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Mixed Maths Questions for SBI PO Pre, IBPS PO Pre, IBPS Clerk Mains and SBI Clerk Mains Exams.

Word Problems Quiz 19

Direction: Study the following questions carefully and choose the right answer.

1. Two inlet pipes P and Q can fill an empty tank in 18 hours and 20 hours respectively. Both the two pipes were opened simultaneously but as soon as the tank was half filled a leak was detected in the bottom of the tank. After closing that leak, the two inlet pipes took 1 hour less to fill the remaining half of the tank than they had taken to fill the first half of the tank. Find how much time the leak would take to empty the filled tank?

A. $54\dfrac{126}{361}$ hrs   B. $51\dfrac{126}{361}$ hrs   C. $44\dfrac{126}{361}$ hrs   D. $58\dfrac{126}{361}$ hrs   E. None of these

2. The perimeter of a square field is 8cm more than the perimeter of a rectangle. The length of the rectangle is 51 cm which is 300% of its width. If a street of width 10 cm surrounds from outside the square, then find the total cost of constructing the street at the rate of Rs. 25 per sq. cm?

A. Rs. 45,000   B. Rs. 45,500   C. Rs. 46,000   D. Rs. 46,500   E. None of the above

3. Three friends Anjali, Pooja and Kriti decide to pay their travel fare during a trip in the ratio of 2 : 3 : 4. Anjali pays the first day's fare which amounts to Rs 500, Pooja pays the second day's fare which amounts to Rs 600 and Kriti pays the third day's fare which amounts to Rs 700. When they settle their accounts, how much money does Kriti has to pay to Anjali?

A. Rs. 200   B. Rs. 150   C. Rs. 0   D. Rs. 100   E. None of these

4. A father stated, "thrice my father's age is 7 times my age. And my son's age is cube root of my age. Also, nine years ago, my age was one-third of my father's age then." Find the ratio between the age of the father's father, the father's son and the father himself is

A. 21 : 2 : 3   B. 14 : 2 : 9   C. 7 : 1 : 3   D. 21 : 1 : 9   E. None of these

5. A and B started a business with initial investment in the respective ratio of 3 : 1. After four months from the start of the business, A invests Rs. 2000 more and after two more months B invested Rs. 6000 more. If A's profit share is double of B's share after a year, then what was A's initial investment?

A. Rs. 14000   B. Rs. 15000   C. Rs. 16500   D. Rs. 18000   E. None of these

6. The strength of Amity University is 4500. The no. of boys and girls is increased by 12% and 17% respectively. As a result, the strength of the university becomes 5125. Find the difference between the no. of boys and girls in the university.

A. 2800   B. 2400   C. 1100   D. 1700   E. 1500

7. There are three categories of jobs HR, CA and PA. The average salary of the student who got the job of HR and CA category is 26 lakhs per annum. The average salary of student who got the job of CA and PA category is 44 lakhs per annum and the average salary of those students who got the job of HR and CA category is 34 lakhs per annum. What is the average salary of all three categories of jobs?(in lakhs per annum)

A. 37.67   B. 17.67   C. 34.67   D. 34.33   E. 37.33

8. Pipe A takes 2/3 of the time required by pipe B to fill the tank individually. When an outlet Pipe C is also opened simultaneously with pipe A and pipe B, it takes 75% more time to fill the empty tank than it takes when only pipe A and B are opened together. If it takes 30 hours to fill when all the three pipes are opened together, then in what time pipe C can empty the full tank operating alone?

A. 60 hours   B. 40 hours   C. 20 hours   D. 15 hours   E. 35 hours

9. Akash borrowed Rs 12000 from a bank at the rate of 18% per annum for 8 years. After certain period of time government introduced a scheme which reduced the interest rate by 15%. At the end of 8 years Akash paid Rs 18000 in total then after how much time(in years) government introduced the scheme?(Simple interest is to be considered while solving the problem)

A. $6\dfrac{4}{5}$ B. $1\dfrac{11}{15}$ C. $1\dfrac{5}{11}$ D. $15\dfrac{1}{9}$ E. $7\dfrac{1}{4}$

10. A labourer works on daily wages at Rs. 180 per day. He works for all 31 days in a month and his salary is cut if he fails to come. Also, he has to pay a fine of Rs 5 per day if he is absent for 1 day, Rs. 10 per day if he is absent for two days continuously, Rs. 15 per day if he is absent for three days continuously. He takes leave on following dates of a month 15th, 16th, 18th, 20th, 21st and 22nd. Find the salary that he received at the end of the month?

