Arithmetic Questions for SBI PO Exam

Q1. A, B and C could do $66\frac{2}{3}\%$ of work together in 6 days, while A and B could do $33\frac{1}{3}\%$ of same work together in 5 days and B & C could do the 25% of work together in 4 days. Find the number of days (approx.) taken by B alone to complete 12.5% of the same work.
(a) 15
(b) 13
(c) 11
(d) 9
(e) 7

Q2. An article P was sold at d% discount after it was marked up by 20% and sold at 10% profit. If another article Q was sold at Rs. 800 and at a profit of 3d%, then find cost price of article Q. (in Rs.)
(a) 600
(b) 640
(c) 740
(d) 720
(e) None of these

Q3. A man can row a boat with the speed of $6\frac{1}{4}$ kmph in still water, while it takes him four times the time taken by the boat to row upstream than as to row downstream the same distance which he covered in still river. Find the speed of the current is how much less than the speed of boat in still water. (in kmph)
(a) 1.75
(b) 1.25
(c) 2.25
(d) 2.50
(e) 2.75

Q4. Mohan invested Rs. 100P in scheme A at 15% rate compounded annually for two years. The interest earned from scheme A is invested in scheme B, offering r% p.a. for three years at simple interest. If Mohan earned Rs. 19.35P interest from scheme B, then find 'r'.
(a) 25
(b) 15
(c) 20
(d) 10
(e) 12

Q5. Pipe A and Pipe B could fill a tank together in 24 hours and 16 hours respectively, while pipe C could empty it in 20 hours. If both inlet pipes are opened together for first 5 hours, then pipe C replaced them. Find the time taken by pipe C to empty the tank filled by pipe A and pipe B together.
(a) 12 hr 15 min
(b) 10 hr 35 min
(c) 12 hr 45 min
(d) 8 hr
(e) 10 hr 25 min

Q6. The ratio of time taken by a man, a woman and a child to complete a work individually is 1: 2: 3. If 10 men, 15 women and 18 children together start the same work and total wages is Rs. 1410, then find total wages of 10 men, 12 women and 15 children?
(a) 1260 Rs.
(b) 1280 Rs.
(c) 1480 Rs.
(d) 1680 Rs.
(e) 1180 Rs.

Q7. 400 students play three different games (A, B and C). 240, 180 & 140 students play A, B & C games respectively. If 10 students play A and C together but not B, 50 students play B and C together but not A and 60 students play A & B together but not C, then find the number of students who play all three games together.
(a) 25
(b) 40
(c) 20
(d) 15
(e) Can't be determined

Q8. A person invested certain sum in scheme A at simple interest at x% for $\frac{x}{5}$ years. If he invested x% less amount in scheme B at simple for three years at $\frac{x}{2}$%, then the ratio of interest received from scheme B to scheme A is 3: 10. Find 3x.
(a) 60
(b) 90
(c) 45
(d) 57
(e) None of these

Q9. The present ages of A, B and C are X years, (X + 10) years and (X + 5) years respectively. The ratio of the age of A after four years to the age of B four years ago was 12:13 respectively. If the present age of D is 20% less than the average present age of A, B, and C, then find the present age of D is what percentage more or less than the present age of B.
(a) $12\frac{1}{2}$%
(b) $33\frac{1}{3}$%
(c) 45%
(d) 30%
(e) $66\frac{2}{3}$%

Q10. The difference between the time taken by a boat covers to X km in downstream and same distance cover in upstream is 2 hours. If the difference between the time taken by a boat to covers (X +25) km in each upstream and downstream is $\frac{8}{3}$ hours and the speed of stream is 5 km/hr, then find the value of X.
(a) 45
(b) 85
(c) 75
(d) 70
(e) Can't be determined

Q11. Three friends A, B and C entered into partnership by investing of Rs. 80X, Rs. (10X + 4500) & Rs. (7500-30X) respectively. The ratio of the time period of A, B & C is 4: 3: 6 respectively. If the profit-sharing ratio of A, B and C is 16: 15: 36 respectively, then find the value of 20X.

(a) 20
(b) 50
(c) 1000
(d) 2000
(e) 500

Q12. Time taken by a man to complete $\frac{2}{3}$rd of W1 work is same as time taken by a woman to do $\frac{1}{3}$rd of W2 work. If W2 is 1.5 times of W1 and pair of one man & one woman can do $\frac{7}{10}$ *th total* works (W1 + W2) together in 5 days, then find the difference between number of days taken by two women to complete W1 and W2 work.

(a) $\frac{5}{3}$
(b) $\frac{4}{3}$
(c) $\frac{7}{3}$
(d) $\frac{10}{3}$
(e) 5

Q13. $\frac{1}{5}^{th}$ of cost price of article B is Rs 45 more than 10% of the cost price of article A, while article A is sold at profit of 12% and article B is sold at loss of 5%. If total selling price of article A and B is Rs 1410, then find the cost price of B.

(a) Rs. 600
(b) Rs. 650
(c) Rs. 700
(d) Rs. 800
(e) None of these

Q14. Monthly income of a man is Rs. 5000. Due to 10% increase in his income his expenditure is increased by 18% and savings are reduced by 2%. Find the initial expenditure of the man. (In Rs.)

(a) 3480
(b) 3040
(c) 3000
(d) 3140
(e) 3080

Q15. A jar contains (50 liters) mixture of two liquid A and B in which liquid A is (34 liters) more than liquid B. If (x liters) mixture taken out from the jar and ($x + \frac{67}{10}$ liters) mixture liquid B added, then the ratio of liquid A to that of liquid B in resultant mixture becomes 5 : 4. Find 'x'.
(a) 20
(b) Can't be determined
(c) 25
(d) 12.5
(e) 6.25

Q16. Length of a rectangular field is two times of radius of a circular field whose circumference is 264 meters. If area of the rectangular field is 2016 meters square, then find radius of circular field is what percent more than breadth of the rectangular field.
(a) 75%
(b) 125%
(c) 50%
(d) 25%
(e) 87.5%

Q17. B's capital is $\frac{3}{5}$ times more than A's capital. B invested his capital at 25% per annum for two years on compound interest. At what rate of interest per annum on simple interest should A invest his capital so that after two years, they both will be received same amount.
(a) 25%
(b) 35%
(c) 55%
(d) 65%
(e) 75%

