

The correct answer is **option 1** i.e. **1005**

Concept

Lateral surface = (1/2) × Perimeter of the base × Slant height

Application

Join EF which is the slant height of this figure.

EO = height = 10 cm

In right triangle EOF

By pythagorous theorem

$EF^2 = OE^2 + OF^2$

$10^2 + 5^2$

Slant height = EF = 125 = 55

Perimeter of base = 4 x 10 = 40cm

Lateral Surface Area = (1/2) × Perimeter of the base × Slant height

(1/2) x 40 x 55 = 1005

Question 53 :
The area (in sq. units) of the triangle formed by the graphs of 8x + 3y = 24, 2x + 8 = y and the x-axis is:

Difficulty : Moderate

Average Time : 70 Seconds

Options :

1. 28
2. 14
3. 15
4. 24

Solution :
The correct answer is **option 1** i.e. **28**

Concept

Intercept form = x / a + y/ b = 1

Application

x / a + y/ b = 1

For 8x + 3y = 24, 2x + 8 = y to find the point of intersection put one equation in other

8x + 3(2x + 8) = 24

14x = 0

x = 0

y = 2×0 + 8 = 8

Height of the triangle = 8

For 8x + 3y = 24, 2x + 8 = y to find the X – intercepts put y = 0

8x + 3×0 = 24

x_1 = 3

2x + 8 = 0

x_2 = -4

Their difference is the base = 3 – (-4) = 7

Area of triangle = 1 /2 x b x h

= 1/2 x 7 x 8 = 28

Question 54 :

The value of (2.4Ì × 0.6Ì × 3 × 0.16Ì) × [0.2Ì 7Ì × (0.83Ì ÷ 0.16Ì)] is:

Difficulty : Moderate   **Average Time : 61 Seconds**

Options :

1. 0.1Ì 1Ì

2. 11.3

3. 1.3Ì 6Ì

4. 1.8Ì 1Ì 4Ì

Solution :

The correct answer is **option 2** i.e. **11.3**

Solution

(2.Ì 4 × 0.Ì 6 × 30 × 0.1Ì 6) ×   [0.2Ì 7 × (0.8Ì 3 ÷ 0.1Ì 6)]

(22 / 9 × 2/ 3× 30 × 1 / 6) × [5 / 18 × (5 / 6 ÷1 / 6)

22 / 9 × 5 × 1 / 3 × 25 / 9

(2750 / 243)

11.31

Question 55 :

Let x = Then x is equal to:

Difficulty : Moderate   **Average Time : 37 Seconds**

Options :

1. $\frac{5}{9}$

2. $\frac{7}{12}$

3. $\frac{5}{12}$

$\frac{4}{9}$

Solution :

The correct answer is **option 3** i.e. $\frac{5}{12}$

Concept

Basic Calculation

Application

(1875 / 3888 ÷ 1200 / 768) × 175 / 1792

Rewriting the numbers as -

[(253 / 363) ÷ (203 / 163)] × (57 /167)

x = (25/36) × (16/20) × (5/16)

x = (25/(36 × 4))

Taking under root from each side

x = (25/(36 × 4))

x = (5/12)

Question 56 :

Pipes A and B can fill a tank in 43.2 minutes and 108 minutes, respectively. Pipe C can empty it at 3 liters/minutes. When all the three pipes are opened together, they fill the tank in 54 minutes. The capacity (in liters) of the tank is:

Difficulty : Moderate

Average Time : 65 Seconds

Options :

1. 200
2. 160
3. 180
4. 216

Solution :

The correct answer is **option 4** i.e. **216**

Concept

LCM approach to calculate total work

Application

Let Total work = 432 units

A's efficieny = 432 / 43.2 = 10 units/min

B's efficiency = 432 / 108 = 4 units/min

Efficiency of (A + B + C) = 432 / 54 = 8 units/min

C's = (10 + 4 − 8) units/min

6 units/min

Capacity of tank = (432/6) × 3 litres

(72 × 3) litres

216 litres

Question 57 :
A certain sum amounts to Rs 15,500 in 2 years at 12% p.a. simple interest. The same sum will amount to what in 1½ years at 10% p.a., if the interest is compounded half yearly (nearest to Rs 1)?

Difficulty : Moderate   **Average Time : 56 Seconds**

Options :

1. Rs 14,470

2. Rs 15,125

3. Rs 14, 360

4. Rs 13,460

Solution :
The correct answer is **option 1** i.e. **Rs 14,470**

Concept

Amount = P + S.I

Application

Let Principal = 100P

Simple Interest for 2 years = 12% x 2 = 24%P

Total Amount = 100 P + 24P

= 124 P

Acccording to the question

124 P = 15,500

P = 125

Total Principal = 125 x 100 = 12, 500

As per the question, Rate of Interest for half yearly = 5%, , Time = 3 half years

Amount = $P(1 + R/100)^n$

Putting the values

Amount = $12,500 \times (1 + 5/100)^3$

$12500 \times (21/20)^3$

14470.31

14470 (approx)

Question 58 :
If (10a3 + 4b3) : (11a3 - 15b3) = 7 : 5, then (3a + 5b) : (9a - 2b) = ?

Difficulty : Moderate   **Average Time : 59 Seconds**

Options :

1. 10 : 13

2. 8 : 7

3. 5 : 4

4. 3 : 2

Solution :
The correct answer is **option 1** i.e. **10 : 13**

Concept

Ratio and cross multiplication

Application

$(10a^3 + 4b^3) : (11a^3 - 15b^3) = 7 : 5$

Cross Multiplying

$5 \times (10a^3 + 4b^3) = 7 \times (11a^3 - 15b^3)$

$50a^3 + 20b^3 = 77a^3 - 105b^3$

$27a^3 = 125b^3$

$3a = 5b$

$a : b = 5 : 3$

Putting the values of a and b in $(3a + 5b) : (9a - 2b)$

$(3 \times 5 + 5 \times 3) : (9 \times 5 - 2 \times 3)$

$= 30 : 39$

$= 10 : 13$

Question 59 :

If (x + 20)% of 250 is 25% more than x% of 220, then 10% of (x+50) is what per cent less than 15% of x?

