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S1. Ans.(e)

Sol.

$(422 + 478) \div ? \simeq 60$

$? \simeq \dfrac{900}{60} = 15$

S2. Ans.(d)

Sol.

$? \simeq \sqrt{256} \times 19 + 8 \times 14$

$? \simeq 16 \times 19 + 8 \times 14 = 416$

S3. Ans.(b)

Sol.

$16 \times 24 + ? \simeq 19 \times 32$

$? = 608 - 384 = 224$

S4. Ans.(c)

Sol.

$28 \times 16 \simeq ? \times 14 + 70$

$448 \simeq ? \times 14 + 70$
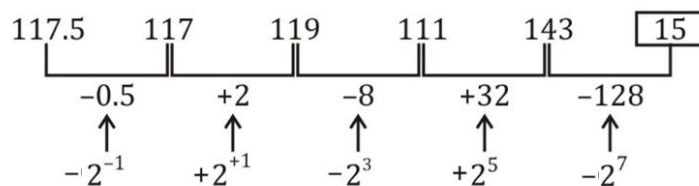
$? = \dfrac{378}{14} = 27$

S5. Ans.(b)

Sol.

$272 + 190 + 84 \simeq ? \times 13 \times 6$

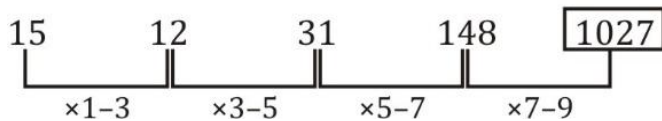$\Rightarrow ? \simeq \dfrac{546}{13 \times 6} = 7$
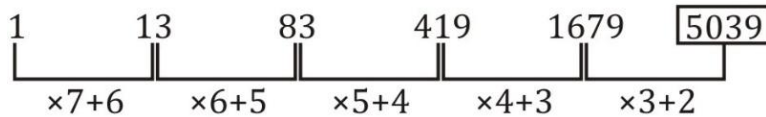
S6. Ans.(c)
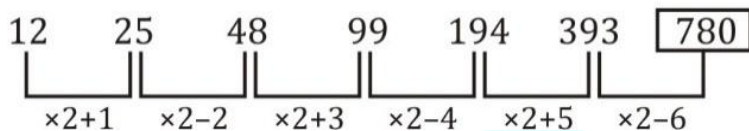
Sol.

S7. Ans.(e)
Sol.

15	12	31	148	**1027**

$\times 1 - 3 \qquad \times 3 - 5 \qquad \times 5 - 7 \qquad \times 7 - 9$

S8. Ans.(b)
Sol.

1	13	83	419	1679	**5039**

$\times 7 + 6 \qquad \times 6 + 5 \qquad \times 5 + 4 \qquad \times 4 + 3 \qquad \times 3 + 2$

S9. Ans.(a)
Sol.

12	25	48	99	194	393	**780**

$\times 2 + 1 \quad \times 2 - 2 \quad \times 2 + 3 \quad \times 2 - 4 \quad \times 2 + 5 \quad \times 2 - 6$

S10. Ans.(d)
Sol.

3	11	31	69	131	**223**

$1^3 + 2 \quad 2^3 + 3 \quad 3^3 + 4 \quad 4^3 + 5 \quad 5^3 + 6 \quad 6^3 + 7$
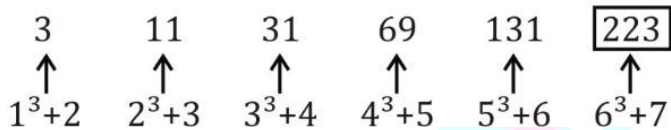
S11. Ans.(b)
Sol.
Number of tickets sold to males by C3 and C6 theatre together
$= (80 - 20) \times \dfrac{2}{5} + (80 - 12) \times \dfrac{9}{17}$
$= 60 \times \dfrac{2}{5} + 68 \times \dfrac{9}{17}$
$= 24 + 36$
$= 60$

