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MATHS by Mohit Sharma SIR

What value should come in the place of (?) in the following number series?

1. 3, 30, 46, 171, 207, ?

A.447

B.478

C.578

D.550

E.490

2. 1, 5, 21, ?, 121

A.57

B.70

C.85

D.101

E.104

3. 124, 62, 62, 93, 186, ?

A.284

B.348

C.420

D.465

E.528

4. 8, 17, 53, 134, 278, ?

A.478

B.487

C.496

D.503

E.512

5. 2880, 480, 96, 24, 8, ?

A.4

B.6

C.2

D.16

E.12

In each of the following questions, two equations are given. You have to solve both the equations to find the relation between x and y.

6.

I: $x^2 - 5x + 6 = 0$

II: $y^2 - 9y + 20 = 0$

A.If $x < y$

B.If $x > y$

C.If $x \leq y$

D.If $x \geq y$

E.If relationship between x and y cannot be determined

7.

I) $3x^2 + 30x + 27 = 0$

II) $y^2 - 28y - 29 = 0$

A. $x > y$

B. $x \geq y$

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

D. $x < y$

E. $x \leq y$

8.

I. $x^2 + 29x + 210 = 0$

II. $y^2 + 25y + 156 = 0$

A. $x > y$

B. $x \geq y$

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

D. $x < y$

E. $x \leq y$

9.

I) $2x^2 - 30x + 112 = 0$

II) $y^2 - 18y + 80 = 0$

A. $x > y$

B. $x \geq y$

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

D. $x < y$

E. $x \leq y$

10.

I) $3x^2 - 18x + 15 = 0$

II) $y^2 - 13y + 42 = 0$



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- A. $x > y$
- B. $x \geq y$
- C. $x = y$ or relationship can't be determined.
- D. $x < y$
- E. $x \leq y$

Study the following information carefully and answer the questions given below:

There are 3000 students studied in four different schools A, B, C and D. 15% of students studied in school B. The ratio between number of boys to number of girls in school B is 4: 5. Equal number of boys and girls studied in school C. 30% of students studied in school A and the ratio between number of girls to number of boys in school A is 1: 2. 900 boys and 600 girls studied in school D.

11. What is the respective ratio between number of boys in school C to number of girls in school A?

- A. 3: 10
- B. 1: 4
- C. 2: 3
- D. 2: 1
- E. 1: 1

12. Number of boys in school D is how much percentage more than number of boys in school A?

- A. 50%
- B. $33 \frac{1}{3} \%$
- C. $66 \frac{2}{3} \%$
- D. 150 %
- E. 75 %

13. What is the difference between total number of boys in school B to total number of students in school C?

- A. 125
- B. 175
- C. 300
- D. 50

E. 100

14. What is the average number of students studied in school A, B and D?

- A. 500
- B. 700
- C. 850
- D. 950
- E. 800

15. Number of girls studied in school D is what percentage of total number of students studied in all the school together?

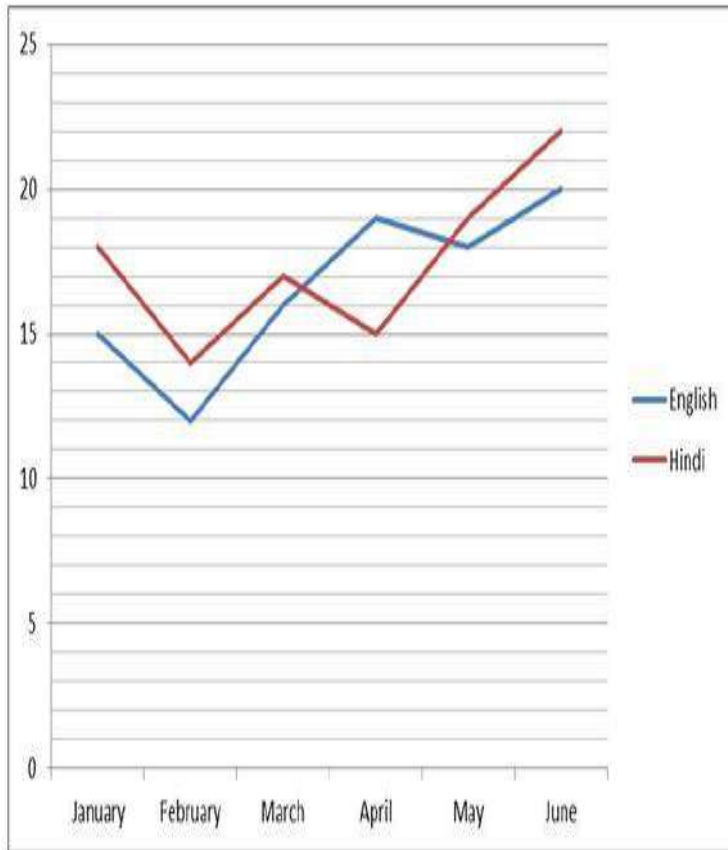
- A. 10 %
- B. 20 %
- C. 25 %
- D. $33 \frac{1}{3} \%$
- E. $16 \frac{2}{3} \%$

