

How many litres of water should be added...



N. Vinaykumar Reddy
Director, IACE,
Hyderabad.

MODEL QUESTIONS

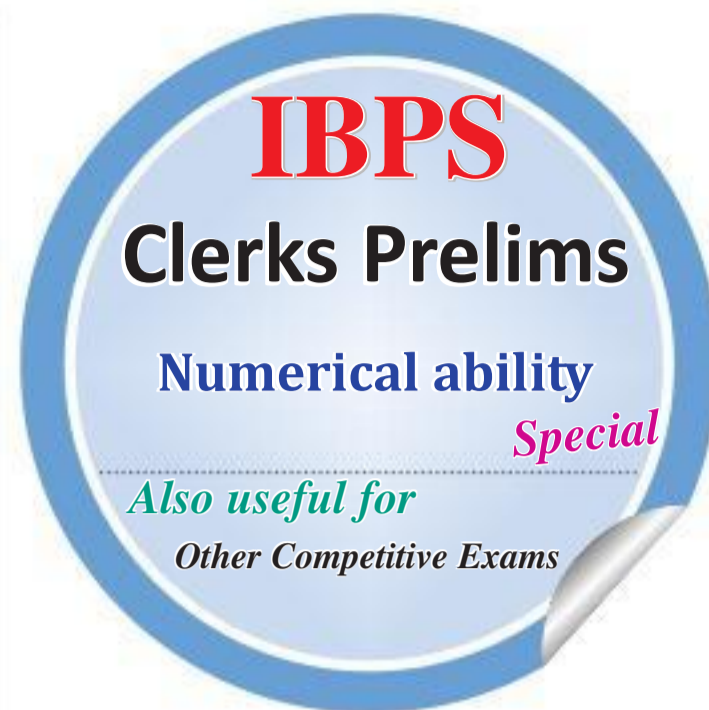
Directions (Q.No.1-5): What will come in place of the question mark (?) in the following number series?

- 174, 169, 162, 152, 138, ?
1) 119 2) 121 3) 111
4) 100 5) 108
- 193, 97, 49, 25, ?, 7
1) 15 2) 12 3) 17
4) 13 5) 11
- 17, 24, 13, 26, 9, ?
1) 30 2) 32 3) 29
4) 28 5) 26
- 462, 462, 456, 432, ?, 282
1) 362 2) 378 3) 364
4) 396 5) 346
- 1, 3, 10, 48, ?, 6432
1) 208 2) 380 3) 400
4) 360 5) 440

Directions (Q.No.6-10): In each of these questions, two equations I and II are given. You have to solve both the equations and give answer

- 1) if $x > y$ 2) if $x \geq y$
3) if $x < y$ 4) if $x \leq y$
5) if $x = y$ or no relation can be

- established between x and y
- I. $x^2 - 264 = 361$
II. $y^3 - 878 = 453$
 - I. $3x^2 + 14x + 15 = 0$
II. $3y^2 - 13y + 14 = 0$
 - I. $12x^2 - 17x + 6 = 0$
II. $y^2 - 16y + 63 = 0$
 - I. $x^2 - 48x + 575 = 0$
II. $46y^2 - 35y - 11 = 0$
 - I. $15x^2 - 11x - 12 = 0$
II. $20y^2 - 49y + 30 = 0$
 - In 30 litres of milk and water, water is only 20%. How many litres of water should be added to it to increase the percentage of water to 60%?
1) 24 litres 2) 6 litres
3) 20 litres 4) 30 litres
5) None of these
 - Three pipes A, B and C working together can fill a cistern in 11 hours. After working at it together for 3 hours, B is closed, and A and C filled it in 16 more Hours. B alone can fill the cistern in
1) 22 hours 2) 20 hours
3) 16 hours 4) 32 hours
5) None of these
 - A train can travel 50% faster than a car. Both start from point A at the same time and reach point B, which is 330 km away from A, at the same time. One the way, however, the train lost about 88 minutes while stopping at the



station. The speed of the train is
1) 75 km/hr 2) 100 km/hr
3) 112.5 km/hr 4) 125 km/hr
5) None of these