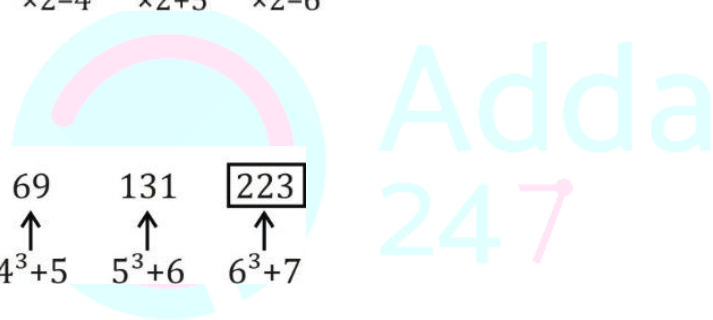Number of tickets sold to females by C3 and C5 theatre together
$= (80 - 20) \times \dfrac{3}{5} + (80 - 8) \times \dfrac{4}{9}$
$= 60 \times \dfrac{3}{5} + 72 \times \dfrac{4}{9}$
$= 36 + 32$
$= 68$

Required ratio $= \dfrac{60}{68} = \dfrac{15}{17}$

S12. Ans.(d)

Sol.

Number of female who bought ticket from C2 and C4 theatre together

$$= (80 - 10) \times \frac{4}{7} + (80 - 14) \times \frac{5}{11}$$

$$= 40 + 30$$

$$= 70$$

Number of male who bought ticket from C5 theatre

$$= (80 - 8) \times \frac{5}{9}$$

$$= 72 \times \frac{5}{9}$$

$$= 40$$

Required % $= \dfrac{70 - 40}{40} \times 100$

$$= \frac{30}{40} \times 100 = 75\%$$

S13. Ans.(c)

Sol.

Total revenue earns by C4 theatre

$$= 14 \times 150 + (80 - 14) \times \frac{6}{11} \times 200 + (80 - 14) \times \frac{5}{11} \times 250$$

$$= 2100 + 66 \times \frac{6}{11} \times 200 + 66 \times \frac{5}{11} \times 250$$

$$= 2100 + 7200 + 7500$$

$$= 16800$$

S14. Ans.(b)

Sol.

Number of male who bought ticket from C1, C2 and C3 together

$$= (80 - 15) \times \frac{6}{13} + (80 - 10) \times \frac{3}{7} + (80 - 20) \times \frac{2}{5}$$

$$= 30 + 30 + 24$$

$$= 84$$

Required average $= \dfrac{84}{3} = 28$

S15. Ans.(a)
Sol.
Number of males who bought ticket from C4, C5 and C6 together

$= (80 - 14) \times \dfrac{6}{11} + (80 - 8) \times \dfrac{5}{9} + (80 - 12) \times \dfrac{9}{17}$

$= 36 + 40 + 36$

$= 112$

Number of females who bought ticket from C4, C5 and C6 together

$= (80 - 14) \times \dfrac{5}{11} + (80 - 8) \times \dfrac{4}{9} + (80 - 12) \times \dfrac{8}{17}$

$= 30 + 32 + 32$

$= 94$

Required difference = 112 – 94 = 18

S16. Ans.(b)
Sol.
(i) $2x^2 - 5x + 3 = 0$

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

$2x(x - 1) - 3(x - 1) = 0$

$(x - 1)(2x - 3) = 0$

$x = 1, \dfrac{3}{2}$

(ii) $3y^2 - 4y + 1 = 0$

$3y^2 - 3y - y + 1 = 0$

$3y(y - 1) - 1(y - 1) = 0$

$(3y - 1)(y - 1) = 0$

$y = \dfrac{1}{3}, 1$

$x \geq y$

S17. Ans.(c)
Sol.
(i) $x^2 - 17x + 72 = 0$

$x^2 - 9x - 8x + 72 = 0$

$x(x - 9) - 8(x - 9) = 0$

$(x - 8)(x - 9) = 0$

$x = 8, 9$

(ii) $y^2 - 27y + 180 = 0$

$y^2 - 12y - 15y + 180 = 0$

$y(y - 12) - 15(y - 12) = 0$

$(y - 15)(y - 12) = 0$

$y = 15, 12$

$y > x$

S18. Ans.(b)
Sol.
(i) $(x - 12)^2 = 0$
  $x - 12 = 0$
  $x = 12$

(ii) $y^2 - 21y + 108 = 0$
  $y^2 - 12y - 9y + 108 = 0$
  $y(y - 12) - 9(y - 12) = 0$
  $(y - 9)(y - 12) = 0$
  $y = 9, 12$
$x \geq y$