Difficulty : Moderate   **Average Time : 64 Seconds**

Options :

1. $16\frac{2}{3}$

2. $8\frac{1}{3}$

3. $13\frac{1}{3}$

4. $33\frac{1}{3}$

Solution :

The correct answer is **option 1** i.e. $16\frac{2}{3}$

Concept

Basic Percentage

Application

(x + 20)% of 250 = 125% of x% of 220

(x + 20)% × 250 = 125% × x% × 220

(x + 20)/100 × 250 = 125/100 × x/100 × 220

(x + 20) = 5 × x/100 × 22

(x + 20) = x/20 × 22

x + 20 = 11x/10

11x/10 − x = 20

x/10 = 20

x = 200

10% of (x + 50)

10/100 × 250

25

15% of x

15/100 × 200

30

Required percent = (30 − 25)/30 × 100

Required percent = 5/30 × 100

Required percent = 50/3 = $16\frac{2}{3}$

Question 60 :
If sin 3A = cos(A +10º), where 3A is an acute angle, then what is the value of 2cosecA + tan22A - cot2A

Difficulty : Moderate **Average Time : 67 Seconds**

Options :

1. 4

2. $\frac{7}{4}$

3. 5

4. $\frac{17}{2}$

Solution :

The correct answer is **option 1** i.e. **4**

Concept

When Sin A = Cos B, it means that A and B are complementary angles

Application

sin 3A = cos(A +10⁰) (Given)

According to question

$3A + A + 10° = 90°$

$4A = 80°$

$A = 20°$

According to the question,

putting the value of A in equation $2\cosec A + \tan^2 2A - \cot^2 A$

$2\cosec 30° + \tan^2 2 \times 30° - \cot^2 30°$

$2 \times 2 + 3^2 - 3^2$

4

Question 61 :
The value of (cosec230°sin245° + sec260°) / (tan60°cosec245° - sec260°tan45°) is:

Difficulty : Moderate   **Average Time : 64 Seconds**

Options :

1. -23-2

2. -3(2+3)

3. 3(2+3)

4. 2(3-2)

Solution :
The correct answer is **option 2** i.e. **-3(2+3)**

Concept

Value putting

Application

$(\cosec^2 30° \sin^2 45° + \sec^2 60°) / (\tan 60° \cosec^2 45° - \sec^2 60° \tan 45°)$

$(4 × 1/2 + 4) / (3 × 2 − 4 × 1)$

$6 / (23 − 4)$

$3 / (3 − 2)$

$-3 / (3 + 2)$

Question 62 :

A is 80% more than B and C is 48(rac{4}{7})% less than the sum of A and B. BY what percent is C less than A?

Difficulty : Moderate   Average Time : 51 Seconds

Options :

1. 30
2. 15
3. 25
4. 20

Solution :

The correct answer is **option 4** i.e. **20**

Application

Let B be 5x.

Since A is 80% more than B,

Then, A = 5x + (5x) × 80% = 5x + 4x = 9x

C is 48$\frac{4}{7}$% less than the sum of A and B

And C = (9x + 5x) − (9x + 5x) × 340 / 7% = 14x − 6.8x = 7.2x

According to the question

Percentage = (A - C) / A x 100

= (9x - 7.2x) / 9x x 100

=1.8x / 9x x 100

= 20%

Question 63 :

The value of is (2sin238° - sec252° + cos64° sin26⁰+sin264⁰)/tan223⁰+cot223⁰-sec267⁰-cosec267⁰):

Difficulty : Moderate

Average Time : 57 Seconds

Options :

1. $\frac{-3}{2}$

2. $\frac{3}{2}$

3. 2

4. -2

Solution :

The correct answer is **option 1** i.e. $\frac{-3}{2}$

Concept

$\sin(90° -) = \cos$

$\tan(90° -) = \cot$

$\cot(90° -) = \tan$

$\sin^2 + \cos^2 = 1$

$\csc^2 - \cot^2 = 1$

$\sec^2 - \tan^2 = 1$

Application

$[2\sin^2(90° - 52°)\sec^2 52° + \cos64° \sin(90° - 64°) + \sin^2 64\}/\{\tan^2(90° - 67°) - \csc^2 67° + \cot^2(90° - 67°) - \sec^2 67°]$

$[2\cos^2 52° \sec^2 52° + \cos64° \cos64° + \sin^2 64\}/\{\cot^2 67° - \csc^2 67° + \tan^2 67° - \sec^2 67°]$

$[2 + (\cos^2 64° + \sin^2 64°)\}/\{ - (\csc^2 67° - \cot^2 67°) - (\sec^2 67° - \tan^2 67°)]$

We know that, $\sin^2 + \cos^2 = 1$, $\csc^2 - \cot^2 = 1$ and $\sec^2 - \tan^2 = 1$

$(2 + 1)/(-1 - 1)$

-3 / 2

Question 64 :

How many kg of rice costing Rs 42 per kg should be mixed with 7½kg rice costing Rs 50 per kg so that by selling the mixture at Rs 53.10 per kg, there is a gain of 18%?

Difficulty : Moderate

Average Time : 99 Seconds

Options :

1. 9

2. 8

3. 10½

4. 12½

Solution :

The correct answer is **option 4** i.e. **12½**

Concept

Alligation Method

Application

By selling the mixture at Rs 53.10, he earns a profit of 18%

Therefore Cost Price = 53.10 / 118 x 100

= Rs. 45.

Using Alligation Method

Price	Price
42	50
	45
k	15/2

$(42 \times K) + (50 \times 15/2) = 45 \times (K + 15/2)$

Upon solving

K = 12.5

Question 65 :

When positive numbers x, y and z are divided by 31, the remainders are 17, 24 and 27, respectively. When (4x - 2y + 3z) is divided by 31, the remainder will be:

Difficulty : Moderate

Average Time : 76 Seconds

Options :

1. 9
2. 16
3. 8
4. 19

Solution :

The correct answer is **option 3** i.e. **8**

Concept

Dividend = Divisor x Quotient + Remainder

Application

Let quotient be 0 in each number, we get x = 17.

Similarly, we get y = 24 and z = 27

As per the question, when (4x - 2y + 3z) is divided by 31

Putting the value of x, y and z

(4 x 17 - 2 x 24 + 3 x 27) / 31

= 101 / 31, it will leave a remainder as 8.

