

DFCCIL 75+ Numerical Ability Questions

1. Walking at 3 km per hour, Pintu reaches his school 5 minutes late. If he walks at 4 km per hour he will be 5 minutes early. The distance of Pintu's school from his house is

- A. $1\frac{1}{2}$ km
- B. 2 km
- C. $2\frac{1}{2}$ km
- D. 5 km

Ans. B

Sol. Distance of the school from the house

$$= \frac{4 \times 3}{(4 - 3) \times 5} \times \frac{5 + 5}{60}$$

$$= 12 \times \frac{1}{6} = 2 \text{ km}$$

2. There is an 80% increase in an amount in 4 years at simple interest. What will be the compound interest on Rs. 5000 after 3 years at the same rate of interest?

- A. Rs. 3660
- B. Rs. 3640.40
- C. Rs. 3640
- D. Rs. 3656.25

Ans. C

Sol.

Let the principal sum be P unit.

Simple interest for 4 years = 80% of P

$$\frac{4P}{5} = \frac{P \times R \times 4}{100}$$

We know that,

$$S.I. = \frac{\text{Principal Sum} \times \text{Int. Rate} \times \text{Time}}{100}$$

$$\frac{4P}{5} = \frac{P \times R \times 4}{100}$$

$$R = 100/5 = 20\% \text{ p.a.}$$

Now, we have to find compound interest on Rs. 5000 after 3 years at 20% rate of interest per annum.

$$A = 5000 \times \left(1 + \frac{20}{100}\right)^3$$

$$A = 5000 \times \frac{6}{5} \times \frac{6}{5} \times \frac{6}{5}$$

$$A = 5000 \times \frac{6}{5} \times \frac{6}{5} \times \frac{6}{5}$$

$$A = \text{Rs. } 8640$$

$$\text{Hence, Compound Interest} = A - P = 8640 - 5000 = \text{Rs. } 3640$$

3. A train is moving at a speed of 108 km/h. If the length of the train is 280 meters, then how long will it take to cross the platform 485 meters long?

- A. 48.5 sec
- B. 25.5 sec
- C. 29.5 sec
- D. 27.5 sec

Ans. B

Sol.

Given, the speed of the train = 108

$$\text{km/h} = 108 \times \frac{5}{18} \text{ m/s} = 30 \text{ m/sec.}$$

Total distance to be covered = Length of the train + Length of the platform = 280 + 485 = 765 m

Therefore, time taken by the train to

$$\text{cross the platform} = \frac{765}{30} = 25.5 \text{ sec.}$$

4. The monthly incomes of A and B are in the ratio 4 : 7 and the ratio of their savings is 4 : 5. If the income of B is equal to four times the savings of A, then what is the ratio of the expenditures of A and B?

- A. 36 : 77
- B. 4 : 9

- C. 2 : 1
D. 35 : 76

Ans. A

Sol.

Let the income of B be $28x$.

Then, the income of A = $(28x) \times \frac{4}{7} = 16x$ and

Now, the savings of A = $\frac{28x}{4} = 7x$

The savings of B = $(7x) \times \frac{5}{4} = \frac{35x}{4}$

So, the ratio of expenditures of A and B = $(16x - 7x) : (28x - (35x/4))$
 $= 9x : 77x/4$
 $= 36 : 77$

5. A person gets ₹27 more by selling an article at a profit of 6.5% than selling it at a loss of 7%. The cost price of the article is.

- A. ₹200
B. ₹300
C. ₹150
D. ₹250

Ans. A

Sol.

Let the cost price of the article be ₹100x.

Then, selling price in case of 6.5% profit = $(100x) + 6.5\% = 106.5x$

And selling price in case of 7% loss = $(100x) - 7\% = 93x$

Difference between both selling prices = ₹27

$$\Rightarrow 106.5x - 93x = 27$$

$$\Rightarrow 13.5x = 27$$

$$\Rightarrow x = \frac{27}{13.5} = 2$$

Therefore, cost price of article = $2 \times 100 = ₹200$

6. On selling a motor for ₹2800, a seller incurs a loss of 25%. What price would have caused him to lose 35%?

- A. ₹2526.67
B. ₹2624.67
C. ₹2246.67
D. ₹2426.67

Ans. D

Sol.

$$C.P. = \frac{2800}{75} \times 100 = ₹ \frac{11200}{3}$$

$$S.P. \text{ for } 35\% \text{ loss} = \frac{11200}{3} - \frac{11200}{3} \times 35\% = \frac{11200}{3} - \frac{3920}{3} = ₹ \frac{7280}{3}$$

Therefore, the selling price is ₹2426.67

7. A person marks his 60 items at 30% of the cost price. He sells 20 items at a discount of 10% and 25 items at a discount of 20% on marked price. What is the maximum discount (rounded off) he can offer on the remaining items if he still gets some profit?

- A. 54%
B. 48%
C. 50%
D. 52%

Ans. D

Sol.

Let the cost price of an item be 100x.

Then, marked price of an item = $100x + (100x) \times 30\%$
 $= 100x + 30x = 130x$

Selling price at 5% discount = $130x - (130x) \times 5\%$
 $= 130x - 6.5x = 123.5x$

Selling price at 20% discount = $130x - (130x) \times 20\%$
 $= 130x - 26x = 104x$

Total profit on selling 20 items at 10% discount = $20 \times (123.5x - 100x)$
 = $20 \times (23.5x) = 470x$
 Total profit on selling 25 items at 20% discount = $25 \times (104x - 100x)$
 = $25 \times (4x) = 100x$
 Cost of remaining items = $15 \times (100x)$
 = $1500x$
 Minimum selling price of these items = $1500x - 470x - 100x$
 = $930x$

Selling price of an item = $\frac{930x}{15} = 62x$
 Thus, Discount (in %) = $\frac{130x - 62x}{130x} \times 100$
 $= \frac{68x}{130x} \times 100 = 52.31\% \approx 52\%$

8. 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 Rs. lakhs):
 A. 7.5
 B. 3
 C. 4.5
 D. 5

Ans. D
 Sol.

