QUANTITATIVE APTITUDE

IBPS PO PRELIMS 23th SEPTEMBER 2023

Missing number series

Directions (1-5): What value should come in the place of (?) in the following number series?

1) 100, ?, 228, 299, 372, 451

a) 161

b) 170

c) 184

d) 190

e) 145

Answer: A

100 + 61 = **161**

161 + 67 = 228

228 + 71 = 299

299 + 73 = 372

372 + 79 = 451

2) 40, 66, 116, 198, 320, ?

a) 474

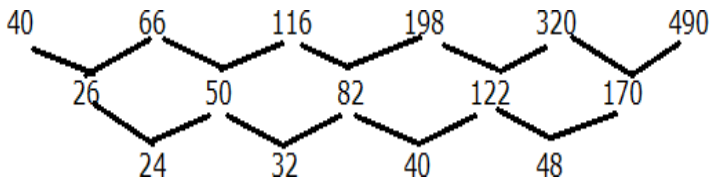b) 420

c) 460

d) 490

e) 400

Answer: D

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40        66        116        198        320        490
   26        50        82        122        170
      24        32        40        48
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3) 500, 50, 10, 3, 1.2, ?

a) 1.2

b) 1.4

c) 0.6

d) 1

e) 0.8

Answer: C

500 * 10/100 = 50

50 * 20/100 = 10

10 * 30/100 = 3

3 * 40/100 = 1.2

1.2 * 50/100 = **0.6**

4) 20, 32, 47, 57, ?, 82

a) 54

b) 74
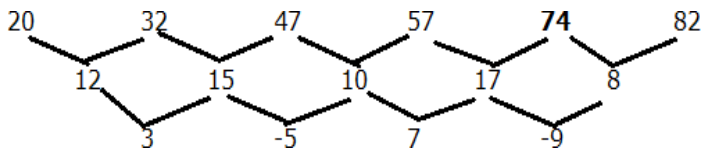
c) 70

d) 64

e) 60

Answer: B

5) 80, ?, 117 168, 271, 478

a) 96

b) 88

c) 74

d) 100

e) 92

Answer: E
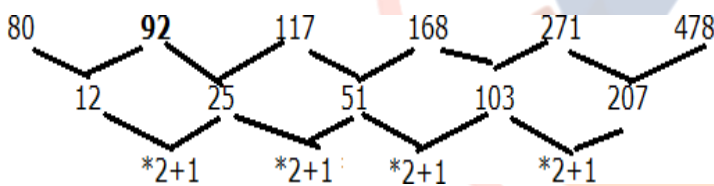
Quadratic equations

Directions (6-10): The following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give the answer as,

6)

I) $3x^2 - 16x + 20 = 0$

II) $y^2 + 3y - 10 = 0$

a) x > y

b) x ≥ y

c) x = y or relationship can't be determined.

d) x < y

e) $x \le y$

Answer: B

$3x^2 - 16x + 20 = 0$

$3x^2 - 10x - 6x + 20 = 0$

$x(3x - 10) - 2(3x - 10) = 0$

$x = 2, 10/3$

$y^2 + 3y - 10 = 0$

$y^2 + 5y - 2y - 10 = 0$

$y(y + 5) - 2(y + 5) = 0$

$y = 2, -5$

$x \ge y$

7)

I) $x^2 - 19x + 84 = 0$

II) $y^2 - 21y + 110 = 0$

a) $x > y$

b) $x \ge y$

c) $x = y$ or relationship can't be determined.

d) $x < y$

e) $x \le y$

Answer: C

$x^2 - 19x + 84 = 0$

$x^2 - 12x - 7x + 84 = 0$

$x(x - 12) - 7(x - 12) = 0$

$x = 7, 12$

$y^2 - 21y + 110 = 0$

$y^2 - 11y - 10y + 110 = 0$

$y(y - 11) - 10(y - 11) = 0$

$y = 11, 10$

Relationship can't be determined

8)

I) $5x^2 - 19x + 18 = 0$

II) $y^2 - 8y + 12 = 0$

a) $x > y$

b) $x \geq y$

c) $x = y$ or relationship can't be determined.