S19. Ans.(e)
Sol.
(i) $2x^2 + 7x + 5 = 0$
  $2x^2 + 2x + 5x + 5 = 0$
  $2x(x + 1) + 5(x + 1) = 0$
  $(2x + 5)(x + 1) = 0$
  $x = \dfrac{-5}{2}, -1$
(ii) $3y^2 + 12y + 9 = 0$
  $3y^2 + 9y + 3y + 9 = 0$
  $3y(y + 3) + 3(y + 3) = 0$
  $(3y + 3)(y + 3) = 0$
  $y = -1, -3$
No relation can be established.

S20. Ans.(b)
Sol.
(i) $x^2 + 2x - 35 = 0$
  $x^2 + 7x - 5x - 35 = 0$
  $x(x + 7) - 5(x + 7) = 0$
  $(x - 5)(x + 7) = 0$
  $x = 5, -7$

(ii) $y^2 + 15y + 56 = 0$
  $y^2 + 7y + 8y + 56 = 0$
  $y(y + 7) + 6(y + 7) = 0$
  $(y + 8)(y + 7) = 0$
  $y = -8, -7$
$x \geq y$

S21. Ans.(b)

Sol.

Speed of Train 'A' on Tuesday

$$= \frac{450}{2} = 225 \, \text{km/hr}$$

Speed of train 'B' on Monday

$$= \frac{450}{3} = 150 \, \text{km/hr}$$

$$\text{Required\%} = \frac{225 - 150}{150} \times 100$$

$$= \frac{75}{150} \times 100$$

$$= 50\%$$

S22. Ans.(d)

Sol.

Speed of train 'B' on Tuesday

$$= \frac{450}{4.5} = 100 \, \text{km/hr}$$

Speed of train 'A' on Wednesday

$$= \frac{450}{3} = 150 \, \text{km/hr}$$

$$\text{Average speed} = \frac{2 \times 100 \times 150}{100 + 150}$$

$$= 120 \, \text{km/hr}$$

S23. Ans.(a)

Sol.

Speed of train 'A' on Friday

$$= \frac{450}{4} \times \frac{160}{100} = 180$$

Speed of train 'B' on Friday

$$= \frac{450}{5} \times \frac{125}{100} = 112.5$$

Required sum of time

$$= \frac{450}{180} + \frac{450}{112.5}$$

$$= 2.5 + 4$$

$$= 6.5 \, \text{hr}$$

S24. Ans.(c)

Sol.

Speed of train 'A' on Tuesday

$= \dfrac{450}{2} = 225 \text{ km/hr}$

Speed of train 'B' on Wednesday

$= \dfrac{450}{1.5} = 300 \text{ km/hr}$

Required difference = 300 – 225 = 75 km/hr

S25. Ans.(d)

Sol.

Required time $= \dfrac{450}{\frac{450}{2} \times 1.6} = \dfrac{450}{360} = 1.25 \text{ hr}$

S26. Ans.(a)

Sol.

From only (A) we can say whether Z is a positive integer or not

Explanation: - If we look at Statement A, the condition of Z being a positive integer is being satisfied as putting a negative value will give $Z^7 < Z$. Whereas, in the Statement B, putting both negative as well as positive values of Z will satisfy "$Z^8 > Z$". So, we conjecture that option 'a'is the correct option.

S27. Ans.(c)

Sol.

From (A) and (B) together value of $4^{\frac{1}{a}} + 4^{\frac{1}{b}}$ can be find out.

Explanation: -

From (A) $\dfrac{1}{a} + \dfrac{1}{b} = \dfrac{6}{5}$

From (B) $ab = 5$

So, value of $4^{\frac{1}{a}} + 4^{\frac{1}{b}}$ can be find out.