Given: $2A = 3B = 5C$
 $A : B : C = 1 : \frac{2}{3} : \frac{2}{5} = 15 : 10 : 6$
 Sum of ratios = $15 + 10 + 6 = 31$
 Thus, Share of B in profit = $15.5 \times \frac{10}{31} = \text{Rs. 5 lakhs}$

9. 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:
 A. 56
 B. 60
 C. 50
 D. 54

Ans. D
 Sol.

Total score of 90 students = $90 \times 63 = 5670$
 Now, $A + B = 90$
 $\Rightarrow (B + 10) + B = 90$
 $\Rightarrow 2B = 90 - 10 = 80$
 $\Rightarrow B = 40$
 And $A = 40 + 10 = 50$
 Let the average score of students of section B be x .
 Then, average score of students of section A = $x + (x) \times 30\% = 1.3x$
 Now, Total Score = 5670
 $\Rightarrow 50 \times (1.3x) + 40 \times (x) = 5670$
 $\Rightarrow 65x + 40x = 5670$
 $\Rightarrow 105x = 5670$
 $\Rightarrow x = 54$
 Therefore, average score of students in section B = 54.

10. Reshma buys two articles A and B for Rs. 1,734. She sells A at a loss of 16% and sells B at a gain of 20%. The selling price of both the articles is the same. If A is sold for Rs. 1,147.50, then the gain per cent on A is:
 A. 12.5
 B. 12
 C. 10.5
 D. 10

Ans. A
 Sol.

Let the cost price of A be x and B be y .
 Then $x + y = \text{Rs. 1734}$
 And $0.84x = 1.2y$

$$\Rightarrow \frac{x}{y} = \frac{10}{7}$$

Therefore, $x = 1734 \times \frac{10}{17} = \text{Rs. } 1020$

Hence, cost price of A is Rs. 1020

Profit (in %) on A (SP = Rs. 1147.50)

$$= \frac{1147.5 - 1020}{1020} \times 100$$

$$= \frac{127.5}{1020} \times 100 = 12.5\%$$

11. The monthly salaries of A and B are the same. A, B and C donate 10%, 8% and 9% respectively, of their monthly salaries to a charitable trust. The difference between the donations of A and B is Rs. 400. The total donation by A and B is Rs. 900 more than that of C. What is the monthly salary of C?

- A. Rs. 25,000
- B. Rs. 30,000
- C. Rs. 27,000
- D. Rs. 36,000

Ans. B

Sol.

Difference between donations of A & B (10% - 8% = 2%) = Rs. 400

Therefore, Monthly salary of A & B each

$$= \frac{400}{2} \times 100 = \text{Rs. } 20000$$

Total donations of A & B = 20000 × 10% + 20000 × 8% = Rs. 3600

And Donation by C = 3600 - 900 = Rs. 2700

Thus, Monthly salary of C =

$$\frac{2700}{9} \times 100 = \text{Rs. } 30000$$

12. Find the fourth proportional to 2, 4 and 8.

- A. 15
- B. 14
- C. 16
- D. 18

Ans. C

Sol.

Let the fourth proportional is x

⇒ 2, 4, 8, x are in proportion.

⇒ 2x = 32

⇒ x = 16.

13. Find the HCF of 865 and 5295.

- A. 25
- B. 2595
- C. 865
- D. 5

Ans. D

Sol.

We are interested in finding HCF of 865 and 5295

$$865 = 5 \times 173$$

$$5295 = 3 \times 5 \times 353$$

Clearly, HCF (865 , 5295) = 5

14. The cash difference between the selling price of an article at a profit of 8% and 12% is Rs. 3. The ratio of two selling prices is:

- A. 27:28
- B. 27:29
- C. 29:31
- D. 27:31

Ans. A

Sol.

Let cost price of an article = 100 unit

Profit = 8%

Selling price of the article = 100 unit + 8 unit = 108 unit

When profit = 12%

Selling price of the article = 100 unit + 12 unit = 112 unit

According to question

$\Rightarrow 4 \text{ unit} = \text{Rs. } 3$

$\Rightarrow 1 \text{ unit} = \text{Rs. } \frac{3}{4}$

Ratio of two selling prices =

$108 \times \frac{3}{4} : 112 \times \frac{3}{4} = 108 : 112 = 27 : 28$

15. A man buys a refrigerator at Rs. 22,000 and pays an additional Rs. 1,000 for transport and Rs. 2,000 for installation. What should be the selling price to get a profit of 15% on the whole transaction?

- A. Rs. 27,250
- B. Rs. 28,500
- C. Rs. 28,750
- D. Rs. 29,250

Ans. C

Sol.

The man buys a refrigerator at Rs. 22,000 and pays an additional Rs. 1,000 for transport and Rs. 2,000 for installation.

Net cost price of refrigerator = Rs 25000

Profit = 15%

Selling price = $(115/100) \times 25000 = \text{Rs } 28,750$

16. Find the value of k in $\frac{26}{21} : \frac{24}{9} :: k : \frac{14}{13}$?

- A. $\frac{1}{3}$
- B. 2
- C. $\frac{1}{2}$
- D. 3

Ans. C

Sol. $\frac{26}{21} : \frac{24}{9} :: k : \frac{14}{13}$

$\Rightarrow \left(\frac{26}{21}\right)\left(\frac{14}{13}\right) = k\left(\frac{24}{9}\right)$

$\Rightarrow \frac{4}{3} = k\left(\frac{24}{9}\right)$

$\Rightarrow k = \frac{4}{3} \times \frac{9}{24} = \frac{1}{2}$

17. An article was sold for Rs. 2500 at a profit of 25%. What was the amount of profit?

- A. Rs. 1000
- B. Rs. 500
- C. Rs. 250
- D. Rs. 2000

Ans. B

Sol.

125% of CP = Rs 2500

25% of CP = Rs 500

18. What is $\frac{7}{8}$ th of 60% of 80?

- A. 42
- B. 48
- C. 28
- D. 56

Ans. A

Sol.