d) $x < y$

e) $x \leq y$

Answer: E

$5x^2 - 19x + 18 = 0$

$5x^2 - 10x - 9x + 18 = 0$

$5x(x - 2) - 9(x - 2) = 0$

$x = 9/5, 2$

$y^2 - 8y + 12 = 0$

$y^2 - 2y - 6y + 12 = 0$

$y(y - 2) - 6(y - 2) = 0$

$y = 6, 2$

$x \leq y$

9)

I) $x^2 - 31x + 228 = 0$

II) $y^2 - 15y + 56 = 0$

a) $x > y$

b) $x \geq y$

c) x = y or relationship can't be determined.

d) x < y

e) x ≤ y

Answer: A

$x^2 - 31x + 228 = 0$

$x^2 - 12x - 19x + 228 = 0$

$x(x - 12) - 19(x - 12) = 0$

x = 12, 19

$y^2 - 15y + 56 = 0$

$y^2 - 8y - 7y + 56 = 0$

$y(y - 8) - 7(y - 8) = 0$

y = 8, 7

x > y

10)

I) $x^2 + 12x + 32 = 0$

II) $y^2 + 5x + 6 = 0$

a) x > y

b) x ≥ y

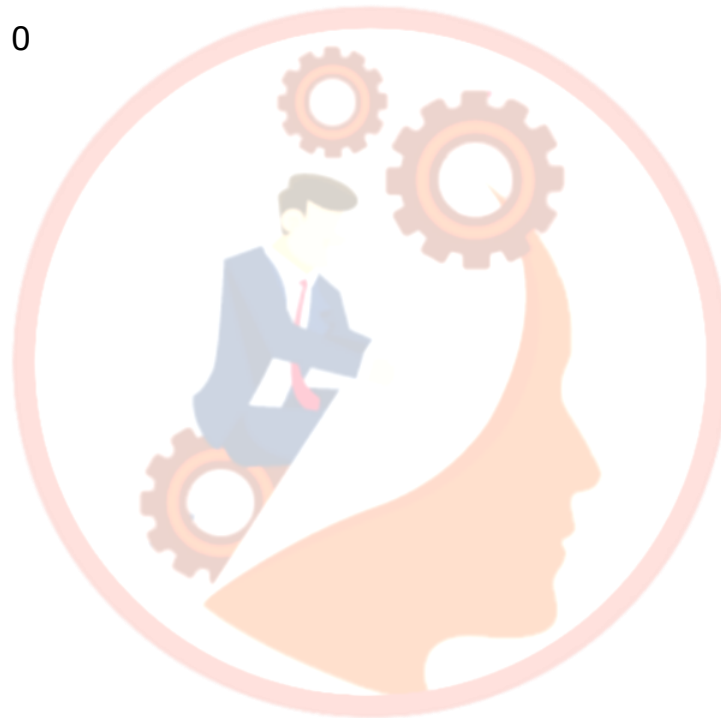c) x = y or relationship can't be determined.

d) x < y

e) x ≤ y

Answer:

$x^2 + 12x + 32 = 0$

$x^2 + 8x + 4x + 32 = 0$

$x(x + 8) + 4(x + 8) = 0$

x = -8, -4

$y^2 + 5x + 6 = 0$

$y^2 + 3x + 2x + 6 = 0$

$y(y + 3) + 2(y + 3) = 0$

$y = -2, -3$

Directions (11-15): Study the following information carefully and answer the questions given below.

The given table chart shows the number of males working (public + private) in four different cities namely A, B, C and D and also given the number of females working in these four cities.

City	Number of males working		Number of females working
	Public sector	Private sector	
A	4x - y	y	15x – 4y
B	21	3y	124
C	4y	26	6y
D	x	30	10x

Notes:-

The sum of the number of males working in private sector in City A and C is 56 and the total number of males working in City A is 80.