S28. Ans.(e)

Sol. We can't find the answer as we don't know the capacity of men. In statement 'A' and 'B', we are given about the capacity of women and children not about men.

S29. Ans.(e)

Sol. We can't find the chance of getting a red ball because we don't know the number of red balls.

S30. Ans.(c)
Sol. When taking both statements together $3w$ = odd number and $2w$ = Even number

A and B is possible only when w is an integer

So, both the statements required to answer the question.

Solutions (31-35)

Total number of girls in St. Xavier college and Vijaya college = 210 × 2 = 420

Let, Number of boys in St. Xavier college = x

And, Number of boys in Vijaya college = y

ATQ,

$x + y = 810$ …(i)

$\frac{2}{3}x + \frac{2}{5}y = 420$ ... (ii)

On solving (i) & (ii)

$x = 360, y = 450$

Number of girls in St. Xavier college

$= \frac{2}{3} \times 360$

$= 240$

Number of girls in Vijaya college

$= \frac{2}{5} \times 450$

$= 180$

	St. Xavier	Vijaya
Boys	360	450
Girls	240	180

S31. Ans.(c)
Sol.

Required% $= \frac{180}{240} \times 100$

$= 75\%$

S32. Ans.(d)
Sol.

Girls in 'X' college = 2 × 320 – 240 = 400

Total no. of students in 'X' colleges

$= \frac{125}{100} \times [360 + 240]$

$= 750$

Number of boys in 'X' college = 750 – 400 = 350

S33. Ans.(d)

Sol.

Required difference

= 450 + 180 – 360 – 240

= 630 – 600

= 30

S34. Ans.(b)

Sol.

Number of boys in 'Y' college

$= \dfrac{450}{9} \times 13 = 650$

Number of girls in 'Y' college

$= \dfrac{80}{100} \times 180$

= 144

Total number of students in 'Y' college

= 650 + 144

= 794

S35. Ans.(e)

Sol.

$\text{Required\%} = \dfrac{450 - 360}{360} \times 100$

= 25%

S36. Ans.(c)

Sol.

15 men can complete the work in 'X' days

1 men can complete the work in '15X' days …(i)

21 women can complete the work in (X – 4) days

1 women can complete the work in 21(X – 4) days …(ii)

And also,

35 men can complete the work in 'Y' days

1 men can complete the work in '35Y' days …(iii)

63 women can complete the work in 'Y – 4' days

1 women can complete the work in 63 (Y – 4) days …(iv)

Equate (i) & (iii) and (ii) & (iv)

$15X = 35Y \Rightarrow \frac{X}{Y} = \frac{7}{3} \Rightarrow Y = \frac{3}{7}X$ …..(v)

$21(X – 4) = 63 (Y – 4) \Rightarrow X – 4 = 3Y – 12$

$\Rightarrow 3Y – X = 8$ …(vi)

Using (v) and (vi)

$3\left(\frac{3}{7}X\right) - X = 8$

$\frac{9X - 7X}{7} = 8$

$\Rightarrow X = \frac{8 \times 7}{2} = 28$

S37. Ans.(b)

Sol.

Let C.P. of A = 2x

C.P. of B = x

Total cost price = 3x

Mark up price $= 3x \times \frac{12}{10}$

$= 3.6x$

ATQ,

$3.6x – 9 = 3x \times 1.17$

$\Rightarrow 3.6x – 3.51x = 9$

$\Rightarrow 0.09x = 9$

$\Rightarrow x = 100$

C.P. of article A = 200

S38. Ans.(d)

Sol.

There are two cases

1st case:

1 boy and 4 girls

probability $= \dfrac{{}^5C_1 \times {}^4C_4}{{}^9C_5} = \dfrac{5}{126}$ ... (i)

2nd case:

2 boys & 3 girls

Probability $= \dfrac{{}^5C_2 \times {}^4C_3}{{}^9C_5} = \dfrac{40}{126}$ ... (ii)

Adding equation (i) and (ii)

Required probability $= \dfrac{5}{126} + \dfrac{40}{126} = \dfrac{45}{126}$

$= \dfrac{5}{14}$

S39. Ans.(b)

Sol.