$\frac{7}{8}$ th of 60% of 80 = $\frac{7}{8} \times \frac{60}{100} \times 80 = 42$

Hence, option A is the correct answer.

19. 12 men or 24 boys can do work in 20 days. In how many days, will 24 men and 12 boys together complete the same work?

- A. 10
- B. 12
- C. 15
- D. 8

Ans. D

Sol.

Let the efficiency of a man = 2 units/day

Then, efficiency of a boy = 1 unit/day

Total work = $2 \times 12 \times 20 = 480$ units

Efficiency of 24 men and 12 boys = $24 \times 2 + 12 = 60$ units/day

Number of days required to complete the work = $480/60 = 8$ days

20. Find 'X' if the below three numbers are in proportion.

2.6, 1.3, X

A. 1.95

B. 1.83

C. 3.9

D. 0.65

Ans. D

Sol.

Given 2.6, 1.3, X are in proportion.

$$\Rightarrow (2.6)(X) = (1.3)^2$$

$$\Rightarrow X = \frac{(1.3)^2}{2.6} = \frac{1.3}{2} = 0.65$$

21. Which of the following is an odd composite number?

A. 13

B. 17

C. 12

D. 15

Ans. D

Sol.

A composite number is a number which has more than 2 factors.

Factors of 15 = 1, 3, 5, 15

And 15 is also an odd number.

Hence, 15 is the required number.

22. In a general survey of 832 people, it was found that 624 owned a car. If a person is selected randomly, what is the probability that the person will not be an owner of a car?

A. 1.33

B. 0.25

C. 0.75

D. 0.40

Ans. B

Sol.

Total people = 832

Number of people who owned a car = 624

Number of people who do not own a car = $832 - 624 = 208$

$$\text{Required Probability} = \frac{208}{832} = 0.25$$

23. Find the smallest 4 digit number which is a perfect square.

(A) 1000

(B) 1024

(C) 1081

(D) 1064

A. (B)

B. (C)

C. (D)

D. (A)

Ans. A

Sol.

The smallest four digit number is 1000 and it's not a perfect square. But smallest four digit number which is perfect square will be near to 1000.

$$30^2 = 900$$

$$31^2 = 961$$

$$32^2 = 1024$$

Therefore smallest four digit number that is perfect square will be 1024.

24. A table is sold at a profit of 10%. If its cost price is reduced by 5% then it will fetch 7 Rs. more and profit will be 20%. Find the cost price of table.

- (A) Rs 175
- (B) Rs 200
- (C) Rs 250
- (D) Rs 150

- A. (D)
- B. (B)
- C. (A)
- D. (C)

Ans. C

Sol.

Let cost price $(CP)_1 = 100$ units
 AT 10% profit, selling price $(SP)_1 = 110$ units

Cost price is reduced by 5%, So new cost price $(CP)_2 = 95$

At 20% profit, new selling price $(SP)_2 = 95 \times 120/100 = 114$ units

According to question, $114 \text{ units} - 110 \text{ units} = \text{RS. } 4$

$4 \text{ units} = \text{Rs. } 7$

$1 \text{ unit} = \text{Rs. } 7/4$

So, $100 \text{ units} = 100 \times 7/4 = 175 \text{ Rs.}$

25. A and B complete a work together in 40 days, their efficiency is in the ratio of 8:5. A alone can complete the work in how many days.

- (A) 65 days
- (B) 40 days
- (C) 72 days
- (D) 104 days

- A. (D)
- B. (B)
- C. (C)
- D. (A)

Ans. D

Sol.

Let the efficiency of A and B be $8x$ and $5x$ respectively.

Total work = Efficiency of A and B together \times Time taken = $40 \times 13x = 520x$

Time taken by A to complete the whole work = $520x/8x = 65$ days.

26. Find the median of the following set of numbers :

2, 3, 4, 3, 0, 5, 1, 1, 3, 2

- (A) 0 (B) 3
- (C) 2.5 (D) 2.4

- A. (D)
- B. (C)
- C. (A)
- D. (B)

Ans. B

Sol.

Given numbers 2, 3, 4, 3, 0, 5, 1, 1, 3, 2

Ordering the numbers from least to greatest 0, 1, 1, 2, 2, 3, 3, 3, 4, 5

Total number of data is even, so we will take middle two terms that is 2 and 3

So median = $(2+3)/2 = 2.5$

27. The value of $(-1)^{-3} +$

$$3 \times \left[\left(\frac{1}{2} \right) \left(\frac{1}{4} \right) - 2 \left(\frac{1}{4} \right) \left(\frac{1}{5} \right) \right] \times 6 - 1(-2)$$

+ $(-1)(0)$ is:

- (A) $\frac{119}{20}$ (B) $\frac{109}{20}$

- (C) $\frac{69}{20}$ (D) $\frac{29}{20}$

- A. (A)
- B. (B)
- C. (C)
- D. (D)

Ans. B

Sol.

Given, $(-1) \quad (-3) \quad +$
 $3 \times \left[\left(\frac{1}{2} \right) \left(\frac{1}{4} \right) - 2 \left(\frac{1}{4} \right) \left(\frac{1}{5} \right) \right] \times 6$
 $-1(-2)$
 $+ (-1)(0)$

$$= 3 + 18[1/8 - 1/10] + 2 + 0$$

$$= 5 + 18[1/40]$$

$$= 5 + 9/20$$

$$= 109/20$$

28. How many numbers are of 10th place in the counting of 1 to 99?

- (A) 96 (B) 90
 (C) 99 (D) 100

- A. (D)
 B. (A)
 C. (C)
 D. (B)

Ans. D

Sol.

To have 10th place a number should contain two digits .

The required numbers are from 10 to 99.

So, total number of 10th place digits = 90

29. Find the range, mode and median of

13,14,13,12,15,21,16,18,19

(A) 9,13,15 (B) 6,13,15

(C) 8,13,15 (D) 5,13,15

- A. (D)
 B. (C)

- C. (B)
 D. (A)

Ans. D

Sol.