11) If the number of females working in private sector in City A is z and the number of females working in public sector in City A is 5x more than the number of males working in public sector in City D, then find the value of z.

a) 40

b) 54

c) 60

d) 75

e) None of these

Common Explanation:

Number of males working in private sector in City A = y = 56 – 26 = 30

Number of males working in public sector in City A = 80 – 30 = 50

4x − y = 50

4x − 30 = 50

4x = 80

x = 20

Number of males working in private sector in City B = 3 * 30 = 90

Number of males working in public sector in City C = 4 * 30 = 120

Number of males working in public sector in City D = 20

Total number of females working in City A = 15 * 20 − 4 * 30 = 300 − 120 = 180

Total number of females working in City C = 6 * 30 = 180

Total number of females working in City D = 10 * 20 = 200

City	Number of males working		Number of females working
	Public sector	Private sector	
A	50	30	180
B	21	90	124
C	120	26	180
D	20	30	200

Answer: C

Number of females working in public sector in City A = 20 + 5 * 20 = 120

Number of females working in private sector in City A = 180 − 120 = 60

z = 60

12) If the total number of males working in City E is 5x% more than that of City D and the ratio of the number of males working in public to private sector in City E is 7:3, then find the number of males working in private sector in City E.

a) 20

b) 30

c) 45

d) 28

e) None of these

Answer: B

Total number of males working in City E = 50 + 50 * 5 * 20/100 = 50 + 50 = 100

Number of males working in private sector in City E = 100 * 3/10 = 30

13) 40% and 50% of the women in City A and B respectively are working in public sector. Find the difference between the number of females working in private sector in City A and B respectively.

a) 30

b) 24

c) 38

d) 46

e) None of these

Answer: D

Number of females working in private sector in City A = 180 * 60/100 = 108

Number of females working in private sector in City B = 124 * 50/100 = 62

Required difference = 108 – 62 = 46

14) If the total number of females working in public sector in City C and D together is 240 and the ratio of the number of females working in private sector in City C to D is 4:3, then find the number of females working in Public sector in City D is what percentage of the number of females working in public sector in City C?

a) 140%

b) 150%

c) 120%

d) 130%

e) None of these

Answer: A

Number of females working in private sector in City C and D together = (180 + 200) – 240 = 380 – 240 = 140

Number of females working in private sector in City C = 140 * 4/7 = 80

Number of females working in private sector in City D = 140 − 80 = 60

Number of females working in public sector in City C = 180 − 80 = 100

Number of females working in public sector in City D = 200 − 60 = 140

Required percentage = 140/100 * 100 = 140%

15) Find the ratio of the total number of males working in City A to the number of females working in City D.

a) 4:3

b) 3:2

c) 2:5

d) 3:2

e) None of these

Answer: C

Required ratio = (50 + 30) : 200 = 80:200 = 2:5

16) The height and the radius of the right circular cylinder is in the ratio of 2;1 and the total surface area of the right circular cylinder is 924 m^2. Find the volume of the right circular cylinder.

a) 2189 m^3

b) 2266 m^3

c) 3168 m^3

d) 2156 m^3

e) None of these

Answer: D

Height of the right circular cylinder = 2x m

Radius of the right circular cylinder = x m

Total surface area of the right circular cylinder = 2∠r * (h + r)

2 * 22/7 * x * (2x + x) = 924

44/7 * 3x^2 = 924

x^2 = 49

x = 7 m

Volume of the right circular cylinder = 22/7 * 7 * 7 * 14 = 2156 m^3

Average

17) The average temperature on Monday, Tuesday and Wednesday is 130° and the temperature on Monday is 50° less than that of Wednesday and the temperature on Tuesday is 50° less than that of Monday. Find the ratio of the temperature on Tuesday to Wednesday.