Study the following information carefully and answer the given questions.

The following line graph shows the total number of monthly magazine readers (In thousands) in English and Hindi language in 6 different months in a certain city.



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Note: Consider only two magazines

16. Find the difference between the total number of English monthly magazine readers in January and April together to that of total number of Hindi monthly magazine readers in February and June together?

- A.4000
- B.6000
- C.2000
- D.5000
- E.None of these

17. Find the ratio between the total number of English monthly magazine readers in February and May together to that of total number of Hindi monthly magazine readers in January and March together?

- A.6: 7
- B.11: 9
- C.9: 5
- D.15: 23
- E.None of these

18. If the ratio between the total number of male to that of female English magazine readers in March and that of Hindi magazine readers in April is 5: 3 and 7: 8 respectively, then find the difference between the total male English magazine readers in March to that of total female Hindi magazine readers in April?

- A.5000
- B.4000
- C.3000
- D.2000
- E.None of these

19. Find the average number of Hindi magazine readers in all the given months together?

- A.18600
- B.17500
- C.16600
- D.15200
- E.None of these

20. Total number of English magazine readers in March and June together is approximately what percentage of total number of Hindi magazine readers in April and May together?

- A.124 %
- B.92 %
- C.106 %
- D.138 %
- E.78 %

Study the following information carefully and answer the question given below.

The following table represents the number of students enrolled in six different colleges, percentage of students left the college and percentage of students who passed out the college among those who continued their study in the college.



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COLLEGE	Total number of students enrolled	% of students left the college	% of students passed who continued study in the college
A	1400	5	80
B	1250	8	76
C	1550	12	75
D	900	10	60
E	1300	15	80
F	1500	4	90

21. Find the sum of total number of students from all the colleges, who continued their study.

- A.7432
- B.7223
- C.7199
- D.7351
- E.None of these

22. Number of students passed from college B is approximately what percent of the number of students passed from college D?

- A.152
- B.180
- C.187
- D.125
- E.None of these

23. Total number of students enrolled in A and B together is what percent more than the number of students enrolled in C and D together?

- A.6.134%
- B.8.163%
- C.9.156%
- D.4.146%
- E. 178%

24. Find the ratio of number of failed students of college C and college F respectively.

- A.1137 : 450
- B.960 : 1457
- C.341 : 144
- D.450 : 137
- E.None of these

25. Passed students of college A is approximately what percent of failed students of college C?

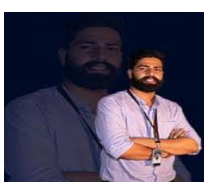
- A.121 %
- B.184 %
- C.211 %
- D.312 %
- E.None of these

26. A Jar contains 90 litres of the mixture of milk and water in the ratio of 5: 4 and 45 litres of the mixture is taken out. Then added x liters of the water in the remaining mixture, the ratio of the milk and water becomes 2: 3. Find the value of x?

- A.18 litres
- B.17.5 litres
- C.16 litres
- D.15.5 litres
- E.14.5 litres

27. A boat takes two hours more to travel upstream than travel the same distance in downstream. If the distance travelled by the boat is 120 km and the ratio of the speed of stream to boat in still water is 5: 1, then what is the speed of the boat in still water?

- A.20 kmph
- B.25 kmph
- C.30 kmph
- D.35 kmph
- E.None of these



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28. A and B invests in the ratio of 2: 3 and the investment period of x months and y months respectively. If the total profit of the business is 3500 and B's share is Rs.1500, then what is the ratio of x : y ?

- A.2: 1
- B.3: 4
- C.4: 3
- D.1: 2
- E.None of these

29. Ratio of the length to breadth of the rectangular floor is 2:1. If Rs.1440 is required to paint the floor at the rate of Rs.5 per square meter, then what is the difference between the length and breadth of the rectangular floor?