Q18. A boat covers 120 km downstream in 8 hours and the same distance covers in upstream in 40 hours. If the speed of boat in still water and speed of stream is increased by 6 kmph and 4 kmph respectively, then what is the total time (in hours) taken by the boat to covers 200 km in upstream and downstream each?
(a) 50
(b) 48
(c) 42
(d) 44
(e) 46

Q19. A bag contains (x+4) pink, 6 green and 8 brown colour balls. If two balls are taken randomly and the probability of getting both are green colour balls is $\frac{5}{92}$, then find the difference between the number of pink colour balls and the number of brown colour balls.
(a) 3
(b) 2
(c) 4
(d) 1
(e) 5

Q20. P, Q, R and S are four pipes which can either fill or empty a tank in 12 hours, 20 hours, 30 hours and 15 hours respectively. If the whole tank is filled in 15 hours when all the pipes are working together, then find the maximum possible number of outlet pipes.
(a) 0
(b) 1
(c) 2
(d) 3
(e) Can't be determined

Q21. The cost price (CP) of article A is 25% more than the cost price of article B and the ratio of the marked price (MP) of article A to that of article B is 12:5. If the shopkeeper offers a discount of x% and (x + 5) % on marked price of article B and article A respectively while he gets the profit of 25% on article B and 20% on article A, then find the value of x?
(a) 90
(b) 80
(c) 70
(d) 60
(e) 50

Q22. Sanjay starts a business with an investment of Rs.24000. After six months, Robin also joins him with an investment of Rs. 36000. At the end of two years, the difference between their profit share is Rs.7500. If Ankur has half of the profit share of Sanjay and he invested it on simple interest at 8% p.a. for five years, then find amount received by Ankur after 5 years.
(a) Rs.48000
(b) Rs.72000
(c) Rs.60000
(d) Rs.42000
(e) Rs.84000

Q23. A vessel contains mixture of milk and water in the ratio 2:1 respectively. x liters of milk is removed out and 2x liters of water is added into the remaining mixture. The ratio of milk to water in the resultant mixture become 6:5. If the resultant quantity of mixture become 99 liters, then find the quantity of water is added?
(a) 14.4 kg
(b) 11 kg
(c) 9.8 kg
(d) 15 kg
(e) 17.2 kg

Q24. Length of a rectangular field is 200% of radius of a circular field whose circumference is 264 meters. If area of the rectangular field is 2016 m^2, then find radius of circular field is what percent more than breadth of the rectangular field?
(a) 75%
(b) 125%
(c) 50%
(d) 25%
(e) 87.5%

Q25. Ten years hence, the ratio of the ages of Bhola and Ram will be 9:5 respectively. If Ram is 10 years younger to Bhola, then find the present age Ram is what % present age of Bhola?
(a) 25%
(b) 40%
(c) 10%
(d) 15%
(e) 20%

Q26. The annual income of Kamal is Rs.228000. He spends 30% of his monthly income on rent and 25% of the remaining monthly income on food and saves rest of the amount. Find the monthly saving of Kamal (in Rs.).
(a) Rs. 9975
(b) Rs. 10033
(c) Rs. 8756
(d) Rs. 11267
(e) Rs. 7777

Q27. A man is travelling on car with speed of 6x km/h. After travelling for 15 km, he decreased his speed by 25% and travels 40 km with the decreased speed. The total time taken by the man to cover the 55 km distance is 41 min. Find the time taken by the man to cover 150 km with the reduced speed.
(a) 120 $min.$
(b) 150 $min.$
(c) 100 $min.$
(d) 90 $min.$
(e) 80 $min.$

Q28. Train A leaves Kolkata at a certain time. After 6 hours Shatabdi express leaves the same station and travels in the same direction at the speed of 160 km/h. If Shatabdi express catches up the train A in 10 hours, then what is the speed of train A?
(a) 100 km/h
(b) 80 km/h
(c) 120 km/h
(d) 95 km/h
(e) 125 km/h

Q29. Pipe A can fill $\frac{200}{3}$% of a tank in 20 minutes and pipe A & B together can fill 50% of the same tank in 6 minutes. Find pipe B can fill what part of the tank in 15 minutes.
(a) $\frac{1}{3}rd$
(b) $\frac{2}{3}rd$
(c) None of these
(d) $\frac{1}{4}th$
(e) $\frac{3}{4}th$

Q30. Cost price of article P is Rs 520 more than that of article Q, while article P is sold at 20% profit and article Q is sold at 25% loss. If selling price of article P and Q is Rs 2.4x and Rs x respectively, then find the cost price of article P.
(a) 1680 Rs.
(b) 1040 Rs.
(c) 1560 Rs.
(d) 1520 Rs.
(e) 1860 Rs.

Q31. A vessel contains approx. 96 liters of mixture of milk and water in which $16\frac{2}{3}\%$ is water and rest is milk. $\frac{3}{4}^{th}$ of the mixture is taken out from the vessel & 'y' liters milk and '0.4y' liters water added in the remaining mixture. If in the resulting mixture quantity of water becomes 25% of the mixture, then find the quantity of water added.
(a) 2
(b) 6
(c) 16
(d) 20
(e) 8

Q32. The ratio of age of P six years ago to the age of Q four years hence is 5 : a. Two years hence, the average age of P and Q will be 35 years, while the sum of present age of P and R is 56 years. If after 10 years, the age of Q will be 50 years, then find the age of R after '2a' years.
(a) 56 years
(b) 48 years
(c) 54 years
(d) 41 years
(e) 52 years

Q33. P invested Rs 3600 in business and Q invested Rs 900 less than P, while the investment of R is $\frac{50}{3}\%$ more than that of Q. If R invested for six months only, then find the percentage of profit share of R out of total profit of the business at the end of the year.
(a) 45.71%
(b) 20.00%
(c) 34.28%
(d) 15.00%
(e) 25.00%

Q34. Train A and B can cross a 400 meters long platform in same time. The length of train A is 480 meters and speed of train B is $\frac{5}{4}^{th}$ of speed of train A. If train A crosses a bridge of the same length as of train B in 59 seconds, then find the time (in seconds) taken by train B to cross a tunnel 100 m long.
(a) 32
(b) 52
(c) 72
(d) 48
(e) 84

Q35. A man invested Rs 'p' at the rate of 5% p.a. on simple interest for 't' years and he received Rs $\frac{2p}{5}$ as interest. When man invested same amount on compound interest at rate of 't+2' for two years, then he received Rs 1050 as interest. Find the value of '2p' (in Rs).