a) 4:9

b) 5:4

c) 4:3

d) 3:2

e) None of these

Answer: A

Total temperature on Monday, Tuesday and Wednesday together = 130 * 3 = 390°

Let the temperature on Wednesday be x°

Temperature on Monday = $x^\circ - 50^\circ$

Temperature on Tuesday = $x^\circ - 50^\circ - 50^\circ = x^\circ - 100^\circ$

$x^\circ - 50^\circ + x^\circ - 100^\circ + x^\circ = 390$

$3x^\circ = 540^\circ$

$x^\circ = 180^\circ$

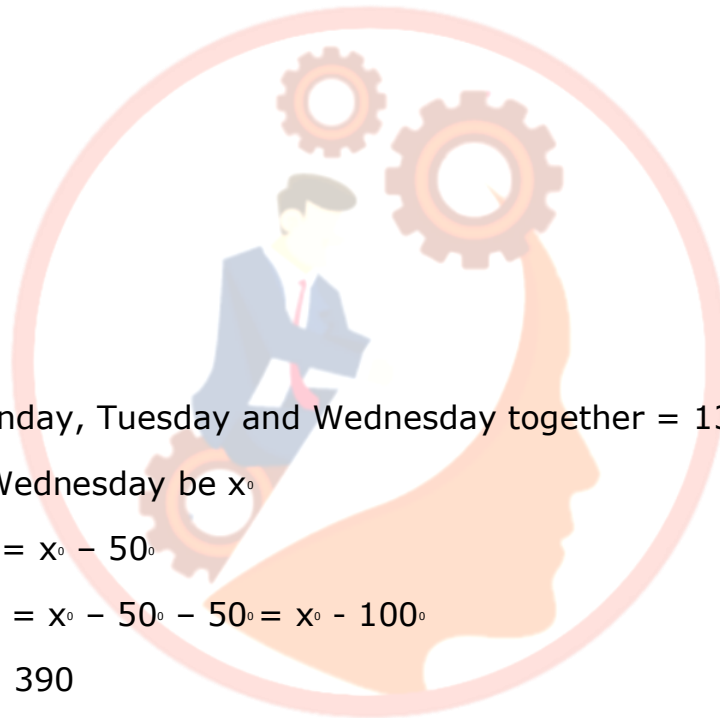Temperature on Tuesday = $180^\circ - 100^\circ = 80^\circ$

Required ratio = 80:180 = 4:9

Topic: DI

Sub topic: Pie chart

Sub type: Based on double pie

**Directions (18-22): Study the following information carefully and answer the questions. (Level: Easy to Moderate)**

The given pie chart shows the percentage distribution of the total number of students in five different schools i.e. A, B, C, D and E.

Note: The total number of students in all five schools together is 2500 and the total number of boys in all five schools together is 1200.
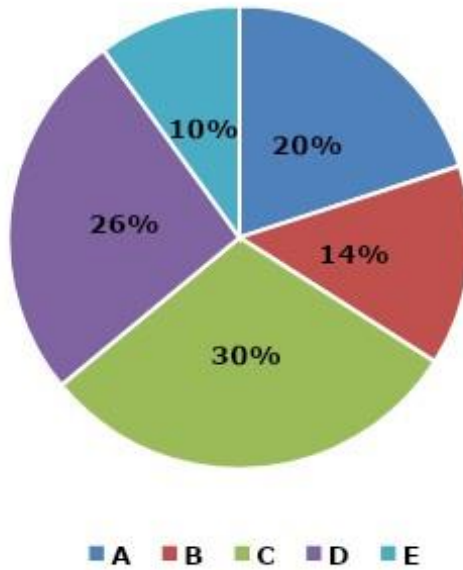
The given pie chart shows the percentage distribution of the number of boys in five different schools i.e. A, B, C, D and E.

13
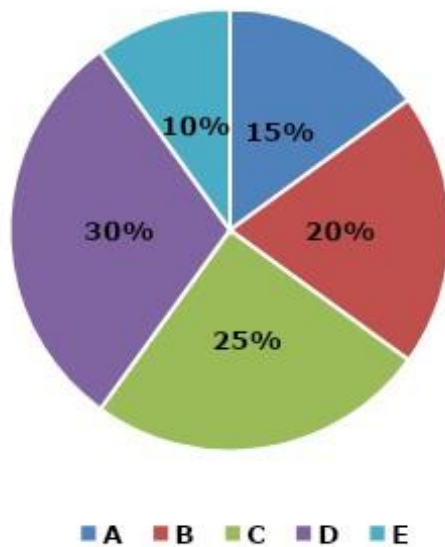
18) If the total number of students in school F is B% more than that of school A and the ratio of the number of girls in school B to school F is 11:21 and the number of boys in school E is 1/3rd of the number of boys in school F, then find the value of B.

a) 14

b) 20

c) 10

d) 30

e) 15

Common Explanation:

School A:

Total number of students = 2500 * 20/100 = 500

Number of boys = 1200 * 15/100 = 180

Number of girls = 500 − 180 = 320

School B:

Total number of students = 2500 * 14/100 = 350

Number of boys = 1200 * 20/100 = 240

Number of girls = 350 − 240 = 110

School C:

Total number of students = 2500 * 30/100 = 750

Number of boys = 1200 * 25/100 = 300

Number of girls = 750 − 300 = 450

School D:

Total number of students = 2500 * 26/100 = 650

Number of boys = 1200 * 30/100 = 360

Number of girls = 650 − 360 = 290

School E:

Total number of students = 2500 * 10/100 = 250
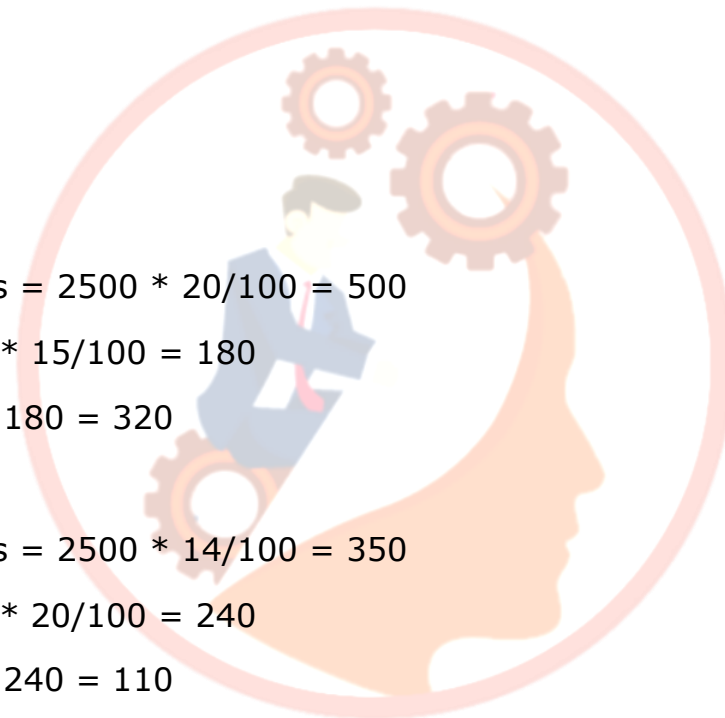
Number of boys = 1200 * 10/100 = 120

Number of girls = 250 – 120 = 130

Schools	Total number of students	Number of boys	Number of girls
A	500	180	320
B	350	240	110
C	750	300	450
D	650	360	290
E	250	120	130

Answer: A

Number of girls in school F = 110 * 21/11 = 210

Number of boys in school F = 120 * 3 = 360

Total number of students in school F = 210 + 360 = 570

B% = (570 – 500)/500 * 100 = 70/500 * 100 = 14%

B = 14

19) The total number of boys in schools B and D together is what percentage of the total number of students in school C?

a) 45%

b) 80%

c) 30%

d) 55%

e) 25%

Answer: B

Total number of boys in schools B and D together = 240 + 360 = 600

Required percentage = 600/750 * 100 = 80%

20) Find the ratio of the number of girls in school C to the total number of boys in schools A and E together.

a) 9:5

b) 4:3

c) 7:6

d) 3:2

e) 3:1

Answer: D

Total number of boys in schools A and E together = 120 + 180 = 300

Required ratio = 450:300 = 3:2

21) If the total number of girls in schools D, E and X together is 670 and the ratio of the total number of students in school D to school X is 13:16, then find the number of boys in school X.

a) 440

b) 380

c) 610

d) 400

e) 550

Answer: E

Total number of students in school X = 650 * 16/13 = 800

Number of girls in school X = 670 – 290 – 130 = 250

Number of boys in school X = 800 – 250 = 550

22) If the sum of the corresponding degree distribution of the number of boys in school A and the total number of students in school C is equal to (x+10.4), then find the value of (x+8.4).