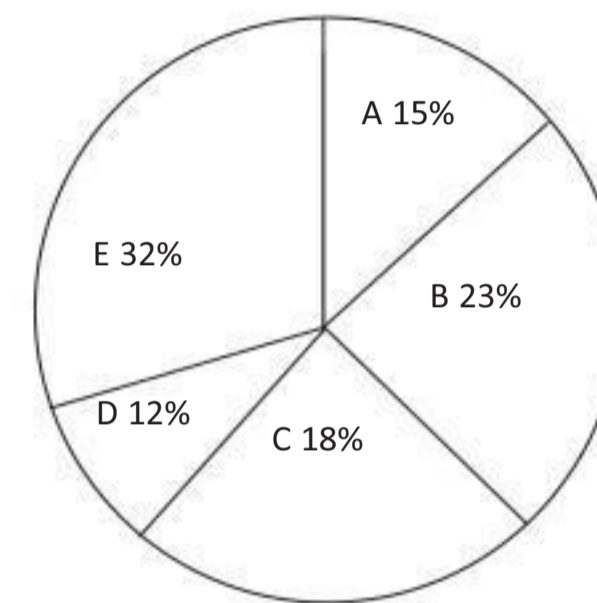
- A mixture contains wine and water in the ratio of 3 : 2 and another mixture contains them in the ratio of 4 : 5. How many litres of the latter must be mixed with 3 litres of the former so that the resultant mixture may contain equal quantities of wine and water?
1) 4 litres
2) $\frac{2}{5}$ liters 3) $3\frac{3}{4}$ liters
4) $4\frac{1}{2}$ liters 5) none of these
- A hemispherical bowl of internal diameter 54 cm contains a liquid. This liquid is to be filled in cylindrical bottles of radius 3 cm

and height 9cm. How many bottles are required to empty the bowl?

- 1) 221 2) 343
3) 81 4) 243
5) None of these

Directions (Q.No.16-20): Study the following pie chart and answer the given questions. Given below is the pie chart which shows the percentage

distribution of number of article sold by 5 shopkeepers A, B, C, D and E in a year 2005 Total article sold = 1200



- What is the ratio of number of articles sold by shopkeeper C and E together to the 125% of number of articles sold by A and D together
1) $\frac{40}{27}$ 2) $\frac{125}{81}$
3) $\frac{113}{100}$ 4) $\frac{87}{81}$

- If in year 2004 number of articles sold by C and E are equal and ratio of articles sold by C & E together in 2004 to 2005 is 13 : 12. Then find the percentage increase or decrease in articles sold by E from 2004 to 2005 (approx)
1) 20% 2) 15%
3) 13% 4) 18%
5) 22%
- If articles sold by A in 2006 is increased by 40% as compared to previous year and articles sold by D in 2006 increases by 75% from previous year, then what is the average of articles sold by A & D together in 2006
1) 240 2) 252
3) 196 4) 225
5) 185
- What is the central angle for the number of articles sold by A and D together?
1) 86.5 2) 78.4
3) 97.2 4) 88.25
5) 90
- What is the difference in Average of articles sold by A and C together and B and D together?
1) 12 2) 8
3) 6 4) 7
5) 13

KEY & SOLUTIONS

- 1;** Difference in Series 5, 7, 10, 14, 19
So, $(138 - 19) = 119$
- 4;** -96, -48, -24, -12, -6
So, $25 - 12 = 13$
- 4;** Series +7, -11, +13, -17, +19
- 2;** 0 6 24 54 96
6 18 30 42 54
So, $432 - 54 = 378$
- 3;** Series $\times 1+2, \times 2+4, \times 4+8, \times 8+16, \times 16+32$
So, $48 \times 8 + 16 = 400$
- 5;** I. $x^2 - 264 = 361$
or, $x^2 = 361 + 264$
 $\therefore x^2 = 625$
 $\therefore x = \sqrt{625} = \pm 25$
II. $y^3 - 878 = 453$
or, $y^3 = 453 + 878$
 $y^3 = 1331$
 $\therefore y = \sqrt[3]{1331} = 11$
Hence no relation can be established
- 3;** I. $3x^2 + 14x + 15 = 0$
or, $3x^2 + 9x + 5x + 15 = 0$
or, $3x(x+3) + 5(x+3) = 0$
or, $(3x+5)(x+3) = 0$
 $\therefore x = -5/3, -3$
II. $3y^2 - 13y + 14 = 0$
or, $3y^2 - 6y - 7y + 14 = 0$
or, $3y(y-2) - 7(y-2) = 0$
or, $(3y-7)(y-2) = 0$
 $\therefore y = 7/3, 2$
Hence $x < y$
- 3;** I. $12x^2 - 17x + 6 = 0$