(a) 2500
(b) 5000
(c) 10000
(d) 15000
(e) 8000

Q36. Annual salary of a man is Rs. 'x' and he spend 20% of his monthly salary on rent. He saved 25% of monthly salary and from rest he invested in LIC and mutual funds in the ratio of 3 : 8. If the difference between amount spent by man on rent and amount invested in mutual funds is Rs 20000, then find 'x' (in Rs.)

(a) 2,40,000
(b) 10 lakhs
(c) 6,00,000
(d) 1,00,000
(e) 12 lakhs

Q37. There are 17 boxes in a bucket and number written on these boxes from 1 to 17. If one box picked up randomly from the bucket, then find the probability that the number written on that box is divisible by three.

(a) $\frac{9}{17}$
(b) $\frac{3}{17}$
(c) $\frac{5}{17}$
(d) $\frac{8}{17}$
(e) $\frac{10}{17}$

Q38. A who is 50% more efficient than B, while B takes double time than C to complete a work. A can complete the same work in 'x' days while C can complete the same work in (x – 15) days. In how many days all three can completes the same work together?

(a) 36 days
(b) 30 days
(c) 22.5 days
(d) 20 days
(e) 18 days

Q39. Time taken by a boat to cover 144 km in upstream is four hours more than the time taken by the boat to cover the same distance in downstream. If the ratio of speed of boat in still water to the speed of stream is 5: 1, then find the speed of boat in still water (in meter/second).

(a) 10
(b) $\frac{28}{6}$
(c) $\frac{25}{6}$
(d) $\frac{35}{6}$
(e) $\frac{20}{3}$

Q40. Length of a rectangle is equal to the side of a square and breadth of the rectangle is 12 cm. If side of a square is decreased by 8 cm, then the area of square becomes 12 cm^2 more than the initial area of the rectangle. Find the area of the rectangle (in cm^2).

(a) 312
(b) 78
(c) 192
(d) 60
(e) 126

Q41. A hollow cylindrical vessel X1 having radius of 14 cm is full with milk and a solid cylinder X2 having radius of 7 cm is put inside the X1. Total milk remaining in X1 is 9240 cm^2 and the height of X1 and X2 is same, then find the height (in cm) of each X1 and X2.

(a) 30
(b) 20
(c) 60
(d) 40
(e) 24

Q42. The cost price of a table is Rs. a and it marked up by b% above cost price, while table sold at 25% discount and shopkeeper made a profit of Rs. (b+20). If the same article marked up by (b+5) % above cost price and sold at same discount, then shopkeeper made a profit of Rs. (b+65). Which of the following is correct.

(a) $\frac{1}{2}a = 15b$
(b) $(80 - \frac{a}{30}) = b$
(c) 1.5a = 40b
(d) None of these
(e) Only (a) and (b) are correct

Q43. Three partners A, B and C started a business with an investment of Rs. $(P - 1200)$, Rs. P and Rs. $(P + 1800)$ respectively. If B invested his profit share in a scheme at the rate of 18% on simple interest for five years, then he received total Rs. 3600 as interest. If total profit received by all three from business is Rs.4800 more than two times the profit share of B. Which of the following statement/s is or are true.

I. Sum of investment of A and B is equal to investment of C.
II. Value of P is multiple of 6.
III. Investment of A is 18.75% of total investment of all three
(a) Only I and II
(b) Only II and III
(c) All I, II and III
(d) Only III
(e) None of these

Q44. x, y and z are three integers, while sum of x and y is 61. When y is divided by x, then the quotient is 2 and the remainder is 7. If (z^n -2) is largest negative integer, then which of the following value definitely lie within ($z^n - n + x$) *and* ($y - x$).
(a) 18
(b) 23
(c) 27
(d) 31
(e) 26

Q45. A right circular cylindrical vessel having radius of 'x' cm and height of the vessel is (x+7) cm contain milk. The entire quantity of milk is taken out from the vessel and poured into 'n' number of hemispherical bottles such that each bottle is filled up to maximum capacity. If maximum capacity of each bottle is $\frac{11x^3}{42}$ cm^3 and 'x' & 'n' positive integers, then which of the following is/are possible value of 'n'.
A. 13
B. 16
C. 8
D. 17
(a) Only C and D
(b) All A, B, C and D
(c) Only D
(d) Only A and B
(e) None of these

Q46. Mixture P is 50% more than mixture Q and mixture P contains a% of milk & x% of water. Mixture Q contains b% of milk and y% of water. When both mixtures mixed, then quantity of milk in resultant mixture becomes 23% of total mixture. If a+b=45, then find the quantity of milk in final mixture, which of the following statement/s is or are required.
A. The initial quantity of mixture P is 60 liters and quantity of milk is 15 liters.
B. When 15 liters is taken out from mixture P and mixed with mixture Q, then the total quantity of water in mixture Q becomes 40 liters.
C. a – b = 10
(a) Only B
(b) Only A
(c) Only C
(d) None of these
(e) Only A and B

Q47. Veer has joined LinkedIn and has fifteen friends and each of these friends has 30 friends. Later, it is found that at least two of his friends know each other and on marriage, he wants to invite all his friends and all the friends of his friends. Find the difference between minimum number of invitations send by Veer and the maximum number of invitations send by Veer.

(a) 408
(b) 418
(c) 398
(d) 428
(e) 388

Q48. Two cars P and Q start travelling at the same time towards each other with uniform speed from stations Delhi and Banaras respectively. Car P reaches Banaras in 10 hours, while car Q takes 9 hours to reach Delhi after meeting car P at Lucknow. The total time (in hours) taken by car Q to travel from Banaras to Delhi.

(a) 15
(b) 20
(c) 12
(d) 16
(e) 11

Q49. A man invested Rs.7500 for two years at rate of X% p.a. in compound interest and received an interest of Rs.3300. He invested Rs.4800 in scheme A, which offer simple interest for two years at the rate of ____% p.a. He also invested Rs. _____ in scheme B, which offers simple interest for two years at the rate of 12% p.a. Total interest received from scheme A is Rs. _____ more than that from scheme B. Which of the following option/s is/are come in blank space.