a) 115

b) 140

c) 160

d) 105

e) 120

Answer: C

Degree distribution of the number of boys in school A = 180/1200 * 360 = 54°

Degree distribution of the total number of students in school C = 750/2500 * 360 = 108°

x + 10.4 = 108 + 54

x = 151.6

Required answer = 151.6 + 8.4 = 160

Topic: Application sums

Time and work

23) 12 men can complete a piece of work in x days, working 7 hours a day. 21 women complete the same work in (x+24) days, working 5 hours a day. How many days will 24 women take to complete the work, working (x/4) hours a day if the efficiency of a man is double that of a woman?

a) 35 days

b) 40 days

c) 28 days

d) 50 days

e) None of these

Answer: C

12m * x * 7 = 21w * (x + 24) * 5

24w * x = 3w * (x + 24) * 5

8x = 5x + 120

x = 120/3 = 40

Required time = (21 * 5 * (40 + 24))/(24 * 10)

= 28 days

Ratio and proportion

24) The expenditure of A is four times the savings of B and the savings of A is 3/20th of the expenditure of B. If the ratio of the income of A to B is 19:24 and the difference between the income of A and B is 2500, then find the savings of A.

a) Rs.1740

b) Rs.2400

c) Rs.900

d) Rs.1500

e) None of these

Answer: D

24a – 19a = 2500

a = 2500/5 = 500

The income of A = 19 * 500 = Rs.9500

The income of B = 24 * 500 = Rs.12000

Let the savings of B = x

And the expenditure of A = 4x

And the expenditure of B = 20y

And the savings of A = 20y * 3/20 = 3y

4x + 3y = 9500 ---(1)

x + 20y = 12000 ---(2)

From equations (1) and (2),

4x + 80y = 48000
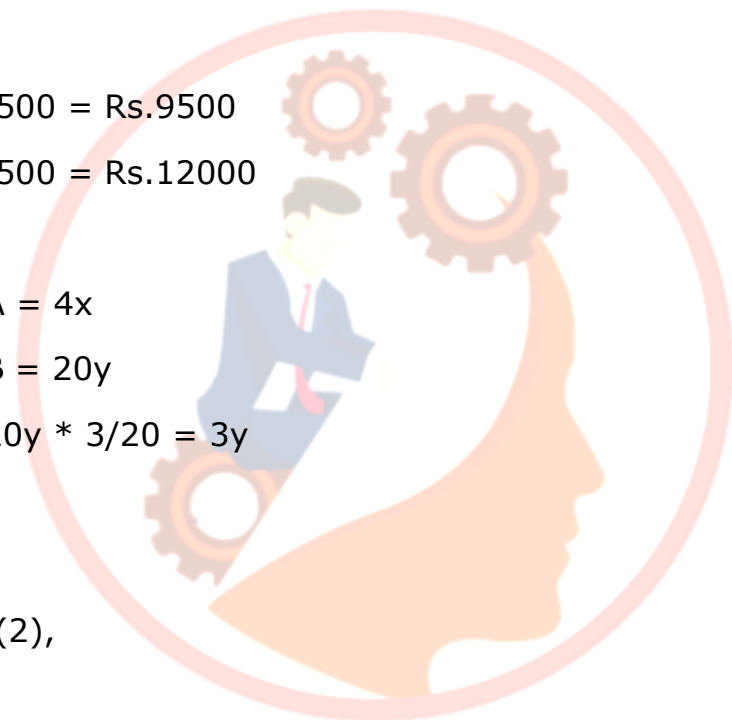
y = 38500/77 = 500

The savings of A = 3 * 500 = Rs.1500

Partnership

25) Ram and Sam entered into a business with an investment in the ratio of 15:8. After one year, Sam added Rs.2000 and after one more year, Ram withdrew Rs.2500. At the end of three years, the profit Ram is 25% more than the profit share of Sam. Find the initial investment of Ram.

a) Rs.7500

b) Rs.4500

c) Rs.9000

d) Rs.6000

e) None of these

Answer: A

[15x * 2 + (15x – 2500) * 1]/[(8x * 1 + (8x + 2000) * 2] = 125/100

[30x + 15x – 2500] * 4 = 5 * [8x + 16x + 4000]

180x – 120x = 20000 + 10000

x = 30000/60 = 500

The initial investment of Ram = 15 * 500 = Rs.7500

Boats and stream

26) The downstream speed of boat A is equal to the upstream speed of boat B. Boat A covers M km upstream in t hours and boat B covers the same distance downstream in (t-4) hours. If the speed of (in still water) boat A and boat B is 14 km/hr and 22 km/hr respectively, then find the value of M.

a) 72

b) 65

c) 80

d) 94

e) 105

Answer: B

Let the speed of the stream be x km/hr.