- or, $12x^2 - 9x - 8x + 6 = 0$
or, $3x(4x-3) - 2(4x-3) = 0$
or, $(3x-2)(4x-3) = 0$
 $\therefore x = 2/3, 3/4$
II. $y^2 - 16y + 63 = 0$
or, $y^2 - 9y - 7y + 63 = 0$
or, $y(y-9) - 7(y-9) = 0$
or, $(y-7)(y-9) = 0$
 $\therefore y = 7, 9$
Hence $x < y$
- 1;** I. $x^2 - 48x + 575 = 0$
or, $x^2 - 23x - 25x + 575 = 0$
or, $x(x-23) - 25(x-23) = 0$
or, $(x-25)(x-23) = 0$
 $\therefore x = 25, 23$
II. $46y^2 - 35y - 11 = 0$
or, $46y^2 - 46y + 11y - 11 = 0$
or, $46y(y-1) + 11(y-1) = 0$
or, $(46y+11)(y-1) = 0$
 $\therefore y = -11/46, 1$
Hence $x > y$
 - 5;** I. $15x^2 - 11x - 12 = 0$
or, $15x^2 - 20x + 9x - 12 = 0$
or, $5x(3x-4) + 3(3x-4) = 0$
or, $(5x+3)(3x-4) = 0$
 $\therefore x = -3/5, 4/3$
II. $20y^2 - 49y + 30 = 0$
or, $20y^2 - 25y - 24y + 30 = 0$
or, $5y(3y-5) - 6(4y-5) = 0$
 $\therefore y = 6/5, 5/4$
No relation
 - 4;** Let x litres of water be added. Then, $(x+6)/(30+x) = 3/5$
or, $5(x+6) = 3(30+x)$
or, $5x+30 = 90+3x$
or, $5x-3x = 90-30$

- or, $2x = 60$
 $\therefore x = 60/2 = 30$ litres
- 1;** Part filled by A, B and C together in 3 hours = 3/11
Remaining 8/11 part is filled by A and C together in 16 hours NOW, work done by A, B and C in 8 hours is equal to the work done by A and C.
Let their efficiency are A, B, C
 $8(A+B+C) = 16(A+C)$
 $B = A+C$
efficiency of B is equal to the efficiency of A and C
Then B alone can do work in 22 hours
 - 3;** Let the speed of the car be x km/hr
Then the speed of the train = $x \frac{150}{100} = \frac{3x}{2}$
now, $\frac{330}{x} - \frac{330}{\frac{3x}{2}} = \frac{88}{60}$
 $= \frac{330}{x} - \frac{220}{x} = \frac{88}{60}$
 $\frac{110}{x} = \frac{88}{60} \Rightarrow x = \frac{60 \cdot 110}{88} = 75$
Therefore the speed of the car = 75 km/hr
 \therefore speed of the train = $\frac{3x}{2} = \frac{3 \cdot 75}{2} = 112.5$ km/h

- 5;**
Wine Water
First Mixture 3x 2x
Second mixture 4y 5y
In 3 litres of first mixture:
Wine = 1.8 l
Water = 1.2 l
When 9y of second mixture is added
 $1.8 l + 4y = 1.2l + 5y$
or, $y = 0.6l$
 \therefore Resultant mixture = 9y = $9 \times 0.6 = 5.4$ litres
- 5;**
Volume of Hemispherical bowl = $\frac{2}{3}\pi r^3$
 \therefore Diameter = 54 cm
 \therefore Radius = $\frac{54}{2} = 27$ cm
Now, Volume of hemispherical bowl = $\frac{2}{3} \frac{27}{27} \frac{27}{27} \frac{27}{27} = 162$
Volume of the cylindrical bottle = $\pi r^2 h = \frac{22}{7} \cdot 3 \cdot 3 \cdot 9$
 \therefore Number of bottles required = $\frac{2}{3} \frac{22}{7} \frac{27}{22} \frac{27}{3} \frac{27}{3} \frac{27}{9} = 162$
- 1;** Articles sold by C & E together = $50/100 \times 1200 = 600$
125% of articles sold by A & D together = $\frac{27}{100} \frac{1200}{100} \frac{125}{100} = 162$
Required ratio

- 4;** Number articles sold by C and E together in 2004 = $\frac{(32+18)}{100} \frac{1200}{12} = 650$
Required % = $\frac{(32-12) \cdot \frac{650}{2}}{\frac{650}{2}} = \frac{384-325}{325} \cdot 100 = 18.15 \approx 18\%$
- 2;** Articles sold by A in 2006 = $15 \times 12 \times 140/100 = 18 \times 14 = 252$
Articles sold by D in 2006 = $144 \times 1.75 = 252$
Average of articles sold by A and D together in 2006 = 252
- 3;** Required central angle = $\frac{18}{5} \cdot \frac{x}{15+12}$
 $x = 97.2$
- 1;** Average of articles sold by A and C together = $(15+18) \frac{12}{2} = 33 \cdot 6 = 198$
Average of articles sold by B and D together = $(23+12) \frac{22}{2} = 35 \cdot 6 = 210$
Required difference = 12