(i) (X-5), 200X, 480
(ii) X, 4800, 360
(iii) 1.5X, 4000, 500
(a) None of these
(b) Only (i)
(c) Only (iii)
(d) Only (i) & (ii)
(e) Only (i) & (iii)

Q50. There are X number of people standing in a line and total number of people standing ahead of Mohit in the line are 40% less than total number of people standing behind of Mohit. If $300 < X \leq (18^2 + \sqrt{169})$, then find the difference between maximum possible number of people standing ahead of Mohit and minimum possible number of people behind of Mohit.

(a) 44
(b) 54
(c) 72
(d) 84
(e) 64

SOLUTION

S1. Ans.(e)

Sol. Number of days taken by A, B and C to complete work together= $6 \times \frac{3}{2} = 9$ days

Number of days taken by A and B to complete work together $= 5 \times \frac{3}{1} = 15$ days

Number of days taken by B and C to complete work together= $4 \times \frac{4}{1} = 16$ days

Let the total work be 720 units. (LCM of 9, 15 and 16)

Efficiency of A, B and C= $\frac{720}{9} = 80$ units/day

Efficiency of A and B= $\frac{720}{15} = 48$ units/day

Efficiency of B and C= $\frac{720}{16} = 45$ units/day

Efficiency of B = 48 + 45 – 80 = 13 units/day

Required days= $\frac{720}{13} \times \frac{1}{8} = \frac{90}{13} \approx 7$ days

S2. Ans.(b)

Sol. Let the cost price of article P be Rs. 100x

Marked price of P= $\frac{120}{100} \times 100x = \text{Rs. } 120x$

Selling price of P= $\frac{110}{100} \times 100 = \text{Rs. } 110x$

ATQ,

$120x \times \frac{100-d}{100} = 110x$

$1100 = 1200 - 12d$

$d = 8\frac{1}{3}\%$

For article Q,

Profit percent= $3 \times \frac{25}{3} = 25\%$

Required cost price= $\frac{800}{125} \times 100 = \text{Rs. } 640$

S3. Ans.(d)

Sol. Let the speed of the current be 'x' kmph and distance be 'D' km.

ATQ,

$\frac{D}{6.25-x} = 4(\frac{D}{6.25+x})$

$25 - 4x = 6.25 + x$

$x = 3.75$ kmph

Required difference= $6.25 - 3.75 = 2.50$ kmph

S4. Ans.(c)

Sol. Equivalent rate of interest for scheme A= $\left(15 + 15 + \frac{15 \times 15}{100}\right)\% = 32.25\%$

Interest earned from scheme A= $32.25P$

ATQ,

$32.25P \times \frac{r}{100} \times 3 = 19.35P$

$r = \frac{1935}{3 \times 32.25} = 20$

S5. Ans.(e)

Sol. Let the capacity of the tank be 240 units. (LCM of 24, 16 and 20)

Efficiency of pipe A= $\frac{240}{24} = 10$ units/hour

Efficiency of pipe B= $\frac{240}{16} = 15$ units/hour

Efficiency of pipe C= $\frac{240}{20} = -12$ units/hour ('−' sign, since it's a outlet pipe)

ATQ,

Tank filled by pipe A and B together in 5 hours= $(10 + 15) \times 5 = 125$ units

Required time= $\frac{125}{12} = 10\frac{5}{12}$ hr= 10 hr 25 min

S6. Ans.(a)

Sol. Given, ratio of time taken by a man, a woman and a child to complete a work individually is 1 : 2 : 3

Since time and work efficiency are inversely proportional to each other's.

So, ratio of one day work of a man, a woman and a child = $\frac{1}{1} : \frac{1}{2} : \frac{1}{3}$ = 6:3:2

And, Ratio of work done by 10 men, 15 women and 18 children

= 10 × 6 : 15 × 3 : 18 × 2

= 60 : 45 : 36

= 20 : 15 : 12

Wages of one man = $1410 \times \frac{20}{47} \times \frac{1}{10} = 60\ Rs.$

Similarly, Wages of one woman = $1410 \times \frac{15}{47} \times \frac{1}{15} = 30\ Rs.$

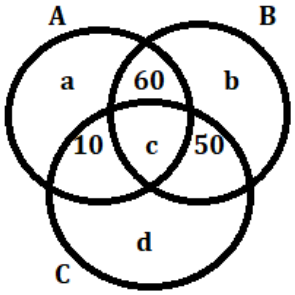
And, wages of one child = $1410 \times \frac{12}{47} \times \frac{1}{18} = 20\ Rs.$

Required wages = 60 × 10 + 30 × 12 + 20 × 15

= 600 + 360 + 300 = 1260 Rs.

S7. Ans.(c)

Sol.



ATQ, a + 60 + c + 10 = 240

a + c = 240 – 70

a + c = 170 …….(1)

b+50 + c + 60 = 180

b + c = 180 - 110

b + c = 70 ……..(2)

d + 50 + c + 10 = 140

d + c = 80 …….(3)

On adding (1), (2) and (3)
a + b + d + 3c = 320 .....(4)
And we know,
a + b + c + d+ 120 = 400
a+ b+ c + d = 280.....(5)
Subtract (5) from (4)
2c = 40
c = 20

S8. Ans.(a)
Sol. Let the amount invested be Rs. 5P in scheme A
Amount invested in scheme B = Rs. $5P\times \frac{100-x}{100}$
Interest received from scheme A = $5P \times \frac{x}{100} \times \frac{x}{5} = \frac{Px^2}{100}$ ..... (1)
Interest received from scheme B = $5P\times \frac{100-x}{100} \times \frac{x}{200} \times 3$ ..... (2)
ATQ,
$\frac{5P\times\frac{100-x}{100}\times\frac{x}{200}\times3}{\frac{Px^2}{100}} = \frac{3}{10}$
$5P \times \frac{100-x}{100} \times \frac{x}{200} \times 3 = \frac{3}{10} \times \frac{Px^2}{100}$
$\frac{100-x}{4} = x$
$100 = 5x$
x = 20
Required value = 60