- A.10 cm
- B.12 cm
- C.14 cm
- D.16 cm
- E.None of these

30. Shon invests Rs.8000 in scheme A which offer simple interest at 15% per annum for x years. After 8 years Shon received the total amount is Rs.17600. Find the value of x ?

- A.6 years
- B.7 years
- C.8 years
- D.10 years
- E.None of these

31. Ratio of the cost price to marked price of the article is 4: 5. A shopkeeper offer a discount of 15% and the marked price of the article is Rs.720. What is the profit percentage of the article?

- A.6.25%
- B.4.75%
- C.5.5%

D.3.40%

E.None of these

32. A and B together can complete the work in 30 days. If B alone complete 20% of the work in 16 days. In how many days A alone complete 75% of the work?

- A.40 days
- B.36 days
- C.32 days
- D.28 days
- E.None of these

33. Rahul spends 12% of the salary on transport, 20% on shopping, 40% on house rent and 50% of the remaining on education fee. Now he left with him is Rs.2800. Find Rahul's salary?

- A.Rs.30000
- B.Rs.20000
- C.Rs.40000
- D.Rs.50000
- E.None of these

34. A is 8 years older than B and B is 12 years younger than C. If the sum of the ages of A, B and C is 80 years, then what is B's age after 10 years?

- A.20 years
- B.30 years
- C.28 years
- D.22 years
- E.None of these

35. Two trains 160 meters and 140 meters in length are running towards each other on parallel tracks, one at the rate of 75 kmph and another at 45 kmph. In how many seconds will they be clear of each other from the moment they meet?

- A.6 seconds
- B.9 seconds
- C.12 seconds
- D.15 seconds



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E.4 seconds

Answers:

1) Answer: D

$$3 + 3^3 = 30$$

$$30 + 4^2 = 46$$

$$46 + 5^3 = 171$$

$$171 + 6^2 = 207$$

$$207 + 7^3 = 550$$

2) Answer: A

$$1 + 4(2^2) = 5$$

$$5 + 16(4^2) = 21$$

$$21 + 36(6^2) = 57$$

$$57 + 64(8^2) = 121$$

3) Answer: D

$$124 * 0.5 = 62$$

$$62 * 1 = 62$$

$$62 * 1.5 = 93$$

$$93 * 2 = 186$$

$$186 * 2.5 = 465$$

4) Answer: D

$$8 + 3^2 = 17$$

$$17 + 6^2 = 53$$

$$53 + 9^2 = 134$$

$$134 + 12^2 = 278$$

$$278 + 15^2 = 503$$

5) Answer: A

$$2880/6 = 480$$

$$480/5 = 96$$

$$96/4 = 24$$

$$24/3 = 8$$

$$8/2 = 4$$

6) Answer: A

$$\text{From I } \Rightarrow x^2 - 5x + 6 = 0$$

$$\Rightarrow x^2 - 3x - 2x + 6 = 0$$

$$\Rightarrow x(x - 2) - 3(x - 2) = 0$$

$$\Rightarrow (x - 2)(x - 3) = 0$$

$$\Rightarrow x = 2, 3$$

$$\text{From II } \Rightarrow y^2 - 9y + 20 = 0$$

$$\Rightarrow y^2 - 5y - 4y + 20 = 0$$

$$\Rightarrow y(y - 5) - 4(y - 5) = 0$$

$$\Rightarrow (y - 5)(y - 4) = 0$$

$$\Rightarrow y = 4, 5$$

Hence, $x < y$

7) Answer: E

$$3x^2 + 30x + 27 = 0$$

$$3x^2 + 27x + 3x + 27 = 0$$

$$3x(x + 9) + 3(x + 9) = 0$$

$$(3x + 3)(x + 9) = 0$$

$$x = -1, -9$$

$$y^2 - 28y - 29 = 0$$

$$y^2 - 29y + y - 29 = 0$$

$$y(y - 29) + 1(y - 29) = 0$$

$$(y + 1)(y - 29) = 0$$

$$y = -1, 29$$

$$x \leq y$$

8) Answer: D

$$x^2 + 29x + 210 = 0$$

$$x^2 + 14x + 15x + 210 = 0$$

$$x(x + 14) + 15(x + 14) = 0$$

$$(x + 15)(x + 14) = 0$$

$$x = -14, -15$$

$$y^2 + 25y + 156 = 0$$

$$y^2 + 13y + 12y + 156 = 0$$

$$y(y + 13) + 12(y + 13) = 0$$

$$(y + 12)(y + 13) = 0$$

$$y = -12, -13$$

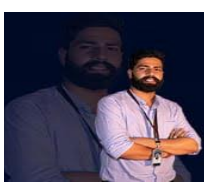
Hence, $x < y$

9) Answer: E

$$2x^2 - 30x + 112 = 0$$

$$2x^2 - 16x - 14x + 112 = 0$$

$$2x(x - 8) - 14(x - 8) = 0$$



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$$(2x - 14)(x - 8) = 0$$

$$x = 8, 7$$

$$y^2 - 18y + 80 = 0$$

$$y^2 - 10y - 8y + 80 = 0$$

$$y(y - 10) - 8(y - 10) = 0$$

$$(y - 8)(y - 10) = 0$$

$$y = 8, 10$$

$$x \leq y$$

10) Answer: D

$$3x^2 - 18x + 15 = 0$$

$$3x^2 - 15x - 3x + 15 = 0$$

$$3x(x - 5) - 3(x - 5) = 0$$

$$(3x - 3)(x - 5) = 0$$

$$x = 1, 5$$

$$y^2 - 13y + 42 = 0$$

$$y^2 - 6y - 7y + 42 = 0$$

$$y(y - 6) - 7(y - 6) = 0$$

$$(y - 7)(y - 6) = 0$$

$$y = 7, 6$$

$$x < y$$

Direction (11-15):

Total number of students = 3000

15% of students studied in school B = $15/100 \times 3000$

Students studied in school B = 450

The ratio between number of boys to number of girls in school B is 4: 5

Number of boys in school B = $4/9 \times 450 = 200$

Number of girls in school B = $5/9 \times 450 = 250$

30% of students studied in school A = $30/100 \times 3000$

Students studied in school A = 900

Ratio between number of girls to number of boys in school A is 1: 2

Number of boys in school A = $2/3 \times 900 = 600$

Number of girls in school A = $1/3 \times 900 = 300$

900 boys and 600 girls studied in school D

Total number of students in school D = $900 + 600 = 1500$

Total number of students in school C = $3000 - (900 + 450 + 1500)$

Total number of students in school C = 150

Ratio between the number of girls to number of boys in school C is 1: 1

Number of boys in school C = 75

Number of girls in school C = 75

	Total students	Number of boys	Number of girls
School A	900	600	300
School B	450	200	250
School C	150	75	75
School D	1500	900	600

11) Answer: B

Ratio between number of boys in school C to number of girls in school A = $75: 300 \Rightarrow 1: 4$

12) Answer: A

Number of boys in school D = 900

Number of boys in school A = 600

Percentage = $(900-600)/600 \times 100 = 50\% \text{ more}$

13) Answer: D

Total number of boys in school B = 200

Total number of students in school C = 150

Required difference = 50

14) Answer: D

Average number of students studied in school A, B and D = $(900 + 450 + 1500)/3$

Average number of students studied in school A, B and D = 950

15) Answer: B

Number of girls studied in school D = 600



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Total number of students studied in all the school together = 3000

Required percentage = $600/3000 \times 100$

Required percentage = **20%**

16) Answer: C

The total number of English monthly magazine readers in January and April together

= > $15000 + 19000 = 34000$

The total number of Hindi monthly magazine readers in February and June together

= > $14000 + 22000 = 36000$

Required difference = $36000 - 34000 = 2000$

17) Answer: A

The total number of English monthly magazine readers in February and May together