Let, length of train = x m

And, length, of platform = y m

ATQ,

$25 \times \dfrac{5}{18} = \dfrac{x+y}{18}$

$\Rightarrow x + y = 125$ ...(i)

And,

$(25 + 5) \times \dfrac{5}{18} = \dfrac{x}{12}$

$\Rightarrow x = 100$ ...(ii)

On solving (i) & (ii)

y = 25

Required difference = 100 – 25 = 75

S40. Ans.(d)

Sol.
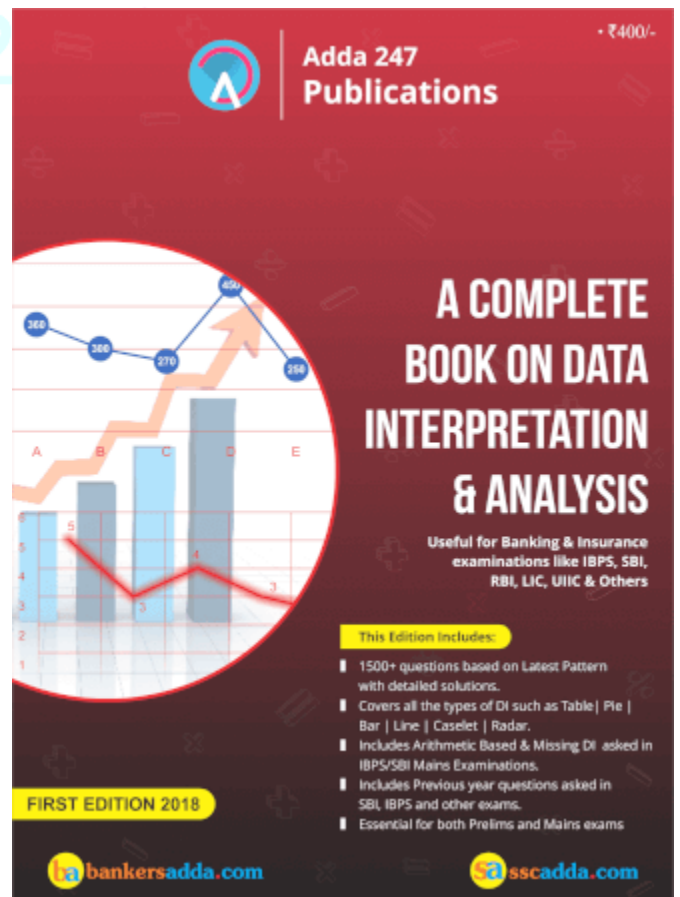
Satish : Bhavya : Abhishek

15×12 : $18 \times (12 - x)$: $24(12 - x)$

10 : 9 : 12

$\Rightarrow \dfrac{15 \times 12}{18 \times (12 - x)} = \dfrac{10}{9}$

$\Rightarrow 12 - x = 9$

$\Rightarrow x = 3$ month

S41. Ans.(b)

Sol.

Let present age of Sakshi = x

ATQ,

$x = \dfrac{5}{4}(x - 6)$

$\Rightarrow 4x = 5x - 30$

$\Rightarrow x = 30$

Present age of her son $= \dfrac{30}{5} = 6$ years

Required ratio $= \dfrac{30 + 10}{6 + 10} = \dfrac{40}{16} = \dfrac{5}{2}$

S42. Ans.(d)

Sol.

Interest earn from scheme 'A' $= \dfrac{18000 \times 15 \times 2}{100} = 5400$

Interest earn from Scheme 'B' $= 15000 \left[\left(1 + \dfrac{18}{100} \right)^2 - 1 \right]$

$= 15000 \left[\dfrac{3924}{10000} \right]$

$= 5886$

Required difference = 5886 – 5400

= 486

S43. Ans.(e)

Sol.