S9. Ans.(b)
Sol. ATQ,
$\frac{X+4}{X+10-4} = \frac{12}{13}$
13X + 52 = 12X + 72
X = 20
Average present ages of A, B and C = $\frac{20+30+25}{3} = 25$ years
Present age of D = $\frac{4}{5} \times 25 = 20$ years
Required percentage = $\frac{30-20}{30} \times 100 = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$

S10. Ans.(c)
Sol. Let the speed of boat in still water be y km/hr.
ATQ,
$\frac{X}{y-5} - \frac{X}{y+5} = 2$
$\frac{[X(y+5)-X(y-5)]}{(y-5)(y+5)} = 2$
$\frac{[Xy+5X-Xy+5X]}{(y-5)(y+5)} = 2$
$\frac{[10X]}{(y-5)(y+5)} = 2$
$5X = (y-5)(y+5)$ ..... (i)

Now

$\frac{X+25}{y-5} - \frac{X+25}{y+5} = \frac{8}{3}$

$\frac{[(X+25)(y+5-y+5)]}{(y-5)(y+5)} = \frac{8}{3}$

$\frac{(X+25)\times 10}{(y-5)(y+5)} = \frac{8}{3}$

$\big((X+25)\times 10\big)\times\frac{3}{8} = (y-5)(y+5) \ldots . (ii)$

From (i) & (ii)

$\big((X+25)\times 10\big)\times\frac{3}{8} = 5X$

$30X + 750 = 40X$

$75 = X$

S11. Ans.(c)

Sol. Let the time period of A, B & C be 4a, 3a & 6a respectively.

Profit sharing ratio of A, B and C = 80X×4a : (10X + 4500)×3a : (7500-30X)×6a

ATQ,

$\frac{80X\times 4a}{(10X+4500)\times 3a} = \frac{16}{15}$

100X = 10X + 4500

90X = 4500

X = 50

Required value = 20 ×50 = 1000

S12. Ans.(a)

Sol. Let the total work (W1) and (W2) be 3u and 3x respectively

ATQ,

3x = 1.5 × 3u

10x = 15u

2x = 3u

Let efficiency of a man = m unit/day

And efficiency of a woman = w unit/day

$3u\times\frac{2}{3}\times\frac{1}{m} = 3x\times\frac{1}{3}\times\frac{1}{w}$

$2x\times\frac{2}{3}\times\frac{1}{m} = 3x\times\frac{1}{3}\times\frac{1}{w}$

$\frac{m}{w} = \frac{4a}{3a}$

Now,

$(4a+3a) = \frac{7}{10}\times\frac{3u+3x}{5}$

$7a = \frac{7}{10}\times\frac{5x}{5}$

10a = x……(1)

Now,

Time taken by two women to complete work W1= $\frac{2x}{2\times 3a} = \frac{10}{3}\ days$

Time taken by two women to complete work W2= $\frac{3x}{2\times 3a} = 5\ days$

Required difference = $5 - \frac{10}{3} = \frac{5}{3}\ days$

S13. Ans.(a)

Sol. Let the cost price of the article A be 25x and the cost price of the article B is 20y

Now ATQ,

$\frac{1}{5} \times 20y - \frac{1}{10} \times 25x = 45$

4y – 2.5x = 45 …….(1)

And,

$25x \times \frac{28}{25} + 20y \times \frac{19}{20} = 1410$

19y + 28x = 1410 …..(2)

Multiply equation (1) by 19 and multiply equation (2) by 4, then subtract (1) from (2)

112x + 47.5x = 5640 – 855

159.5x = 4785

x = 30

so, y = 30

Cost price of B = 30×20 = Rs. 600

S14. Ans.(c)

Sol. Let Man's initial expenditure = Rs x

Saving becomes = Rs 5000 – x

ATQ,

Income = Expenditure + Saving

$\Rightarrow 5000 \times \frac{110}{100} = x \times \frac{118}{100} + (5000 - x)\frac{98}{100}$

⇒ 550000 = 118x + 490000 – 98x

⇒ x = 3000 Rs

S15. Ans.(d)

Sol. Let liquid A & liquid B in jar initially be 'a' and 'b' respectively

a + b = 50 ---- (i)

a – b = 34------ (ii)

From (i) & (ii) we get

a = 42 & b = 8

Ratio of liquid A & liquid B in jar initially = 21 : 4

ATQ –

$\frac{42 - x \times \frac{21}{25}}{8 - x \times \frac{4}{25} + \left(x + \frac{67}{10}\right)} = \frac{5}{4}$

x = 12.5 liters

S16. Ans.(a)

Sol. Let radius of circular field be 'r'

ATQ –

$2 \times \pi \times r = 264$

r = $\frac{264 \times 7}{22 \times 2}$ = 42 meters

Length of rectangular field = $42 \times 2 = 84\ meters$
Let breadth of rectangular field be 'b'
$84 \times b = 2016$
b = 24 meters
Required percentage = $\frac{42-24}{24} \times 100 = 75\%$

S17. Ans.(e)
Sol. Let the required rate of interest be R% p.a.
Let the A's and B's capital be 5x and 8x respectively
Equivalent rate of compound interest at 25% p.a. for 2 years = $(25 + 25 + \frac{25\times25}{100})\% = 56.25\%$
ATQ,
$5x(\frac{100+2R}{100}) = \frac{156.25}{100}\ (8x)$
$100 + 2R = 156.25 \times \frac{8x}{5x}$
$100 + 2R = 250$
$2R = 150$
$R = 75\%$

S18. Ans.(b)
Sol. Speed of boat in downstream $= \frac{120}{8} = 15\ kmph$
Speed of boat in upstream $= \frac{120}{40} = 3\ kmph$
Speed of the boat in still water $= \frac{15+3}{2} = 9\ kmph$
Speed of the stream $= \frac{15-3}{2} = 6\ kmph$
New speed of boat in still water = 9 + 6 = 15 kmph
New speed of stream = 6 + 4 = 10 kmph
Downstream speed = 15+ 10 = 25 kmph
Upstream speed=15 – 10=5 kmph
Required time$= \frac{200}{25} + \frac{200}{5} = 8 + 40 = 48\ hours$