14 + x = 22 – x

x = 8/2 = 4

The upstream speed of boat A = 14 – 4 = 10 km/hr

The downstream speed of boat B = 22 + 4 = 26 km/hr

10 * t = 26 * (t – 4)

10t = 26t – 104

t = 104/16 = 6.5

M = 10 * 6.5 = 65

Profit and Loss

27) Suriya bought an iron box for Rs.1500 and also spent some amount on its transportation. He sold the iron box to Nalini at a profit of 20% and Nalini sold it to Indhu at a loss of 10%. Find the amount spent on transportation if Indhu bought the iron box for Rs.1890.

a) Rs.200

b) Rs.300

c) Rs.250

d) Rs.150

e) None of these

Answer: C

Let the amount spends on transportation = x

(1500 + x) * 120/100 * 90/100 = 1890

1500 + x = 1890 * 100/120 * 100/90

x = 1750 − 1500 = 250

Ages

28) Ratio of the age of Kavin after 4 years to the age of Bala after 6 years is 4:3 and the age of Kavin after x years is equal to the age of Ria after (x/2) years. If Bala is 17 years younger than Ria and the age of Kavin 5 years ago is 19 years, then find the value of x.

a) 16

b) 10

c) 12

d) 18

e) None of these

Answer: A

Present age of Bala = (19 + 5 + 4) * 3/4 − 6 = 28 * 3/4 − 6 = 15 years

Present age of Ria = 15 + 17 = 32 years

19 + 5 + x = 32 + x/2

x = 8 * 2 = 16

Trains

29) Train A crosses a platform of 4/5ᵗʰ of its length in 27 seconds and it also crosses 80 m bridge in 19 seconds. Find the time taken by train A to cross a man travelling in train B in opposite direction if the speed of train B is 36 km/hr.

a) 22 seconds

b) 10 seconds

c) 17 seconds

d) 20 seconds

e) None of these

Answer: B

Let the speed of train A be x m/sec.

And the length of train A and the length of the platform are (5y) m and (4y) m respectively.

5y + 4y = x * 27

y = x * 27/9 = 3x ---(1)

5y + 80 = x * 19 ---(2)

From equations (1) and (2),

5 * (3x) + 80 = 19x

x = 80/4 = 20

y = 3 * 20 = 60

The length of train A = 5 * 60 = 300 m

The speed of train B = 36 * 5/18 = 10 m/sec

Required time = 300/(20 + 10) = 300/30 = 10 seconds

Pipes and cisterns

30) Pipes P can fill 87.5% of the tank in 14 minutes, pipe Q can fill one-third of the tank in 4 minutes and pipe R can fill half of the tank in 24 minutes. If pipes P and Q opened together and after x minutes, pipe Q closed and pipe R opened, then pipes P and R together fill the remaining tank in 5 minutes. Find the value of x.