1st Alloy ratio   Copper : Aluminium
                           2   :   3

2nd Alloy ratio   Copper : Zinc
                           2   :   7

In final alloy ratio is 5 : 3

Let quantity → 5x and 3x

Quantity of copper in final alloy

$$= \frac{2}{5} \times 5x + \frac{2}{9} \times 3x = \frac{8x}{3}$$

Quantity of Aluminium

$$= \frac{3}{5} \times 5x = 3x$$

Required percentage

$$= \frac{3x - \frac{8x}{3}}{\frac{8x}{3}} \times 100 = 12.5\%$$

S44. Ans.(c)

Sol.

Time to collide $= \frac{20}{10 + 5} = \frac{4}{3}$ hr

1 minute before collision, distance $= 20 - \left(\frac{79}{60} \times 5 + \frac{79}{60} \times 10 \right)$

$$= 20 - \frac{237}{12}$$

$$= \frac{1}{4} \text{ km}$$

Alternate method

Relative speed of boats= 5+10 = 15 km/hr

In m/sec

$$15 \times \frac{5}{18} = \frac{25}{6} \text{ m/sec}$$

Distance covered in one minute $= \frac{25}{6} \times 60 = 250 \text{ m} = \frac{1}{4} \text{ km}$

S45. Ans.(a)

Sol.

$$\frac{\pi r^2 h}{2\pi rh} = \frac{616}{352}$$

$$r = 3.5 \text{ m}$$

$$\pi r^2 h = 616$$

$$h = \frac{616}{11 \times 3.5} = 16 \text{ m}$$

Total S.A. $= 2\pi rh + 2\pi r^2$

$$= 2\pi r(h + r)$$

$$= 2 \times \frac{22}{7} \times 3.5(3.5 + 16)$$

$$= 429 \text{ m}^2$$

S46. Ans.(b)

Sol.

Required ratio $= \dfrac{\frac{1}{65}}{\frac{2}{39}} = \dfrac{3}{10}$

S47. Ans.(c)

Sol.

Let efficiency of men of first group is M_1 and second group is M_2

$$3M_1 \times 2 = 4M_2 \times 3$$

$$M_1 = 2M_2$$

$$\text{work} = 40M_1 \times 8 \times 15$$

According to question

$$40M_1 \times 8 \times 15 \times 2 = 60M_2 \times 4 \times d$$

$$d = 80 \text{ days}$$

S48. Ans.(a)

Sol.

Let speed of boat in still water and speed of stream is x km/hr and y km/hr respectively.

ATQ,

$$\frac{75}{x+y} = \frac{60}{x-y}$$

75x – 75y = 60x + 60y

15x = 135y

x = 9y

Required percentage $= \dfrac{10y}{9y} \times 100$

$= 111\dfrac{1}{9}\%$

S49. Ans.(a)

Sol. Let length of train and platform be 'L and 'P' respectively

1st train cross the pole = 24 s

2nd train (20% faster than first train) Cross the pole $= \dfrac{24}{6} \times 5 = 20$ s (same length)

Time taken to cross platform = 30 s

ATQ,

$$\frac{L+P}{30} = \frac{L}{20}$$

2P = L

$$\frac{L}{P} = \frac{2}{1}$$

S50. Ans.(d)

Sol.

In 30 min the part of the tank will be filled by both tap $= \dfrac{30}{36} = \dfrac{5}{6}$

Required tap $= 1 - \dfrac{5}{6} = \dfrac{1}{6}$

$\dfrac{1}{6}$ part of the tank will be filled by tank A in 10 min.

∴ tap A will take 60 min.

∴ tap B will take time to fill the tank

$$= \frac{1}{36} - \frac{1}{60}$$
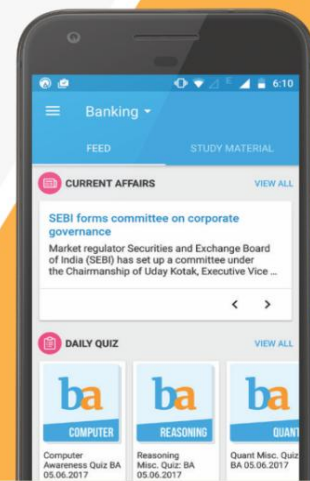
$$= \frac{1}{90}$$

∴ Required time = 90 min.