S19. Ans.(b)
Sol. ATQ, $\frac{6}{x+18} \times \frac{5}{x+17} = \frac{5}{92}$
$552 = x^2 + 35x + 306$
$x^2 + 35x - 246 = 0$
$x^2 + 41x - 6x - 246 = 0$
$x\ (x+41) - 6\ (x+41) = 0$
$(x-6)\ (x+41) = 0$
$x = 6, -41$
x = -41 (not possible)
x = 6
Required difference = (6+4)-8 = 2

S20. Ans.(c)

Sol. Let the capacity of the tank be 60 units. (LCM of 12, 20, 30 and 15)

Efficiency of P= $\frac{60}{12} = 5\ units/hour$

Efficiency of Q= $\frac{60}{20} = 3\ units/hour$

Efficiency of R= $\frac{60}{30} = 2\ units/hour$

Efficiency of S= $\frac{60}{15} = 4\ units/hour$

If the tank is filled in 15 hours when all the pipes are working together, then efficiency should be $\frac{60}{15} = 4\ units/hour$

Case I- Q, R, S are inlet pipes and P is outlet pipe. (3+2+4 – 5 = 4 units/hour)

Outlet pipe = 1

Case II- P&S are inlet pipes and Q &R are outlet pipes. (5+4 – 3 –2 = 4 units/hour)

Outlet pipe = 2

So, the maximum possible number of outlet pipes= 2

S21. Ans.(a)

Sol. Let CP of article B = 4y

CP of article A = $\frac{125}{100} \times 4y = 5y$

Selling price (SP) of article B = $4y \times \frac{125}{100} = 5y$

Selling price of article, A = $5y \times \frac{120}{100} = 6y$

Let MP of article B = 5z & MP of article A = 12z

$5y = 5z(\frac{100-x}{100})$

$y = \frac{z(100-x)}{100}$.....(i)

$6y = 12z\left(\frac{100-(x+5)}{100}\right)$

$y = 2z\ (\frac{100-(x+5)}{100})$.....(ii)

Equating (i) & (ii)

$\frac{z(100-x)}{100} = 2z\left(\frac{100-(x+5)}{100}\right)$

100 – x = 2(100 – x – 5)

100- x= 200 - 2x - 10

x = 190-100

x = 90

S22. Ans.(d)

Sol. Ratio of profit share of Sanjay and Robin=

$= 24000 \times 24 : 36000 \times 18$

$= 8 : 9$

So, profit share of Sanjay = $\frac{8}{9-8} \times 7500 = Rs.60000$

Required amount = $\frac{60000}{2} + \frac{60000}{2} \times \frac{40}{100}$ = 42000 Rs.

S23. Ans.(a)

Sol. Quantity of milk is taken out = x liters

Quantity of water is added =2x liters

Final quantity of milk and water in vessel $= 99 \times \frac{6}{11}$

$= 54$ liters and $99 \times \frac{5}{11} = 45$ liters respectively

ATQ, $\frac{54+x}{45-2x} = \frac{2}{1}$

x =7.2

Quantity of milk added = $7.2 \times 2 = 14.4$ liters

S24. Ans.(a)

Sol. Let radius of circular field be 'r'

ATQ –

$2 \times \pi \times r = 264$

r = $\frac{264 \times 7}{22 \times 2}$ = 42 meters

Length of rectangular field = $42 \times 2 = 84\ meters$

Let breadth of rectangular field be 'b'

$84 \times b = 2016$

b = 24 meters

Required percentage = $\frac{42-24}{24} \times 100 = 75\%$

S25. Ans.(e)

Sol. Let the present age of Bhola and Ram be x+10 years and x years respectively.

ATQ.

$\frac{x+10+10}{(x+10)} = \frac{9}{5}$

$5(x + 20) = 9(x + 10)$

$4x = 10$

$x = 2.5\ years$

Required percentage = $\frac{2.5}{12.5} \times 100 = 20\%$

S26. Ans.(a)

Sol. Monthly income of Kamal = $\frac{228000}{12} = Rs.19000$

Amount spend on rent = $19000 \times \frac{30}{100} = Rs.5700$

Amount spend on food = $19000 - 5700 = 13300$

$13300 \times \frac{25}{100} = Rs\ 3325$

Monthly saving of Kamal = $19000 - 5700 - 3325$

$= Rs.9975$

S27. Ans.(a)

Sol. Reduced speed of the car = $6x \times \frac{75}{100} = 4.5x\ km/h$

ATQ.

$\frac{15}{6x} + \frac{40}{4.5x} = \frac{41}{60}$

$\frac{45+160}{18x} = \frac{41}{60}$

$\frac{205}{18x} = \frac{41}{60}$

$x = \frac{50}{3}$

Required time = $\frac{150}{4.5 \times \frac{50}{3}} = 2\ hours = 120\ min.$

S28. Ans.(a)

Sol. Distance travelled by Shatabdi express in 16 hours = $160 \times 10 = 1600\ km$

Speed of train A = $\frac{1600}{6+10} = 100\ km/h$

S29. Ans.(e)

Sol. Time taken by A to fill the whole tank = $\frac{3}{2} \times 20 = 30\ minutes$

A and B together fill the whole tank = 12 minutes

Let the capacity of tank be 60 units (LCM of 30 & 12)

then, pipe A's efficiency = $\frac{60}{30} = 2$ units/min

together pipe (A+ B)'s efficiency = $\frac{60}{12}$ = 5 units/min

so, pipe B's efficiency = 3 units/min

Pipe B can fill 45 units i.e., $\frac{3}{4}th$ part of tank in 15 minutes.

S30. Ans.(c)

Sol. Let cost price of article Q = Rs a

And cost price of article P = Rs (a+520)

ATQ, $\frac{(a+520) \times \frac{120}{100}}{a \times \frac{75}{100}} = \frac{2.4x}{x}$

8a + 4160 = 12a

4a = 4160

a = 1040

So, cost price of article P = 1040 + 520 = 1560 Rs.