Question 66 :
The areas of three adjacent faces of a cuboidal tank are 3m2, 12m2 and 16 m2. The capacity of the tank, in liters, is:

Difficulty : Moderate

Average Time : 52 Seconds

Options :

1. 36000
2. 72000
3. 24000
4. 48000

Solution :

The correct answer is **option 3** i.e. **24000**

Concept

Volume of cuboid when area of adjacent faces are given = (x × y × z) where x, y and z are the areas of adjacent faces.

Application

Volume of cuboid = (x × y × z)

Putting the values

Volume of cuboid = (3 × 12 × 16) m^3

Upon solving

Volume of cuboid = 24 m^3

Since 1 m3 = 1000 Litres

Volume of cuboid = 24 x 1000

= 24, 000 litres

Question 67 :
Amit sold an article for Rs 369.60 after allowing 12% discount on the market price. Had he not allowed any discount he would have earned a profit of 20%. What is the cost price of the article?

Difficulty : Moderate

Average Time : 63 Seconds

Options :

1. Rs 350

2. Rs 400

3. Rs 380

4. Rs 320

Solution :
The correct answer is **option 1** i.e. **Rs 350**

Concept

Basic Calculation

Application

Selling price of article = Rs. 369.60

It was sold after a discount of 12%. means it was sold at 88%

Therefore, Marked Price = 369.60 / 88 x 100

= Rs. 420

If no discount is allowed, it means Marked Price equals Selling Price.

Now, selling price = Rs 420.

It was sold at 20% profit.

Therefore, Cost Price = 420 / 120 x 100 = Rs. 350

Question 68 :
ABCD is a cyclic quadrilateral. Diagonals BD and AC intersect each other at E. If BEC = 128⁰ and ECD = 25⁰, then what is the measure of BAC?

Difficulty : Moderate   **Average Time : 57 Seconds**

Options :

1. 98⁰

2. 52⁰

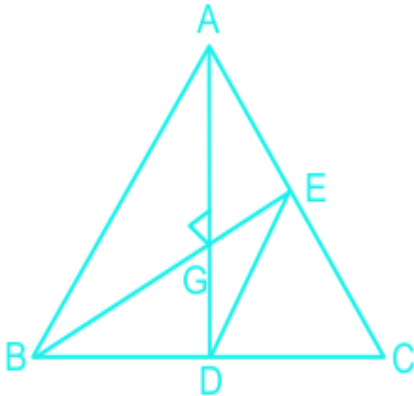3. 93⁰

4. 103⁰

Solution :
The correct answer is **option 4** i.e. **103⁰**

Concept

Angle made by the same arc on the perimeter is same.

Application

ABCD is a cyclic quadrilateral.

ECD = 25º (Given)

Therefore, DBA = 25º (Angle made by same arc on perimeter is same)

BEC + AEB = 180º (Straight line)

128º + AEB = 180º

AEB = 52º

In triangle AEB

DBA + AEB + BAC = 180º

Putting the values

 25º + 52º + BAC = 180º

BAC = 103º

Question 69 :
The lengths of two sides of a parallelogramm are 3 cm and 10 cm. What is the sum of the squares of the diagonals of the parallelogram?

Difficulty : Moderate

Average Time : 72 Seconds

Options :
1. 218 cm^2

109 cm^2

3. 169 cm^2

4. 206 cm^2

Solution :

The correct answer is **option 1** i.e. **218 cm^2**

Concept

Sum of square of diagonals of parallelogram = 2 (a^2 + b^2) where a and b are the sides of the parallelogram.

Application

Sides of Parallelogram = 3cm and 10cm

According to question

Sum of square of diagonals of parallelogram = 2 (a^2 + b^2)

Putting the values, we get

Sum of square of diagonals of parallelogram = 2 (3^2 + 10^2)

= 2 (9 + 100)

218 cm

Question 70 :
If sec = (rac{a}{b}), b 0, then (1 - tan2) / (2 - Sin2) = ?

Difficulty : Moderate

Average Time : 61 Seconds

Options :

1. $b^2(2b^2a^2) / a^2(a^2+b^2)$

2. $a^2 (2b^2 - a^2) / b^2 (a^2 + b^2)$

3. $a^2 (2b^2 + a^2) / b^2 (a^2 + b^2)$

4. $a^2 (2b^2 + a^2) / b^2 (a^2 - b^2)$

Solution :

The correct answer is **option 2** i.e. $a^2 (2b^2 - a^2) / b^2 (a^2 + b^2)$

Concept

Sec = H / B

Application

H/B = a/b

$P = (a^2 - b^2)$, H = a and B = b

$\tan^2 = (a^2 - b^2) / b^2$

$\sin^2 = (a^2 - b^2))/a2$

$(1 - \tan^2)/(2 - \sin^2)$

$[(2b^2 - a^2)/b^2] / [(a^2 + b^2) / a^2]$

$a^2 (2b^2 - a^2) / b^2 (a^2 + b^2)$

Question 71 :

Two positive numbers differ by 1280. When the greater number is divided by the smaller number, the quotient is 7 and the remainder is 50. The greater number is:

Difficulty : Moderate   Average Time : 98 Seconds

Options :

1. 1558

2. 1458

3. 1585

4. 1485

Solution :

The correct answer is **option 4** i.e. **1485**

Concept

Dividend = Quotient ✕ divisor + remainder

Application

Let the greater number = x

The smaller number = y

According to question

Smaller number = b

From question,

x - y = 1280

We know that, Dividend = Quotient × divisor + remainder

x = 7y + 50

Equating x, we get

7y + 50 - y = 1280

6y = 1280 - 50

6y = 1230

y = (1230/6)

y = 205

Put the value of y

x - 205 = 1280

 x = 1485

Greater number = 1485

Question 72 :
If =, then the value of is :

Difficulty : Moderate

Average Time : 61 Seconds

Options :
1. $4/9$
2. $3/5$
3. $1/9$
4. $2/5$

Solution :
The correct answer is **option 3** i.e.**1/9**

$$\frac{cosec\ x + cot\ x}{cosec\ x - cot x} = 7$$

cosec x + cot x = 7 (cosec x – cot x)

cosec x + cot x = 7 cosec x – 7 cot x

8 cot x = 6 cosec x

$$\frac{8\cos x}{sinx} = \frac{6}{sinx}$$

Cos x = (6/8) = (3/4)