= > $12000 + 18000 = 30000$

The total number of Hindi monthly magazine readers in January and March together

= > $18000 + 17000 = 35000$

Required ratio = $30000 : 35000 = 6 : 7$

18) Answer: D

The total male English magazine readers in March

= > $16000 * (5 / 8) = 10000$

The total female Hindi magazine readers in April

= > $15000 * (8 / 15) = 8000$

Required difference = $10000 - 8000 = 2000$

19) Answer: B

The average number of Hindi magazine readers in all the given months together

= > $(18000 + 14000 + 17000 + 15000 + 19000 + 22000) / 6$

= > $105000 / 6$

= > 17500

20) Answer: C

Total number of English magazine readers in March and June together

= > $16000 + 20000 = 36000$

Total number of Hindi magazine readers in April and May together

= > $15000 + 19000 = 34000$

Required % = $(36000 / 34000) * 100 = 105.88 \% = 106 \%$

21) Answer: C

A = $(100 - 5)/100 \times 1400 = 1330$

B = $(100 - 8)/100 \times 1250 = 1150$

C = $(100 - 12)/100 \times 1550 = 1364$

D = $(100 - 10)/100 \times 900 = 810$

E = $(100 - 15)/100 \times 1300 = 1105$

F = $(100 - 4)/100 \times 1500 = 1440$

Required No of students = $1330 + 1150 + 1364 + 810 + 1105 + 1440 = 7199$

22) Answer: B

Number of students who continued study in B = $(100 - 8)/100 \times 1250 = 1150$

Passed Students = $76/100 \times 1150 = 874$

Number of students who continued study in D = $(100 - 10)/100 \times 900 = 810$

Passed Students = $60/100 \times 810 = 486$

Required percentage = $(874/486) \times 100 = 179.83\% = 180 \%$

23) Answer: B

Total number of students enrolled in A and B together = $1400 + 1250 = 2650$

Total number of students enrolled in C and D together = $1550 + 900 = 2450$

Required percentage = $(2650 - 2450)/2450 \times 100 = 8.163\%$

24) Answer: C

Number of students who continued study in C = $(100 - 12)/100 \times 1550 = 1364$

Failed = $(100-75)/100 \times 1364 = 341$



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Number of students who continued study in F = $(100 - 4)/100 \times 1500 = 1440$

Failed = $(100 - 90)/100 \times 1440 = 144$

Required ratio = $341 : 144$

25) Answer: D

Number of students who continued their study from college A = $(100 - 5)/100 \times 1400 = 1330$

Passed = $80/100 \times 1330 = 1064$

Number of students who continued their study from college C

= $(100 - 12)/100 \times 1550 = 1364$

Failed = $(100 - 75)/100 \times 1364 = 341$

Required percentage = $(1064/341) \times 100 = 312.023\%$
= 312%

26) Answer: B

Milk = $5/9 \times 90 = 50$ litres

Water = $4/9 \times 36 = 40$ litres

Milk in 45 litres = $5/9 \times 45 = 25$ litres

Water in 18 litres = $4/9 \times 45 = 20$ litres

$(50 - 25)/(40 - 20 + x) = 2/3$

$40 + 2x = 75$

$2x = 35$

$x = 17.5$ litres

27) Answer: B

Distance = speed * time

$120/4x - 120/6x = 2$

$(30 - 20)/x = 2$

$10 = 2x$

= $\> x = 5$

Speed of the boat in still water = $5 \times 5 = 25$ kmph

28) Answer: A

A's profit = $3500 - 1500 = 2000$

$(2 \times x)/(3 \times y) = 2000/1500$

$2x/3y = 4/3$

$x/y = 2/1$

29) Answer: B

Area of the rectangle = $l \times b$

$2x \times x = 1440/5$

$x = 12$ m

Length = $2 \times 12 = 24$ m

Breadth = 12 cm

Difference = $24 - 12 = 12$ cm

30) Answer: C

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

SI = $17600 - 8000 = \text{Rs.}9600$

$9600 = (8000 \times 15 \times N)/100$

$N = 8$ years

31) Answer: A

CP = $4/5 \times 720 = \text{Rs.}576$

SP = $720 \times 85/100 = \text{Rs.}612$

Profit percentage = $(612 - 576)/576 \times 100$
= 6.25%

32) Answer: B

$A + B = 1/30$

$B = 5/1 \times 16 = 80$ days

$A = 1/30 - 1/80$

$A = (8 - 3)/240 = 5/240$

$A = 1/48$

A complete the 75% of the work in = $48 \times 3/4 = 36$ days

33) Answer: B

Salary = $100x$

Transport + Shopping + House rent = $12x + 20x + 40x$
= $72x$

Remaining = $100x - 72x = 28x$

$28x \times 50/100 = 2800$

$x = 200$

Salary = $100 \times 200 = 20000$

34) Answer: B

$A - B = 8$

$C - B = 12$

$A + B + C = 80$

$B + 8 + B + 12 + B = 80$



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$$3B = 60$$

$$B = 20 \text{ years}$$

$$\text{After 10 years B's age} = 20 + 10 = 30 \text{ years}$$

35) Answer: B

$$\text{Distance} = \text{speed} * \text{time}$$

$$(160 + 140) = (75 + 45) \times T \times 5/18$$

$$\text{Time} = 9 \text{ seconds}$$

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