S31. Ans.(c)

Sol. The ratio of milk to water in initial mixture = 5 : 1 (we know $16\frac{2}{3}\% = \frac{1}{6}$)

Initial quantity of milk in vessel = $96 \times \frac{5}{6} = 80$ liters

Initial quantity of water in vessel = $96 \times \frac{1}{6} = 16$ liters

Remaining quantity of milk in vessel = $80 \times \frac{1}{4}$ = 20 liters

Remaining quantity of water in vessel = =$16 \times \frac{1}{4} = 4$ liters

ATQ,

$\frac{20+y}{4+0.4y} = \frac{3}{1}$

20 + y = 12 + 1.2y

0.2y = 8

y = 40

So, quantity of water added = $0.4 \times 40 = 16$ liters

S32. Ans.(e)

Sol. Let the present age of P, Q and R be x, y and z years respectively

ATQ, $x + y = 35 \times 2 - 4 = 66$ ------ (i)

And, x + z = 56 ------- (ii)

Given, y = 50 – 10 = 40 -----(iii)

From (i) and (iii)

x = 66 – 40 = 26

And z = 56 – 26 = 30

Now, $\frac{26-6}{40+4} = \frac{5}{a}$

4a = 44

a = 11

Required age = $30 + 2 \times 11 = 52$ years

S33. Ans.(b)

Sol. Investment of Q = 3600 – 900 = 2700 Rs

Investment of R = $2700 \times \frac{7}{6} = 3150$ Rs (we know $\frac{50}{3}\% = \frac{1}{6}$)

Ratio of profit share of P, Q and R = $3600 \times 12 : 2700 \times 12 : 3150 \times 6$

= 16 : 12 : 7

Required percentage = $\frac{7}{(16+12+7)} \times 100 = 20\%$

S34. Ans.(a)

Sol. Let speed of train A = 4x meters/second

And speed of train B = 5x meters/second

Let length of train B = y meters

ATQ, $\frac{y+400}{5x} = \frac{480+400}{4x}$

y + 400 = 1100

y = 700 meters

Speed of train A = $\frac{480+700}{59} = 20$ m/s

Speed of train B = $\frac{5}{4} \times 20 = 25$ m/s

Required time = $\frac{700+100}{25} = 32$ seconds

S35. Ans.(c)

Sol. ATQ, $p \times \frac{5t}{100} = \frac{2p}{5}$

$5t = 40$

$t = 8$

Now rate of interest = (8+2) = 10%

Equivalent rate of interest at rate of 10% p.a. for two years = $(10+10+\frac{10+10}{100})\% = 21\%$

ATQ, $p \times \frac{21}{100} = 1050$

$p = 5000$

Required value = $2 \times 5000 = 10000$ Rs.

S36. Ans.(e)

Sol. Let monthly income of man = 100p

Amount spend by man on rent = $100p \times \frac{20}{100} = 20p$

Saving of man = $100p \times \frac{25}{100} = 25p$

ATQ, $(100p - 45p) \times \frac{8}{11} - 20p = 20000$

$40p - 20p = 20000$

$p = 1000$ Rs

So, monthly income of man = 1,00,000 Rs

x = 12 lakhs

S37. Ans.(c)

Sol. Numbers which are divisible by three from 1 to 17 = 3, 6, 9, 12, 15

So required probability = $\frac{5}{17}$

S38. Ans.(d)

Sol. Ratio of efficiency of A to B = 150 : 100 = 3 : 2

Ratio of time taken by A to B alone to complete the work = 2 : 3

Ratio of time taken by B to C alone to complete the work = 2 : 1

⇒ Ratio of time taken by A, B and C alone to complete the work = 4 : 6 : 3

ATQ, $\frac{4}{3} = \frac{x}{x-15}$

$4x-60 = 3x$

$x = 60$

A alone can do the work in 60 days

C alone can do the work = 60 – 15 = 45 days

B alone can do the work = $\frac{60}{4} \times 6 = 90$ days

Work done by A, B and C together in one day

$= \frac{1}{60} + \frac{1}{45} + \frac{1}{90} = \frac{3+4+2}{180}$

$= \frac{9}{180} = \frac{1}{20}$

Required days = 20 days

S39. Ans.(c)

Sol. Let the speed (in kmph) of boat in still water and the speed of stream be 5x and x respectively

ATQ,

$\frac{144}{5x-x} - \frac{144}{5x+x} = 4$

$\frac{36}{x} - \frac{24}{x} = 4$

4x = 12

x = 3

So required speed = $15 \times \frac{5}{18} = \frac{25}{6}$ meters/seconds

S40. Ans.(a)

Sol. Let the length of rectangle be x cm

ATQ,

$(x-8)^2 - 12x = 12$

$x^2 + 64 - 16x - 12x - 12 = 0$

$x^2 - 28x + 52 = 0$

$x^2 - 26x - 2x + 52 = 0$

$x(x-26)-2(x-26) = 0$

x = 26, 2

We cannot take the value of x as 2 because if it will be decreased by 8 then it becomes negative

So, x = 26

Area of the rectangle initially = $26 \times 12 = 312$ cm^2

S41. Ans.(b)

Sol. Let height of each X1 and X2 be Y cm

Given, Volume of X1 – Volume of X2 = 9240

$\frac{22}{7} \times 14 \times 14 \times Y - \frac{22}{7} \times 7 \times 7 \times Y = 9240$

$616Y - 154Y = 9240$

462Y = 9240

Y = 20

S42. Ans.(e)

Sol. ATQ –

$(a + \frac{a \times b}{100}) \times \frac{75}{100} = a + b + 20$ ------- (i)

$[a + \frac{a(b+5)}{100}] \times \frac{75}{100} = a + b + 65$ --------- (ii)

From (i) and (ii) we get –

$\frac{3}{4} \times \left(\frac{5a}{100}\right) = 45$

a = 1200

Putting value of a = 1200 in (i)

We get b = 40

(a) $\frac{1200}{2} = 15 \times 40$

600 = 600

So, (a) is correct

(b) $\left(80 - \frac{1200}{30}\right) = 40$

40 =40

So, (b) is correct

(c) $1.5\times 1200 = 40 \times 40$

$1800 \neq 1600$

So, (c) is not correct

So, only (a) and (b) are correct

S43. Ans.(c)

Sol. Let profit share of B is Rs. b

ATQ –

$b \times \frac{18\times5}{100} = 3600$

$b = 200 \times \frac{100}{5}$

b = 4000 Rs.

So, total profit of business = $4800 + 4000 \times 2 = 12800\ Rs.$

$\frac{P}{2P+600} = \frac{4000}{8800}$

11P = 10P + 3000

P = 3000 Rs.