Cos² x = 9/16

Sin² x = 1 – 9/16 = 7/16

Now,

$$\frac{4\sin^2 x - 1}{4\sin^2 x + 5} = \frac{4 \times (7/16) - 1}{4 \times (7/16) + 5} = \frac{3/4}{27/4} = \frac{1}{9}$$

Question 73 :

If 9x2 + y2 = 37 and xy = 2, x, y > 0, then the value of (27x3 + y3) is:

Difficulty : Moderate   **Average Time : 37 Seconds**

Options :

1. 301

2. 217

3. 207

4. 259

Solution :

The correct answer is **option 2** i.e. **217**

Concept

Basic Algebric identities

$(x + y)^2 = x^2 + y^2 + 2xy$

$(x + y)^3 = x^3 + y^3 + 3x^2y + 3xy^2$

Application

$(3x + y)^2 = 9x^2 + y^2 + 6xy$

Putting the values of $9x^2 + y^2$ and xy

$(3x + y)^2 = 37 + 6 \times 2$

$(3x + y)^2 = 37 + 12$

$(3x + y)^2 = 49$

$(3x + y) = 7$

$(3x + y)^3 = 27x^3 + y^3 + 27x^2y + 9xy^2$

Putting the value of (3x + y) and xy

$7^3 = 27x^3 + y^3 + 27x^2y + 9xy^2$

$343 = 27x^3 + y^3 + 9xy(3x + y)$

$343 = 27x^3 + y^3 + 9 \times 2 \times 7$

$27x^3 + y^3 = 343 - 126$

$27x^3 + y^3 = 217$

Question 74 :

As observed from the top of a light house, 1203 m above the sea level, the angle of depression of a ship sailing towards it changes from 30⁰ to 60⁰. The distance travelled by the ship during the period of observation is :

Difficulty : Moderate   Average Time : 94 Seconds
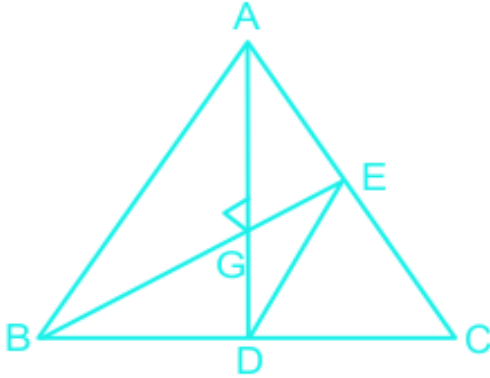
Options :

1. 2403 m

2. 1803 m

3. 180 m

4. 240 m

Solution :

The correct answer is **option 4** i.e. **240 m**

Concept

Basic Trigonmetric rations and trignometric values

Application

In triangle ABD

tan60° = AB/BD

Putting the value of tan60° = 3 , we get

3 = 1203 / BD

BD = 120 m

In ABC,

tan 30° = AB/BC

Putting the value of tan 30° = 1/3

1/3 = 1203/BC

BC = 360

DC = BC - BD

DC = 360 - 120

DC = 240 m

Question 75 :
The value of is:

Difficulty : Moderate

Average Time : 61 Seconds

Options :

1. 7$\frac{1}{2}$

1$\frac{1}{3}$

3. 10

4. 15

Solution :

The correct answer is **option 3** i.e. **10**

Concept :

BODMAS Rule

B - Bracket

0 - of

D - Division

M -Mulitplication

A - Addition

S -Subtraction

Application

[4 /7 of14 / 5 × 5 / 3 (7 / 2 13 / 6)] ÷ (16 / 5 ÷ 9 / 2 of 16 / 3)

[8 / 3 ((21 13)/ 6)] ÷ (16 / 5 × 1 / 24)

[8 / 3 - 8 / 6] ÷ (2 / 15)

Upon solving

(8 / 6) x (15 / 2)

= 10

Question 76 :

The value of (Sec2 (2+tan2 + cot2) ÷ (sin2 – tan2))/(Cosec2 + sec2)(1+cot2)2is:

Difficulty : Moderate   **Average Time : 56 Seconds**

Options :

1. 1

2. -2

2

4. -1

Solution :

The correct answer is **option 4** i.e. **-1**

Concept

Value putting

Put = 45°

Application

$2 \times 4 \div (1 / 21) / (2+2) \times (1+1)^2$

$2 \times 4 \times (2) / 4 \times 2^2$

-16/16

-1

Question 77 :

A solid matallic sphere of radius 15 cm is melted and recast into spherical balls of radius 3 cm each. What is the ratio of the surface area of the original sphere and the sum of the surface areas of all the balls?

Difficulty : Moderate

Average Time : 50 Seconds

Options :

1. 1 : 5

2. 5 : 27

3. 1 : 10

4. 3 : 40

Solution :

The correct answer is **option 1** i.e. **1 : 5**

Concept

When melting a particular shape into new, the volume remains constant.

Volume of sphere = $(4 / 3) r^3$

Surface Area of sphere = $4 r^2$

Application

Volume of original sphere = volume of no. of new sphere

Let the no of new sphere = K

According to the question

$(4 / 3) r^3 = K \times (4 / 3) r^3$

Putting the values

$(4 / 3) 15^3 = x \times (4 / 3) 3^3$

k = 125

No. of Newly formed spheres = 125

According to question

The surface area of the larger sphere $= 4 x \times 15^2 = 900$

Surface area of smaller sphere $= 125 \times 4 \times 3^2 = 4500$

Surface area of the bigger sphere : Surface area of all smaller spheres = 900 : 4500

1 : 5

Question 78 :
The numerator of a fraction is 3 more than the denominator. When 5 is added to the numerator and 2 is subtracted from the denominator, the fraction becomes $\frac{8}{3}$. When the original fraction is divided by $5\frac{1}{2}$, the fraction so obtained is:

Difficulty : Moderate

Average Time : 84 Seconds

Options :

1. $\frac{1}{2}$

2. $\frac{2}{3}$

3. $\frac{3}{4}$

4. $\frac{1}{4}$

Solution :
The correct answer is **option 4** i.e. $\frac{1}{4}$

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Concept

Basic Statement based question.