a) 3
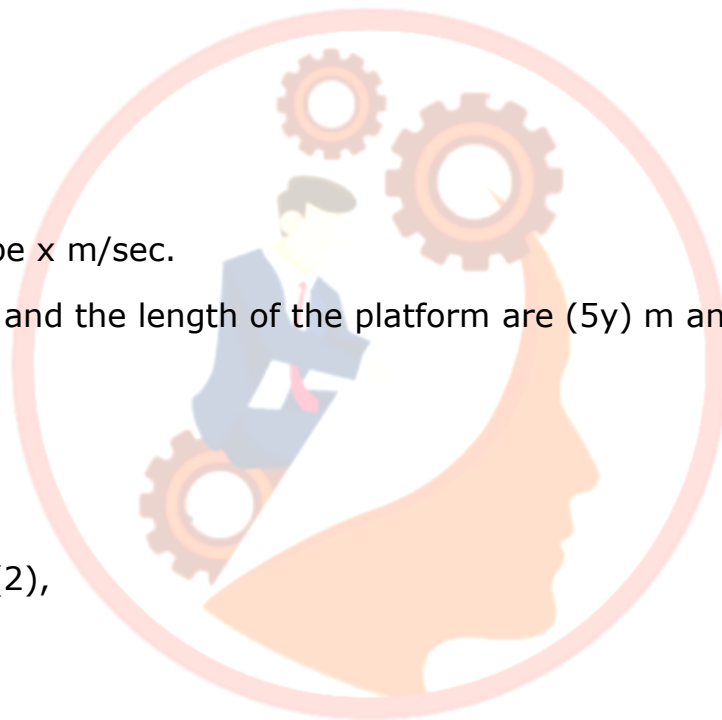
b) 7

c) 5

d) 4

e) None of these

Answer: D

Pipe P alone fill the tank = 14 * 100/87.5 = 14 * 8/7 = 16 minutes

Pipe Q alone fill the tank = 4 * 3/1 = 12 minutes

Pipe R alone fill the tank = 24 * 2 = 48 minutes

(1/16 + 1/12) * x + (1/16 + 1/48) * 5 = 1

(3/48 + 4/48) * x + (3/48 + 1/48) * 5 = 1

7x + 20 = 48

x = (48 − 20)/7 = 28/7 = 4

Time and distance

31) The time taken by car A to cover 3x km is equal to the time taken by car B to cover 2x km and the speed of car A is 15 km/hr more than that of B. If the speed of car B is increased by 4 km/hr, then find the time taken by car B to cover 170 km.

a) 4 hours

b) 3 hours

c) 5 hours

d) 2 hours

e) None of these

Answer: C

Ratio of the speed of car A to car B = (3x/y):(2x/y) = 3:2

3x − 2x = 15

x = 15

The new speed of car B = 2 * 15 + 4 = 30 + 4 = 34 km/hr

Required time = 170/34 = 5 hours

Percentage

32) A had certain number of chocolates. Out of the 60% of the chocolates with A, he gave 80% of the chocolates to B and the remaining to C. If the difference between the number of chocolates left with A and the number of chocolates with B, then find the total number of chocolates A had.

a) 2000

b) 1500

c) 1600

d) 1800

e) None of these

Answer: C

Let the total number of chocolates A had be 100x.

Number of chocolates with B = 100x * 60/100 * 80/100 = 48x

Number of chocolates with C = 100x * 60/100 * 20/100 = 12x

Number of chocolates with A = 100x – 48x – 12x = 40x

48x – 40x = 144

8x = 144

x = 18

Total number of chocolates A had = 100 * 18 = 1800

SI and CI

33) A person invested Rs.20000 in compound interest at 10.15% per annum for 2 years. If he invested the amount received as interest after two years in compound interest at the same rate of interest for the same period, then find the amount received finally.

a) 4104

b) 5082

c) 4356

d) 6534

e) 6050

Answer: B

The interest received after 2 years = $20000 * (1 + 10/100)^2 - 20000$

= $20000 * (110/100)^2 - 20000$

= $24200 - 20000$

= 4200

Required amount = $4200 * (1 + 10/100)^2 - 4200$

= $4200 * (110/100)^2 = 5082$

Mixture and allegation

34) A vessel contains 79.99 liters of a mixture of milk and water in which 20.13% of water. If 24.99% of the mixture is taken out and x liters of water is added to the mixture, then the ratio of milk to water becomes 12:5. Find the value of x.

a) 14

b) 20

c) 16

d) 8

e) None of these

Answer: D

Water in 80 liters = $80 * 20/100 = 16$ liters

Milk in 80 liters = $80 - 16 = 64$ liters

25% of the mixture in 80 liters = $80 * 25/100 = 20$ liters

Ratio of milk to water in the initial mixture = $64:16 = 4:1$

$[64 - 20 * 4/(4 + 1)]/[16 - 20 * 1/(4 + 1) + x)] = 12/5$

$(64 - 16) * 5 = (16 - 4 + x) * 12$

$12x = 240 - 144 = 96$

$x = 96/12 = 8$