Investment of A = $(3000 - 1200) = 1800\ Rs,$

Investment of C = (3000 + 1800) = 4800 Rs.

For I. (1800+3000) =4800

4800 = 4800

So, I is true

For II. So, P = 3000

And, 3000 is multiple of 6

II is true

For III. $\frac{1800}{(1800+3000+4800)} \times 100 = 18.75\%$

$\frac{1800}{9600} \times 100 = 18.75$

18.75% = 18.75%

So, III is true

Here, all I, II and III are true

S44. Ans.(b)

Sol. Given, x + y =61 ---- (i)

Also given, when y is divided by x, then the quotient is 2 and the remainder is 7

So, y = 2x + 7 –(ii)

From (i) and (ii)

3x + 7 = 61

3x = 54

x = 18

and y = 43

Given, $(z^n - 2) = -1$

$z^n = 1$

so, n = 0

$(z^n - n + x) = (1 - 0 + 18) = 19$

And, $(y - x) = (43 - 18) = 25$

So, only 23 is possible value lies between given range.

S45. Ans.(d)

Sol. ATQ –

$\frac{22}{7} \times x \times x \times (x + 7) = n \times \frac{11x^3}{42}$

$12x + 84 = x \times n$

$n = 12 + \frac{84}{x}$

A. if n = 13, then x = 84

So, A is possible

B. If n = 16, then x = 21

So, B is possible

C. if n = 8, then x = $-value$

So, C is not possible

D. If n = 17, then x = non integer

So, D not possible

Here, only A and B is possible

S46. Ans.(b)

Sol. Let total quantity of mixture Q be 2N

So, total quantity of mixture P = $2N \times \frac{150}{100} = 3N$

ATQ –

$\frac{3N \times \frac{a}{100} + 2N \times \frac{b}{100}}{5N} = \frac{23}{100}$

3a + 2b = 115 ------- (i)

Given, a+b = 45 -----(ii)

From (i) & (ii)

a = 25

and b = 20

Form (A) Given, 3N = 60
So, mixture Q = 40 liters
And we know the value of a and b
So, from A we can determine the quantity of milk in final mixture
From (B). $(2N + 15) \times \frac{y}{100} = 40$
Here one equation and two variables so we cannot determine
From (C). No need of this data
Hence, only A is required

S47. Ans.(b)
Sol. For minimum number of invitations send by Veer,
All of Veer's friends need to know each other and their friends should be also same i.e.
15 friends should be common to each of his friends.
So, minimum number of invitations = 30
For maximum number of invitations send by Veer,
Veer has fifteen friends and each of his friends has 30 friends.
So, apart from veer, each of the fifteen friends have 29 friends each.
As, Veer's at least two friends know each other
So, maximum number of invitation (When only two friends know each other
= (15 × 29 + 15) –2= 448
Required difference = $448 - 30 = 418$

S48. Ans.(a)
Sol. Let total time taken by car P to reach Lucknow from Delhi = x hours
And the time taken by train Q to reach Lucknow from Banaras = x hours
Given, time taken by car P to travel from Delhi to Banaras = 10 hours
And, time taken by car P to travel from Luck now to Banaras = (10-x) hours
And time taken by car Q to travel from Lucknow to Delhi = 9 hours
ATQ – (by componendo -dividendo)
$\frac{x}{9} = \frac{10-x}{x}$
$x^2 = 9(10-x)$
$x^2 = 90 - 9x$
$x^2 + 9x - 90 = 0$
$x^2 + 15x - 6x - 90 = 0$
$x(x+15) - 6(x + 15) = 0$
$(x+15)\ (x-6) = 0$
x = 6 & - 15
x can't be negative
So, x = 6
Total time (in hours) taken by car Q to travel from Banaras to Delhi = 6 + 9=15 hours

S49. Ans.(b)

Sol. ATQ.

$3300 = 7500\left((1+\frac{X}{100})^2 - 1\right)$

$\frac{3300}{7500} = \left((1+\frac{X}{100})^2 - 1\right)$

$\frac{11}{25} + 1 = (1+\frac{X}{100})^2$

$X = 20$

From (i)

Rate of interest in scheme A = (X-5) % = 20-5 =15%

Invested in scheme B = Rs. (200X)=Rs.$(200 \times 20) = Rs.4000$

Interest received from scheme A is Rs.480 more than that of scheme B.

ATQ.

$4800 \times \frac{15}{100} \times 2 = Rs.1440$

And

$4000 \times 12 \times \frac{2}{100} = Rs.960$

Req. difference = $1440 - 960 = Rs.480$

So, option (i) follows the condition.

From (ii)

Rate of interest in scheme A = X% = 20%

Invested in scheme B = $Rs.4800$

Interest received from scheme A is Rs.360 more than that of scheme B.

ATQ.

$4800 \times \frac{20}{100} \times 2 = Rs.1920$

And

$4800 \times 12 \times \frac{2}{100} = Rs.1152$

Req. difference = $1920 - 1152 = Rs.768$

So, option (ii) doesn't follow.

From (iii)

Rate of interest in scheme A = 1.5X% = (1.5×20) = 30%

Invested in scheme B = $Rs.4000$

Interest received from scheme A is Rs.500 more than that of scheme B.

ATQ.

$4800 \times \frac{30}{100} \times 2 = Rs.2880$

And

$4000 \times 12 \times \frac{2}{100} = Rs.960$

Req. difference = $2880 - 960 = Rs.1920$

So, option (iii) doesn't follow

S50. Ans.(e)

Sol. Let total number of people standing behind of Mohit = 5n

So, total number of people standing ahead of Mohit = $5n \times \frac{60}{100} = 3n$

Given, $300 < X \leq (18^2 + \sqrt{169})$

So, $300 < X \leq 337$

For maximum value we shows take X = 337

ATQ –

$8n + 1 = 337$

$8n = 336$

$n = 42$

So, maximum possible number of people standing ahead of Mohit = $3 \times 42 = 126$

For minimum value we should take X = 301

So, 8n + 1= 301

But we get n = non integer value

So, to get the minimum possible value of (8n + 1) which is more than 300 and also an integer

So, $8 \times 38 + 1 = 305$

Possible minimum number of people behind of Mohit = $38 \times 5 = 190$

Required difference = $190 - 126 = 64$