Application

Let the denominator of the fraction = x

Therefore, the numerator of the fraction = x + 3

Therefore, fraction = (x + 3) / x

According to the question -

(x + 3 + 5) / (x - 2) = 8/3

Upon solving, x = 8

Therefore, original denominator = 8

Original numerator = 11

Original fraction = 11 / 8

Now, when the original fraction is divided by $5\frac{1}{2}$, we get

11 / 8 divided by 11 /2 , we will get 1 /4.

The new fraction is 1 / 4

Question 79 :
The curved surface area of a right cylinder is 3696 cm2. Its height is three times its radius. What is the capacity (in litres) of the cylinder? (Take = 22/7)

Difficulty : Moderate　　　　　　　　　　　**Average Time : 68 Seconds**

Options :

1. 25.872

2. 30.87

3. 29.75

4. 19.008

Solution :
The correct answer is **option 1** i.e. **25.872**

Concept

Basic formula related to cylinder

Curved Surface Area of Cylinder = 2rh

Volume of Cylinder = r^2h

Application

Let radius of cylinder = x

Therefore, the height of cylinder = 3x

C.S.A of cylinder = 2rh

Putting the values

2x(3x) = 3696

upon solving

x = radius = 14 cm

Height = 14 x 3 = 42 cm

Volume of cylinder = r^2h

= 22 / 7 x 14 x 14 x 42 = 25872 cm^3

1000 cm^3 = 1 litre

Therefore, the capacity of cylinder = 25872 / 1000 = 25.872 litres

Short cut
Check the option that is divisible by 11 since it is a factor of pie. 25.872 litres is the only option that is divisible by 11.

Question 80 :
A certain sum is lent at 4% p.a. for 3 years, 8% p.a. for the next 4 years, and 12% p.a. beyond 7 years. If for a period of 11 years, the simple interest obtained is Rs 27,600, then the sum is (in Rs):

Difficulty : Moderate

Average Time : 77 Seconds

Options :
1. 25,000
2. 32,000

27,000

4. 30,000

Solution :

The correct answer is **option 4** i.e. **30,000**

Concept

Total Simple Interest Percentage

For first 3 years = 4 x 3 = 12%

For next 4 years = 8 x 4 = 32%

For remaining period = 12 x 4 = 48%

Total Rate of Interest = (12 + 32 + 48) = 92%

Application

S.I. = (P × R × T)/100

27,600 = (P x 4 x 3) / 100 + (P x 4 x 8) / 100 + (P x 4 x 12) / 100

Upon solving

P = Rs 30,000

Question 81 :
Given that $x^8 - 34x^4 + 1 = 0$, $x > 0$. What is the value of $(x^3 + x^{-3})$?

Difficulty : Moderate

Average Time : 52 Seconds

Options :

1. 102

2. 56

3. 68

4. 66

Solution :

The correct answer is **option 1** i.e. **102**

Concept

Given $= x^8 - 34x^4 + 1 = 0$

Dividing both sides by x^4, we get

$x^4 + 1 / x^4 = 34$

Adding 2 to both sides, we get

$(x^2 + 1 / x^2)^2 = 36$

Upon solving, we get

$x^2 + 1 / x^2 = 6$

Adding 2 to both sides

$(x + 1 /x)^2 = 8$

$= (x + 1/x) = 22$

Cubing Both Sides

$x^3 + 1 / x^3 + 3 (x) (1/x) (x + 1 /x) = 162$

$x^3 + 1 / x^3 + 3(22) = 162$

$x^3 + 1 / x^3 + 6(2) = 162$

$x^3 + 1 / x^3 = 102$

Question 82 :
A takes 2 hours more than B to cover a distance of 40 km. If A doubles his speed, he takes 1½ hours more than B to cover 80 km. To cover a distance of 90 km, how much time will B take travelling at his same speed?

Difficulty : Moderate   **Average Time : 83 Seconds**

Options :
1. $1\frac{3}{8}$
2. $1\frac{1}{8}$
3. $1\frac{1}{6}$
4. $1\frac{1}{3}$

Solution :
The correct answer is **option 2** i.e. $1\frac{1}{8}$

Concept

We will use the concept of inverse relationshion between Speed and Time.

Application

Let the speed of B be x kmph

Time taken by B to cover 40 km = 40/x

Since A takes 2 hours more than "B"

Time taken by A = (40/x) + 2

The speed of A = (20x)/(20 + x)

According to the question

Distance = 80 km

Time taken by B to cover 80 km = 80/x   ----(2)

When A doubles his speed = (40x)/(20 + x)

Total Time taken by A to cover 80 km = (40 + 2x)/(x)   ----(3)

A.T.Q., A takes 3/2 hours more than B

(80/x) + (3/2) = (40 + 2x)/x

Upon solving

2 (40 + 2x - 80) = 3x

2 (2x - 40) = 3x

4x - 80 = 3x

4x - 3x = 80

x = 80

Actual Speed of B = 80 kmph

Distance To Be Covered By B = 90 km

Total Time taken by B = 90/80 = $1\frac{1}{8}$ hours

Question 83 :

A train of length 287 m, running at 80 km/h, crosses another train moving in the opposite direction at 37 km/h in 18 seconds. What is the length of the other train?

Difficulty : Moderate   **Average Time : 96 Seconds**

Options :

1. 300 m
2. 298 m
3. 289 m
4. 285 m

Solution :

The correct answer is **option 2** i.e. **298 m**

Concept

When two trains travel opposite to each other, the total distance covered is equal to the sum of the length of the train.