Arranging the following dataset in the ascending order

12, 13, 13, 14 ,15 ,16 , 18, 19, 21

Range of data = maximum value - minimum value = 21 - 12 = 9

Mode of the data = Most frequently occurring data = 13

Median of the data = middle value of the dataset = 15

30. A shopkeeper sold two chairs for 462 each . On one he gains 12% and incurs of loss of 20% on another. Which is the right option-

- (A) He gains 110
 (B) He gains 13.50
 (C) Neither gain nor loss
 (D) He losses 66

- A. (B)
 B. (D)
 C. (C)
 D. (A)

Ans. B

Sol. Total C.P = 462/ 1.12 + 462/ 0.8
 = 412.5 + 577.5 = 990

Toal S.P = 924

Loss = 990 - 924 = 66

31. A gains 20% by selling a cycle for 3480. Find the cost price.

- (A) 2784 (B) 2900
 (C) 2874 (D) 3122

- A. (D)
 B. (C)

- C. (B)
D. (A)

Ans. C

Sol. 120% of A = 3480
A = 2900

32.If the sum of digits is 9 and the difference between the digit in the ten's place and unit's place is 1. Then the two digit number is?

- (A) 45
(B) 63
(C) 54
(D) 72
A. (D)
B. (C)
C. (A)
D. (B)

Ans. B

Sol.

Let the number be xy.

$$x + y = 9$$

$$x - y = 1$$

therefore x= 5, y=4

Number = 54

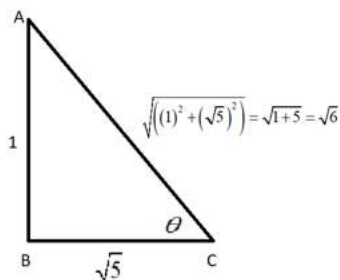
33.If $\tan \theta = 1/\sqrt{5}$; then find the value of $\operatorname{cosec}^2\theta$:

- A. 5
B. $\sqrt{5}$
C. $\sqrt{3}$
D. 6

Ans. D

Sol.

$$\tan \theta = 1/\sqrt{5}$$



$$\Rightarrow \operatorname{cosec}\theta = AC/AB = \sqrt{6}$$

$$\Rightarrow \operatorname{cosec}^2\theta = 6$$

34.On a certain rate of simple interest 800 Rs. becomes 956 in 3 years. If in this duration it becomes 1052. Then find the percent increment in rate.-

- (A) 7%
(B) 4%
(C) 5%
(D) 9.5%
A. (C)
B. (A)
C. (D)
D. (B)

Ans. D

Sol.

Principal = Rs.800

Amount = Rs. 962

Simple interest = 956 - 800 = Rs. 156

Time = 3 yrs

$$SI = PRT/100$$

$$156 = (800 \times R \times 3) / 100$$

$$156 / 24 = R$$

$$R = 6.5\%$$

When amount = Rs.1052

$$SI = 1052 - 800 = Rs.252$$

$$R = (SI \times 100) / P \times T$$

$$R = (252 \times 100) / 800 \times 3$$

$$R = 252 / 24$$

$$R = 10.5\%$$

Therefore, percent increment in rate =
10.5 - 6.5 = 4%

35. Ratio of spirit and water in 20 litre and 36 litre mixture are 3 : 7 and P : Q. If two mixtures are mixed in each other then the ratio of spirit and water in resultant mixture is 27 : 29. Then find P : Q:

- (A) 3 : 2
- (B) 5 : 7
- (C) 7 : 5
- (D) 4 : 5
- A. (D)
- B. (A)
- C. (B)
- D. (C)

Ans. D

Sol.

Spirit : Water

3 : 7 --- (in 20L mixture)

$(3 \times 20) / 10 : (7 \times 20) / 10$

6 : 14

P : Q --- (36L mixture)

After mixing both the mixtures, the ratio becomes

27 : 29 --- (56L mixture)

$6 + P = 27$

$P = 27 - 6$

$P = 21$

$14 + Q = 29$

$Q = 29 - 14$

$Q = 15$

$P : Q = 21 : 15 = 7 : 5$

Option D is correct.

36. Two numbers are in the ratio 2 : 5 and their HCF is 18. Their LCM is:

- (A) 180
 - (B) 36
 - (C) 90
 - (D) 188
 - A. (D)
 - B. (A)
 - C. (C)
 - D. (B)
- Ans. B

Sol.

Let the numbers be $2x$ and $5x$

HCF of $2x$ and $5x = x = 18$

LCM = $10x = 180$

37. Solve $(50 + 0.5 \times 20) / 0.7$

- (A) 8.571
- (B) 857.1
- (C) 85.71
- (D) 72.85
- A. (A)
- B. (D)
- C. (C)
- D. (B)

Ans. C

Sol.

$(50 + 10) / 0.7$

$= 60 / 0.7 = 85.71$

38. Simplify $\left(\frac{2}{7} + \frac{3}{5}\right) \div \left(\frac{2}{5} + \frac{2}{7}\right)$.

- (A) $\frac{31}{21}$
- (B) $\frac{24}{21}$
- (C) $\frac{26}{21}$
- (D) $\frac{12}{17}$
- A. (A)
- B. (C)
- C. (D)
- D. (B)

Ans. A

Sol.

$\left(\frac{2}{7} + \frac{3}{5}\right) \div \left(\frac{2}{5} + \frac{2}{7}\right)$

$= (10 + 21) / 35 \div (14 + 10) / 35$

=31/35 ÷ 24 /35
= 31/24

39.If $\frac{x}{5} + \frac{y}{7} = 1$ and $x=2$ then $y = ?$

- (A) $\frac{3}{5}$ (B) $\frac{7}{5}$

- (C) $\frac{5}{3}$ (D) $\frac{21}{5}$

- A. (A)
- B. (D)
- C. (C)
- D. (B)

Ans. B

Sol.