Relative Speed = Speed of Train one and Train two

To convert km into metres, we need to multiply by 5 / 18

Application

Let the length of other train = x metres

Length of the first train = 287 metres (Given)

Total Distance = Relative Speed x Time

 (287 + x) = (80 + 37) x 5 /18 x 18

(287 + x) = (117) x 5 /18 x 18

Upon solving

x = 298 metres

The length of the other train = 298 metres

Question 84 :
If â–³ABC, D and E are the mid points of sides Bc and AC, respectively .If AD = 10.8cm, BE = 14.4 cm and AD and BE intersect at G at a right angle, then the area (in cm2) of â–³ABC is:

Difficulty : Moderate

Average Time : 69 Seconds

Options :

1. 103.68
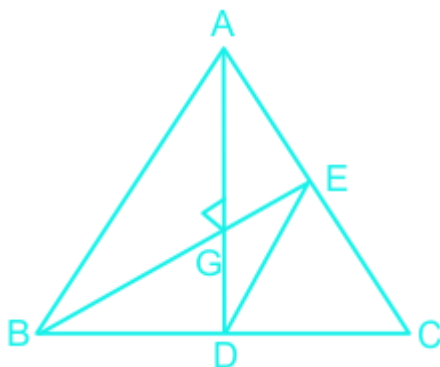2. 53.76
3. 80.64
4. 56.76

Solution :

The correct answer is **option 1** i.e. **103.68**

Concept

Centroid divides median in the ratio of 2: 1

Centroid divides the trinagle in the 6 equal areas:

Application

D and E is the midpoint of BC so AD and BE is median respectively

Centroid always divide the median in 2 ∶ 1

AG = (2/3) × AD

AG = (2/3) × 10.8

AG = 7.2 cm

Similarly, BG = (2/3) × BE

BG = (2/3) × 14.4

BG = 9.6 cm

In AGB,

AGB = 90°

area of AGB = (1/2) × AG × BG

(1/2) × 9.6 × 7.2 = 34.56 cm^2

Centroid divides the trinagle in the 6 equal areas:

So, area of AGB = 2 units

2 units = 34.56 cm^2

6 units = 34.56 x 3 = 103. 68 cm^2

So, area trinagle ABC = 103. 68 cm^2

Question 85 :

Shashi sells two articles for Rs 5,000 each with no loss and no profit in the overall transaction. If one article is sold at 16(rac{2}{3})% loss, then the other is sold at a profit of:

Difficulty : Moderate   Average Time : 87 Seconds

Options :

1. 25%

2. 24%

3. 16$\frac{2}{3}$%

4. 18$\frac{1}{3}$%

Solution :

The correct answer is **option 1** i.e. **25%**

Concept

Fraction value of 16$\frac{2}{3}$% = 1 / 6

Application

C.P of one sold at a loss of 16$\frac{2}{3}$% = Rs. 5000 × 6 /5 = Rs. 6000

Since there is no profit or loss

Thus, C.P of other article = Rs. (10,000 – 6000)

Rs. 4000

S.P of other article = Rs. 5000

Gain = Rs. (5000 – 4000)

Rs. 1000

Gain% = (Gain / CP) x 100

(1000/4000) × 100%

25%

Question 86 :
The sum of the radii of spheres A and B is 14 cm, the radius of A being larger than that of B. The difference between their surface areas is 112. What is the ratio of the volumes of A and B?

Difficulty : Moderate   **Average Time : 66 Seconds**

Options :

1. 125 : 64

2. 64 : 27

3. 27 : 8

4. 8 : 1

Solution :
The correct answer is **option 2** i.e. **64 : 27**

Concept

Use of basic formulae of sphere

Surface of Sphere = 4 x x r^2

Volume of Sphere = 4 / 3 x x r^3

Application

Let the radius of sphere A = x

Let the radius of sphere B = y

According to the question:

$4 \times x^2 - 4 \times y^2 = 112$

$(x - y) \times (x + y) = 28$

Putting the value of (x + y) = 14 (Sum of radii of spheres)

$(x - y) \times (14) = 28$

$(x - y) = 2$

Now

x + y = 14

x - y = 2

Upon solving

x = 8

y = 6

Ratio Volume of sphere = $4 \ x^3 : 4 \ y^3$

$8^3 : 6^3$

512 : 216

64 : 27

Question 87 :
An article is marked 35% above its cost. If a profit of 20% is earned by selling the article, then the discount per cent offered on the market price of the article is:

Difficulty : Moderate

Average Time : 85 Seconds

Options :
1. 12%

2. $10\frac{1}{9}$%

3. $11\frac{1}{9}$%

4. 15%

Solution :

The correct answer is **option 3** i.e. **$11\frac{1}{9}$%**

Concept

M.P / C.P = (100 + Profit %) / (100 - Discount%)

Application

Let CP = 100 units

Therefore M.P = 135 units

According to the question, there is a profit of 20% on selling

M.P / C.P = (100 + Profit %) / (100 - Discount%)

Putting the values, we get

135 / 100 = (100 + 20) / (100 - Discount)

Upon solving,

we get discount = $11\frac{1}{9}$%

Question 88 :
In △PQR, Q = 84⁰, R = 48⁰, PS ⊥ QR at S and the bisector of P meets QR at T. What is the measure of SPT?

Difficulty : Moderate   **Average Time : 61 Seconds**

Options :
1. 12⁰
2. 24⁰
3. 21⁰
4. 18⁰

Solution :
The correct answer is **option 4** i.e. **18⁰**

Concept

In PQR

QPR + Q + R = 180°

QPR + 84° + 48° = 180°

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QPR = 180° - 132°

QPR = 48°

QPT = 48°/2

QPT = 24°

In QPT

QPT + PQT + PTQ = 180°

Putting the value of QPT = 24°

24° + 84° + PTQ = 180°

PTQ = 180° - 108°

PTQ = 72°

According to the question

In PST

PST + PTS + SPT = 180°

Putting the value of PTQ = 72°

90° + 72° + SPT = 180°

SPT = 180° - 162°

SPT = 18°

Alternate Solution
SPT = (Q - R) / 2

Putting the values

SPT = (84 - 48) / 2

= 36 / 2

= 18°

Question 89 :
If 5 /(42)+ (3+22) / (322) (322) /(3+22) = a + b 2, then what is the value of (3a + 4b)?

Difficulty : Moderate   **Average Time : 87 Seconds**

Options :

1. 99½

2. 98

3. 98½

4. 97

Solution :

The correct answer is **option 3** i.e. **98½**

Concept

Rationalization

$a^2 - b^2 = (a + b)(a - b)$

5 / 42 × 2 / 2 = 52 / 8

(3+22) / (322) × (3+22) / (3+22) =17+122

(3 - 22) / (3 + 22) × (3 - 22) / (3 - 22) =17 - 122

According to the question

52 / 8 + 17+122 + 17 - 122 = a + b 2

0 + 1972 / 8 = a + b2

On comparing

a = 0

b = 197 / 8

(3a + 4b) = 3 × 0 + 4 × 197/8 = 197/2 = 98½

Question 90 :

The parimeters of â—³ABC and â—³DEF are 43.2 cm and 28.8 cm, respectively, and â—³ABC ~ â—³DEF. If DE = 12 cm, then the length of AB is:

Difficulty : Moderate   **Average Time : 60 Seconds**

Options :

1. 18.4 cm

20 cm

3. 18 cm

4. 20.4 cm

Solution :

The correct answer is **option 3** i.e. **18 cm**

Concept of similiarity

If two triangles are similar, the ratios of the lengths of their corresponding sides are equal

Given

â–³ABC ~ â–³DEF, we know that the perimeter of similar triangles are in the same ratio:

= â–³ABC / â–³DEF = AB/DE = BC/EF= AC/DF

According to question

â–³ABC / â–³DEF = AB/DE

43.2/28.8 = AB/12

= AB = 18

Question 91 :
sin[(1tan)tan+sec2]/(1sin)tan(1+tan)(sec+tan) is equal to:

Difficulty : Moderate   **Average Time : 60 Seconds**

Options :

1. cosec sec

2. -1

3. 1

4. sin cos

Solution :

The correct answer is **option 3** i.e. **1**

GIVEN:

$\sin[(1\tan)\tan+\sec^2]/(1\sin)\tan(1+\tan)(\sec+\tan)$

We know:

$\sec^2 \tan^2 = 1$, $\sin^2 + \cos^2 = 1$, $\tan = \sin/\cos$, $\sec = 1/\cos$

Concept

$= \sin[(1\tan)\tan + \sec^2]/(1\sin)\tan(1+\tan)(\sec+\tan)$

$= \sin[\tan\tan^2 + 1 + \tan^2]/(1\sin)\tan(1+\tan)(\sec+\tan)$

$= \sin(1+\tan)/(1\sin)\tan(1+\tan)(\sec+\tan)$

$= \sin/(1\sin)\sin/\cos(\sec+\tan)$

$= \cos/(1\sin)(1/\cos+\sin/\cos)$

$= \cos^2/(1\sin)(1+\sin)$

$= \cos^2/(1\sin^2)$

$= \cos^2/\cos^2$

$= 1$

Question 92 :
The base of a right prism is a regular hexagon of side 5 cm. If its height is 123 cm, then its volume (in cm3) is :

Difficulty : Moderate   *Average Time : 87 Seconds*

Options :
1. 1800
2. 900
3. 1350
4. 675

Solution :
The correct answer is **option 3** i.e. **1350**

Concept

Volume of Prism = Area of Base x Height

Since this is a hexagonal base, we need to find the area of base:

Area of Hexagonal Base = $6 \times 6 \times (3/4) \times \text{side}^2$

Application

Side = 5 cm (Given)

Height = 123 (Given)

Area of Base = $(3/4) \times 5^2 \times 6$

$150 \times (3/4)$

Volume = $150 \times (3/4) \times 123$

= $(1800 \times 3)/4$

= 1350 cm^3

Question 93 :
Three man and 4 women can do a piece of work in 7 days, whereas 2 men and 1 women can do it in 14 days. Seven women will complete the same work in:

Difficulty : Moderate   **Average Time : 62 Seconds**

Options :

1. 10 days

2. 8 days

3. 9 days

4. 12 days

Solution :
The correct answer is **option 1** i.e. **10 days**

Concept

Since the work is same, we need to equate work in both cases which is given by :

$M_1 D_1 = M_2 D_2$

Here M_1 and M_2 represent number of men

D_1 and D_2 represent number of days.

Application

(3 men + 4 women) × 7 = (2 men + 1 women) × 14

(3 men + 4 women) = (2 men + 1 women) × 2

3 men + 4 women = 4 men + 2 women

2 women = men

(women ∵ men) = 1 : 2

Efficiency Ratio of (women ∵ men) = 1 ∵ 2

We know that

Total Work = Efficiency × Time

(3 men + 4 women) × 7 = (2 men + 1 women) × 14

(3 × 2 + 4 × 1) × 7 = (2 × 2 + 1 × 1) × 14 = 70

Total Work = 70

number of days taken to complete the work by 7 women = Total work/Efficiency

70 / (7 × 1)

10 days

Question 94 :
The monthly incomes of A and B are in the ratio 3 : 5 and the ratio of their savings is 2 : 3. If the income of B is equal to three times the savings of A, then what is the ratio of the expenditures of A and B?

Difficulty : Moderate   **Average Time : 88 Seconds**

Options :

1. 5 : 8

2. 8 : 15

3. 3 : 7

4. 7 : 11

Solution :
The correct answer is **option 2** i.e. **8 : 15**

Let the monthly income of A & B = 3x and 5x

Let the monthly savings of A & B = 2y and 3y

The income of B is 3 times the savings of A

According to the question

5x = 3 x 2y

5x = 6y

= x/y = 6/5

Putting the values of x and y

Monthly income of A & B = 18 units and 30 units

Monthly savings of A & B = 10 and 15 units

Therefore expenditure ratio = (Income of A - Saving of A)/(Income of B - Saving of B)

= (18-10)/(30-15)

= 8/15

Question 95 :
Study the given graph and answer the question that follows. The total revenue in 2015 and 2017 is what per cent of the total expenditure of the company in 2016, 2018 and 2019 (correct to one decimal place)?

Difficulty : Moderate   **Average Time : 65 Seconds**

Options :
1. 86.5
2. 89.1
3. 88.2
4. 86.3

Solution :
The correct answer is **option 3** i.e. **88.2**

The total revenue in 2015 and 2017 is = 450 crores (210+240)

The total expenditure of the company in 2016, 2018 and 2019 is 510 crores (175 + 165 + 170)

percentage = (450/510) × 100%

= 88.23%

Question 96 :

The radii of two right circular cylinders are in the ratio 3 : 2 and the ratio of their volumes is 27 : 16. What is the ratio of their heights?