$x/5 + y/7 = 1$ and $x = 2$

putting $x = 2$ in the other equation

$y = 21/5$

40. $128 - 43 + 57 - 143 + 94 = ?$

- (A) 142 (B) 285
- (C) 236 (D) 93
- A. (C)
- B. (D)
- C. (A)
- D. (B)

Ans. B

Sol.

To solve these type of questions we should follow the rule of BODMAS.

$279-43-143=93$

41.What should be subtracted from 107.03 to get 96.4?

- (A) 1.63
- (B) 10.63
- (C) 10.53
- (D) 9.63

- A. (A)
- B. (C)
- C. (D)
- D. (B)

Ans. D

Sol.

Let No be= x

ATQ,

$107.03 - x = 96.4$

$x = 107.03 - 96.4$

$= 10.63$

42.Find the factors of ($x^2 - x = 132$):

- (A) $(x - 11)(x - 12)$
- (B) $(x + 12)(x - 11)$
- (C) $(x + 11)(x + 12)$
- (D) $(x - 12)(x + 11)$

- A. (B)
- B. (C)
- C. (D)
- D. (A)

Ans. C

Sol. Given that, $x^2 - x = 132$

$\Rightarrow x^2 - x - 132 = 0$

$\Rightarrow x^2 - 12x + 11x - 132 = 0$

$\Rightarrow x(x - 12) + 11(x - 12) = 0$

$\Rightarrow (x - 12)(x + 11) = 0$

43. $1.123 + 11.23 + 112.3 = ?$

- (A) 123.453
- (B) 132.343
- (C) 124.653
- (D) 134.643

- A. (B)
- B. (C)
- C. (D)
- D. (A)

Ans. B

Sol.

$$.1.123 + 11.23 + 112.3 = 124.653$$

44. If $5x^2 + 4y^2 - 8xy - 2x + 1 = 0$, then find the value of $(x + y)^2$

- (A) 3
- (B) 4
- (C) 5
- (D) 6
- A. (B)
- B. (D)
- C. (C)
- D. (A)

Ans. A

Sol.

To make the given equation correct, suppose

$$x = 1 \text{ \& } y = 1$$

Now,

$$5 \times 1^2 + 4 \times 1^2 - 8 \times 1 \times 1 - 2 \times 1 + 1 = 0$$

$$5 + 4 - 8 - 2 + 1 = 0$$

$$10 - 10 = 0$$

$$0 = 0$$

Hence, the supposed value of x and y is correct.

$$\text{So, } (x + y)^2 = (1 + 1)^2 = 2^2 = 4$$

The correct response is option A.

45. Which is the correct ascending order of the given numbers?

(A) $\frac{2}{3}, \frac{5}{6}, \frac{3}{4}$

(B) $\frac{3}{4}, \frac{2}{3}, \frac{5}{6}$

(C) $\frac{2}{3}, \frac{3}{4}, \frac{5}{6}$

(D) $\frac{5}{6}, \frac{3}{4}, \frac{2}{3}$

- A. (B)
- B. (C)
- C. (D)
- D. (A)

Ans. B

Sol.

$$\frac{2}{3} = 0.66$$

$$\frac{5}{6} = 0.833$$

$$\frac{3}{4} = 0.75$$

Ascending order

$$\frac{2}{3}, \frac{3}{4}, \frac{5}{6}$$

46. A field is in the form of a rectangle of length 18 m and width 15 m. A pit, 7.5 m long, 6 m broad and 0.8 m deep, is dug in a corner of the field and the earth taken out is evenly spread over the remaining area of the field. The level of the field raised is

- A. 12 cm
- B. 14 cm
- C. 16 cm
- D. 18 cm

Ans. C

Sol. Volume of earth taken out of pit = $7.5 \times 6 \times 0.8$

$$= 36 \text{ m}^3$$

$$= 36 \times 100 \times 100 \times 100 \text{ cm}^3$$

$$\text{Remaining area of the field} = 18 \times 15 - 7.5 \times 6$$

$$= 270 - 45$$

$$= 225 \text{ m}^2$$

$$= 225 \times 100 \times 100 \text{ cm}^2$$

Suppose the level of the field raised by h cm.

$$\text{Then, } 225 \times 100 \times 100 \times h = 36 \times 100 \times 100 \times 100$$

$$h = \frac{36 \times 100}{225} = 16$$

$$h = 16 \text{ cm}$$

47. Which is the least number which when doubled will be exactly divisible by 12, 18, 21 and 30 ?

- A. 2520
- B. 1260
- C. 630
- D. 196

Ans. C

Sol. LCM of (12, 18, 21, 30) = 1260

The required number = $1260/2 = 630$

48. A tradesman marks his goods at such a price that after allowing a discount of 15%, he makes a profit of 20%. What is the marked price of an article whose cost price is ₹ 170?

- A. ₹ 220
- B. ₹ 200
- C. ₹ 240
- D. ₹ 260

Ans. C

$$\frac{MP}{CP} = \frac{100 + P\%}{100 - L\%}$$

$$\frac{MP}{CP} = \frac{120}{85}$$

Sol.

Value of 85 is 170 means two times,
So, value of 120 is **240 Ans.**

49. If $9\sqrt{x} = \sqrt{12} + \sqrt{147}$ then $x = ?$

- A. 2
- B. 3
- C. 4
- D. 5

Ans. B

Sol. Given that, $9\sqrt{x} = \sqrt{12} + \sqrt{147}$
 $= 9\sqrt{x} = 2\sqrt{3} + 7\sqrt{3}$
 $= \sqrt{x} = \sqrt{3}$
 $\Rightarrow x = 3$

50. If 50% of $(x - y) = 30\%$ of $(x + y)$, then what per cent of x is y ?

- A. 25

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

- C. 40
- D. 400

Ans. A

Sol. 50% of $(x - y) = 30\%$ of $(x + y)$,

$$5(x - y) = 3(x + y)$$

$$2x = 8y$$

$$x = 4y$$

$$y = x/4$$

Therefore $y = (x/4) \times 100\%$

$\rightarrow y = 25\%$ of x

51. Walking at sixth seventh of his usual speed, a man is 12 minutes late. The usual time taken by him to cover that distance is

- A. 1 hour
- B. 1 hour 12 minutes
- C. 1 hour 15 minutes
- D. 1 hour 20 minutes

Ans. B

Sol. New speed = $6/7$ of usual speed
 Speed and time are inversely proportional.