Difficulty : Moderate   **Average Time : 41 Seconds**

Options :
1. 8 : 9
2. 3 : 4
3. 4 : 3
4. 9 : 8

Solution :

The correct answer is **option 2** i.e. **3 : 4**

Let the radius of cylinders = 3x and 2x

Let the height of cylinders = h1 and h2

We know that, volume of cylinder = r^2h

Putting the values of r in the formula

$(3x)^2 h_1/(2x)^2 h_2 = 27 : 16$

h1/h2 = 3:4

Question 97 :

When x is added to each of 9, 15, 21 and 31, the numbers so obtained are in proportion. What is the mean proportional between the numbers (3x -2) and (5x + 4)?

Difficulty : Moderate   **Average Time : 50 Seconds**

Options :
1. 42
2. 35
3. 20
4. 30

Solution :

The correct answer is **option 2** i.e. **35**

Concept

When numbers are in proportion, it can be written as a/b = c/d

Application

(9+x)/ (15+x) = (21+x)/(31+x)

Cross Multiplying, we get

x^2 + 40x + 279 = x^2 + 36x + 315

Upon solving

x = 9

We know that Mean Proportion of two numbers x and y = xy

According to question, we need to find the mean proportion of (3x -2) and (5x + 4)

Putting the value of x, we get numbers - 25 and 49

Therefore, Mean Proportion = 25 x 49

= 5 x 7

= 35

Question 98 :
Given that â–³DEF~â–³ABC. IF the area of â–³ABC is 9 cm2 and that of â–³DEF = 12 cm2 and BC = 2.1 cm, then the length of EF is :

Difficulty : Moderate

Average Time : 67 Seconds

Options :

1. \(\frac{8âˆš3}{5}\)cm
2. \(\frac{7âˆš3}{5}\)cm
3. \(\frac{4âˆš7}{5}\)cm
4. \(\frac{3âˆš7}{5}\)cm

Solution :
The correct answer is **option 2** i.e. \(\frac{7âˆš3}{5}\)cm

Concept of Similiarity

When two triangles are similar, the lenght of the corresponding side ratios are in square.

Understanding

(area of ABC/area of DEF) = $(AB/DE)^2$ = $(BC/EF)^2$ = $(AC/DF)^2$

Application

Let EF = x

BC = 2.1 Given

According to question

$(9/12) = (2.1/x)^2$

Upon solving

$x^2 = (7 \times 7 \times 3)/25$

$x = (73)/5$

EF = (73)/5 cm

Question 99 :
The average score in Mathematics of 90 students of section A and B of class IX was 63. The number of students in A were 10 more than those in B. The average score of students in A was 30% more than that of students in B. The average score of students in B is:

Difficulty : Moderate

Average Time : 75 Seconds

Options :
1. 56
2. 60
3. 50
4. 54

Solution :
The correct answer is **option 4** i.e. **54**

Let the students in section B be 'x'

Students in section A = x + 10

Number of the students = 90

$x + x + 10 = 90$

$x = 40$

Students in Section B = 40

Students in section A = 50

Total score of students = 90 x 63 = 5670

Let the average be 'k'.

Average of students in section A = 130% of students in section B

Let the average of students in Section B = 10K

Sum of score of students in Section B = 10K x 40 = 400K

Therefore, the average of students in Section A = 13K

Sum of score of students in Section B = 13K x 50 = 650

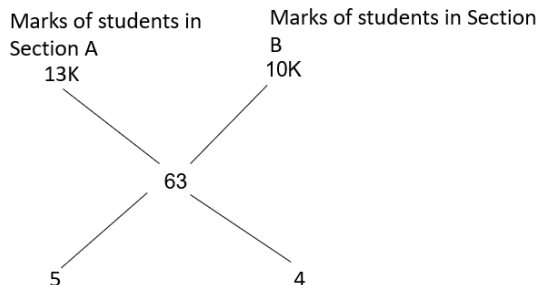**According to question**

650K + 400K = 5670

1050K = 5670

K = 5.4

Average of students in section B = 10K

5.4 × 10

54

Alternate Method
Using Alligation

Marks of students in Section A
13K

Marks of students in Section B
10K

63

5   4

Using Alligation formula

13K × 5 + 10K × 4 = 63 (4 + 5)

Upon solving

K = 5.4

Average of students in Section B = 5.4 x 10 = 54

Question 100 :
The radius and height of a right circular cone are in the ratio 3 : 4. If its curved surface area (in cm2) is 240, then its volume (in cm3) is:

Difficulty : Moderate   **Average Time : 92 Seconds**

Options :
1. 2304
2. 384
3. 1536
4. 768

Solution :
The correct answer is **option 4** i.e. **768**

Given

Ratio of radius and height of the cone = 3 ∶ 4

Curved surface area = 240 cm^2

We know that

CSA of cone **=** r l

where l = (h^2 + r^2)

According to the question

Let radius and height = 3x and 4x

l = [(4x)^2 + (3x)^2]

= 5x

 r l = 240

Putting the values of r and l

× 3x × 5x = 240

Upon Solving

x = 4

Radius = 12 cm

Height = 16 cm

Slant height = 20 cm

We know, volume of cone = 1/3 x r x r x h

Putting the values of r and h

(1/3) × × 12 x 12 × 16

= 768

Ssc Cgl Tier II Previous Year Question Paper Analysis

The analysis of Ssc Cgl Tier II Previous Year Question Paper held on 2020-11-15 in the Morning exam is as follows:
1. 100 questions were moderate.
2. The safe score is 140 marks.
3. 100 questions were asked from Quantitative Aptitude and 100 questions were asked from Quantitative Aptitude
4. 0 questions should have been skipped if you were short of time.

Ssc Cgl Tier II Previous Year Question Paper Topic Wise Weightage

Quantitative Aptitude

1. Simplification - 1
2. Average - 1
3. Percentage - 1
4. Data Interpretation - 5
5. Time Speed And Distance - 2

Ssc Cgl Tier II Previous Year Question Paper Tips and Tricks

1. Try to solve Ssc Cgl Tier II Previous Year Question Paper without taking any help from the solutions.
2. Ssc Cgl Tier II Previous Year Question Paper require proper usage of concept so firstly read the question thoroughly and then use the right concept.
3. In case you're not able to solve the question in less than 30 seconds in the exam then you should skip the question and move to the next question.

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