Hence new time = $7/6$ of usual time

Hence, $7/6$ of usual time - usual time = 12 minutes

$\Rightarrow 1/6$ of usual time = 12 minutes

\Rightarrow usual time = $12 \times 6 = 72$ minutes
 = 1 hour 12 minutes

52. Find the range of the data 6, 7, 8, 9, 5, 6, 7, 4, 8, 9, 5, 9

- (A) 2 (B) 3
- (C) 4 (D) 5

A. (C)

B. (D)

C. (B)

D. (A)

Ans. B

Sol.

Largest number in the dataset = 9

Smallest number in the dataset= 4
Range = 9-4 = 5

53.If $xy = 6$ and $x^2y + xy^2 + x + y = 63$; then find the value of $x^2 + y^2$

- A. 69
- B. 57
- C. 46
- D. 81

Ans. A

Sol.

$$x^2y + xy^2 + x + y = 63$$

$$xy(x + y) + (x + y) = 63$$

$$(x + y)(xy + 1) = 63$$

$$x + y = 9$$

Squaring both the sides,

$$x^2 + y^2 + 2xy = 81$$

$$x^2 + y^2 = 81 - 12 = 69$$

54.Mr. Sharma deposited Rs. 24500 at the rate of 10% per annum at simple interest. After every second year, he adds his interest earnings to the principal. The total interest at the end of the 4th year is

- A. Rs. 6864
- B. Rs. 10800
- C. Rs. 10780
- D. Rs. 10500

Ans. C

Sol. Principal = Rs. 24500

Rate = 10%

Simple interest for 2 years =

$$\frac{24500 \times 10 \times 2}{100} = \text{Rs. } 4900$$

After 2nd year, Principal = Rs

$$(24500 + 4900) = \text{Rs. } 29400$$

Rate = 10 %

Simple interest for 2 years =

$$\frac{29400 \times 10 \times 2}{100} = \text{Rs. } 5880$$

Required amount = Rs. 4900 + Rs. 5880 = Rs. 10780

55.If Rahim decreases his speed by 25% then he will take 2 more hours to reach his destination. How much time will Rahim take reach his destination with his usual speed?

- A. 8 hours
- B. 4 hours
- C. 5 hours
- D. 6 hours

Ans. D

Sol.

Rahim's decreased speed = $(100 -$

$$25)\% = \frac{3}{4}$$

The ratio of his usual speed with his

$$\text{decreased speed} = 1 : \frac{3}{4} = 4 : 3$$

Since distance is constant in both cases.

So, the ratio of time = 3 : 4

Here, $(4 - 3) = 1$ Ratio \rightarrow 2 hour

Therefore,

His usual time = 3 ratio = $3 \times 2 = 6$ hours

56.A and B started a business with an investment of Rs. 2400 and Rs. 4500, respectively. After 4 month C joined with Rs. 3600 . If the difference between B's share and A's share in the annual profit was Rs. 630 . What was the total annual profit.

- A. 2600
- B. 2654
- C. 2700
- D. 2790

Ans. D

Sol.

Ratio of profits of A, B and C

$$2400 \times 12 : 4500 \times 12 : 3600 \times (12-4)$$

$$24 \times 12 : 45 \times 12 : 36 \times 8$$

$$72 : 135 : 72$$

Let total annual profit be Rs. X and profit of A, B and C be 72x, 135x and 72x.

Now, A.T.Q,

$$\frac{135x}{279} - \frac{72x}{279} = 630$$

$$\frac{63x}{279} = 630$$

$$X = 279 \times 10$$

$$X = 2790$$

Hence the total annual profit is Rs. 2790.

57. Machines P and Q operate independently at their respective constant rates. Machine P can produce a lot in 7 hours and Q in x hours. If P and Q work alternatively, while each working for 1 hour at a time, they produce the same lot in 10 hours. What is the value of x?

- A. 14 hours
- B. 17.5 hours
- C. 10.5 hours
- D. 21 hours

Ans. B

Sol.

Let the total work be 7x,

Then the efficiency of P and Q are x and 7 respectively.

Now, as per the question they take 10 hours to produce the lot, so

$$x + 7 + x + 7 + x + 7 + x + 7 + x + 7 = 7x$$

$$\Rightarrow 5x + 35 = 7x$$

$$\Rightarrow x = 17.5 \text{ hours}$$

58. The following table shows the annual profit of a company (in Rs. lakh).

2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
625	690	725	775	815

The period which has the maximum percentage increase in profit over the previous year is:

- A. 2016-2017
- B. 2017-2018
- C. 2018-2019
- D. 2015-2016

Ans. D

Sol.

Percentage increase in profit (2015-2016) = $[(690 - 625)/625] \times 100 = 10.4\%$

Percentage increase in profit (2016-2017) = $[(725 - 690)/690] \times 100 = 5.07\%$

Percentage increase in profit (2017-2018) = $[(775 - 725)/725] \times 100 = 6.89\%$

Percentage increase in profit (2018-2019) = $[(815 - 775)/775] \times 100 = 5.16\%$

∴ Maximum percentage increase in profit over the previous year is 2015-2016

59. A circular wire folded in the form of a circle of radius 8 cm is cut in such a way that it gets adjusted on circumference of bangle of radius 90 cm. What is the value of angle (in degree) made by wire at the centre of Bangle?

- A. 22°
- B. 23°30'
- C. 32°
- D. 32°30'

Ans. C

Sol.

Let the angle made by wire at the centre = θ

A.T.Q.

Perimeter of sector of Bangle =
Perimeter of wire

$$\frac{\theta}{360} \times 2\pi r = 2\pi R$$

$$\frac{\theta}{360} \times 2 \times \frac{22}{7} \times 90 = 2 \times \frac{22}{7} \times 8$$

$$\theta = 32^\circ$$

60. The given bar graph shows the imports and exports (in crores) of steel by a country from 2013 to 2017.



What is the ratio of the total imports in 2015 and 2017 to the total exports in 2013 and 2016?

- A. 9 : 8
- B. 9 : 11
- C. 25 : 21
- D. 11 : 4

Ans. C

Sol.

$$\begin{aligned} \text{Required ratio} &= \frac{550 + 450}{400 + 440} \\ &= \frac{1000}{1000} \\ &= \frac{840}{25} \\ &= \frac{21}{1} \end{aligned}$$

61. Simplify 68% of 595 - 43% of 372.

- A. 244.64
- B. 232.84

- C. 278.44
- D. None of these

Ans. A

Sol.

$$\begin{aligned} &595 * \frac{68}{100} - 372 * \frac{43}{100} \\ &= 404.6 - 159.96 \\ &= 244.64 \end{aligned}$$

62. A person sells an article at 11% below its cost price. If he had sold it for ₹30 more, he would have gained 14%. At what price should he sell the article to gain 25%?

- A. ₹125
- B. ₹120
- C. ₹141
- D. ₹150

Ans. D

Sol. Given, 25% of Cost price = Rs 30
At, 25% profit, Selling price = 125% of CP

Hence, 125% of CP = 30 × 5 = Rs 150

63. If $a^2 + b^2 + c^2 = 6(a - 2b + 3c - 21)$, then the value of $(2a - 3b + 4c)$ is:

- A. 56
- B. 48
- C. 60
- D. 72

Ans. C

Sol.

$$\begin{aligned} \text{Given; } a^2 + b^2 + c^2 &= 6(a - 2b + 3c - 21) \\ \Rightarrow a^2 - 6a + 9 + b^2 + 12b + 36 + c^2 - 18c + 81 &= -126 + 126 \\ \Rightarrow (a-3)^2 + (b+6)^2 + (c-9)^2 &= 0 \end{aligned}$$

Since all three terms are squares and their sum is zero, all three terms are also equal to zero. This gives us,

$$\Rightarrow a = 3, b = -6, c = 9$$

$$\Rightarrow 2a - 3b + 4c = 2 \times 3 - 3 \times (-6) + 4 \times 9$$

$$= 6 + 18 + 36 = 60$$

64. If $\tan\theta = \frac{1}{\sqrt{3}}$ then find the value of $\tan 60^\circ + \frac{1}{\tan 60^\circ}$.

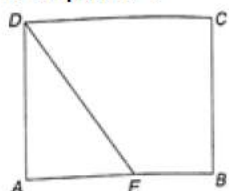
- A. $4\sqrt{3}$
- B. $\frac{4\sqrt{3}}{3}$
- C. 2
- D. 23

Ans. B
Sol.

If $\tan\theta = \frac{1}{\sqrt{3}}$ then $\theta = 30^\circ$

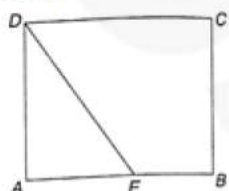
So $\tan 60^\circ + \frac{1}{\tan 60^\circ} = \sqrt{3} + \frac{1}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

65. ABCD is a square, E is a point on AB such that BE = 17 cm. The area of triangle ADE is 84 cm^2 , What is the area of square ?



- A. 400 cm^2
- B. 625 cm^2
- C. 729 cm^2
- D. 576 cm^2

Ans. D
Sol.



Let side of square be a

Since BE = 17 cm
 AE = a - 17 cm
 Area of triangle ADE = $\frac{1}{2} \times a \times (a - 17) = 84 \text{ cm}^2$
 $a^2 - 17a - 168 = 0$
 $a^2 - 24a + 7a - 168 = 0$
 $(a + 7)(a - 24) = 0$
 Since a can't be negative
 So a = 24 cm
 Now, area of Square = $a^2 = 24^2 = 576 \text{ cm}^2$

66. If 4 is added to the numerator of a fraction, it becomes $\frac{1}{3}$ and if 3 is added to the denominator of the same fraction, it becomes $\frac{1}{6}$. The sum of the numerator and denominator is:

- A. 23
- B. 32
- C. 27
- D. 72

Ans. B
Sol.

Let $\frac{x}{y}$ is the fraction. Then,
 $(x + 4)/y = 1/3 \Rightarrow y = 3x + 12$
 $x/(y + 3) = 1/6 \Rightarrow y = 6x - 3$
 $\Rightarrow 3x + 12 = 6x - 3$
 $\Rightarrow 3x = 15$
 $\Rightarrow x = 5$
 $\Rightarrow y = 6x - 3 = 27$
 $\Rightarrow x + y = 5 + 27 = 32$

67. The value of $\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ$ is:

- A. 1
- B. 2
- C. 9
- D. 0

Ans. D
Sol.

$$\left(\frac{1}{2} \times \frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{4}\right) = 0$$

68. Taps A & B can together fill a bucket in 5 hours, B & C can fill it in 3 hours and C & A can fill it in 6 hours. How long would it take to fill the bucket if all the taps are opened together?

- A. 7/10 hours
- B. 10/7 hours
- C. 7/20 hours
- D. 20/7 hours

Ans. D

Sol. Let the time taken by A, B, and C to individually fill the tank be a, b and c hours.

$$\text{So, } (1/a) + (1/b) = 1/5$$

$$(1/b) + (1/c) = 1/3$$

$$(1/c) + (1/a) = 1/6$$

Adding the above three equations,
 $2[(1/a) + (1/b) + (1/c)] = (1/5 + 1/3 + 1/6) = 21/30$ or $7/10$

$$(1/a) + (1/b) + (1/c) = 7/20$$

So in one hour, all the three taps can fill $(7/20)$ of the tank. Tank gets fully filled in $(20/7)$ hours.

69. Find the value of X.
 $\sqrt{5776} + \sqrt{1936} = 4.8 \times X$
- A. 45
 - B. 25
 - C. 40
 - D. 30
 - E. None of these

Ans. B

Sol. \Rightarrow Here $\sqrt{5776} + \sqrt{1936} = 4.8 \times X$
 $\Rightarrow 76 + 44 = 4.8 \times X$

$\Rightarrow 120 = 4.8x$
 $\Rightarrow X = \frac{120}{4.8}$
 $\Rightarrow X = 25$
 \therefore Answer is 25

70. The smallest number which when added to 938274 as to obtain a perfect square, is

- A. 687
- B. 563
- C. 654
- D. 645

Ans. A

	969
9	938274
+9	-81
186	1282
+6	-1116
1929	- 16674
	17361

Sol. 687
 So, 687 must be added to make it perfect square.

71. If $\operatorname{cosec}\theta + \cot\theta = 9$ then find the value of $\cos\theta$.
- A. 40/41
 - B. 9/40
 - C. 41/9
 - D. 0

Ans. A
 Sol. We know that

$\operatorname{cosec}^2\theta - \cot^2\theta = 1$ (Here, $\operatorname{csc}\theta = \operatorname{cosec}\theta$)

$$\therefore (\operatorname{csc}\theta + \cot\theta)(\operatorname{csc}\theta - \cot\theta) = 1$$

\Rightarrow

$$9 \times (\operatorname{csc}\theta - \cot\theta) = 1 \Rightarrow (\operatorname{csc}\theta - \cot\theta) = \frac{1}{9}$$

Now given $\operatorname{csc}\theta + \cot\theta = 9$(1)

$$(\operatorname{csc}\theta - \cot\theta) = \frac{1}{9} \dots\dots\dots(2)$$

Adding equation (1) and (2), we get

$$2\operatorname{csc}\theta = 9 + \frac{1}{9} = \frac{82}{9} \Rightarrow \operatorname{csc}\theta = \frac{41}{9}$$

$$\sin\theta = \frac{1}{\operatorname{csc}\theta} = \frac{1}{\frac{41}{9}} = \frac{9}{41}$$

Required

$$\cos\theta = \sqrt{1 - \sin^2\theta} = \sqrt{1 - \left(\frac{9}{41}\right)^2} = \sqrt{1 - \frac{81}{1681}} = \sqrt{\frac{1681 - 81}{1681}} = \frac{40}{41}$$

72. Each person of a school party contributed thrice as many rupees as the total number of person and total amount collection was 6075 Rs. The total number of person in the party was

- A. 40
- B. 55
- C. 45
- D. 35

Ans. C

Sol. Let total number of person = n

Total amount collection = $n \times (3 \times n)$

$$\therefore n \times (3 \times n) = 3n^2 = 6075$$

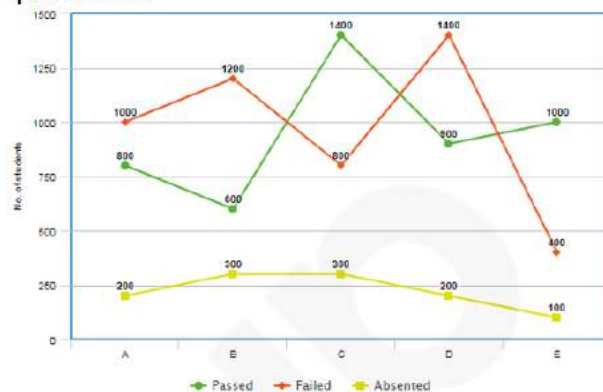
$$n^2 = 2025$$

$$n = 45$$

73.

Direction: In the line graph data is given about the number of passed,

failed, and absent students. Study the data carefully and answer the related questions.



- What is passing percentage of students form all schools together ?
- A. 43.4%
 - B. 42.5%
 - C. 47.3%
 - D. 44.3%

Ans. D

Sol. Required % =

$$\frac{800 + 600 + 1400 + 900 + 1000}{2000 + 2100 + 2500 + 2500 + 1500} \times 100$$

$$= \frac{4700}{10600} \times 100 = \frac{2350}{53} = 44.3\%$$

74. What is difference between average number of passed and failed students in all schools together ?

- A. 20
- B. 50
- C. 100
- D. 200

Ans. A

Sol. Required difference =

$$\frac{1000 + 1200 + 800 + 1400 + 400}{5}$$

$$- \frac{800 + 600 + 1400 + 900 + 1000}{5}$$

$$= \frac{100}{5} = 20$$

75. Number of failed students is what percent of appeared students in A ?

- A. 41.5%
- B. 42.5%
- C. 45.5%
- D. 55.5%

Ans. D

Sol. Required % =

$$\frac{1000}{1800} \times 100 = \frac{500}{9} = 55.5\%$$

76. What is difference between number of appeared students in A and B ?

- A. 50
- B. 100
- C. 200
- D. 0

Ans. D

Sol. Required difference =

$$(1000 + 800) - (1200 + 600) = 0$$

77. What is respective ratio of total number students C and E ?

- A. 3 : 5
- B. 5 : 3
- C. 20 : 21
- D. 2 : 3

Ans. B

Sol. Required ratio =

$$(1400 + 800 + 300) : (1000 + 400 + 100) \\ = 2500 : 1500 = 5 : 3$$

78. The sum of the squares to two natural consecutive odd numbers is 394. The sum of the numbers is

- A. 24
- B. 32
- C. 40
- D. 28

Ans. D

Sol. Let the consecutive odd numbers be x and $(x + 2)$. Therefore,

$$x^2 + (x + 2)^2 = 394$$

$$x^2 + x^2 + 4x + 4 = 394$$

$$2x^2 + 4x - 390 = 0$$

$$x^2 + 2x - 195 = 0$$

$$(x + 15)(x - 13) = 0$$

$$\therefore x = -15, 13$$

Thus, required sum = $13 + 15 = 28$



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