A. Rs. 4440   B. Rs. 4460   C. Rs. 4430   D. Rs. 4470   E. None of these

Correct Answers:

1	2	3	4	5	6	7	8	9	10
A	C	D	D	A	C	C	B	B	C

Explanations:

1. Let the capacity of the tank = lcm of 18 and 20 = 180 litres

Efficiency of P = $\dfrac{180}{18}$ = 10 litres/hr

Efficiency of Q = $\dfrac{180}{20}$ = 9 litres/hr

If there is no leak then the total time taken by (P + Q) to fill half of the tank

= $\dfrac{90}{10 + 9}$ = $\dfrac{90}{19}$ hrs

When there is leak then according to the question, the total time taken by them

= $\dfrac{90}{19}$ + 1 hr = $\dfrac{109}{19}$ hrs

Efficiency of (P + Q) + leak = $\dfrac{90}{\dfrac{109}{19}}$

{because 109/19 hrs is taken by P, Q, and leak to fill half of the tank}

= 90 × $\dfrac{19}{109}$ litres/hr = $\dfrac{1710}{109}$ litres/hr

We know that the efficiency of (P + Q) = (10 + 9) = 19 litres/hr

So, the efficiency of the leak

= 19 − $\dfrac{1710}{109}$ = $\dfrac{361}{109}$ litres/hr

So the total time taken by the leak to empty the filled tank

= $\dfrac{180}{\dfrac{361}{109}}$ = $\dfrac{19620}{361}$ hrs = 54$\dfrac{126}{361}$ hrs

Hence, option A is correct.

2. Let the width of the rectangle = x cm

Then, 300% of x = 51

$$x = 51 \times \frac{100}{300} = 17 \text{ cm}$$

Perimeter of the rectangle = 2(length + width) = 2 × (51 + 17) = 136 cm

Perimeter of the square = (136 + 8) = 144 cm

The sides of the square = $\frac{144}{4}$ = 36 cm

The area of the square field without street = $(36)^2$ sq. cm = 1296 sq. cm

The area of the square field with street = $(36 + 20)^2$ sq. cm = 3136 sq. cm

The area of the street = 3136 – 1296 = 1840 sq. cm

The total cost of constructing the street = 1840 • × 25 = Rs. 46,000

Hence, option C is correct.

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3. Total fare for 3 days = Rs. (500 + 600 + 700) = Rs. 1800/–

According to their agreement,

Anjali has to pay = $\frac{2}{2 + 3 + 4} \times 1800 = 400/–$

Pooja has to pay = $\frac{3}{2 + 3 + 4} \times 1800 = 600/–$

Kriti has to pay = $\frac{4}{2 + 3 + 4} \times 1800 = 800/–$

Person	Amount Paid during the trip	Due amount according to ratio
Anjali	500	400
Pooja	600	600
Kriti	700	800

But we can see that Anjali paid 100/– more and Kriti paid 100/– less than the amounts they should have paid. Hence Kriti has to pay 100/– to Anjali.
Hence, option (D) is correct.

4. Let father's age be x, and father's father age be y.
Then, ATQ,

$7x = 3y$ or, $y = \dfrac{7x}{3}$

Nine years ago,
ATQ,

$(x - 9) = \dfrac{1}{3}(y - 9)$

Replacing the value of y, and simplifying, we get,

$3(x - 9) = \dfrac{7x}{3} - 9$

$3(3x - 27) = 7x - 27$
$9x - 81 = 7x - 27$
$2x = 81 - 27 = 54$

$x = \dfrac{54}{2} = 27$ years

father's father's age $= \dfrac{7x}{3} = 7 \times 9 = 63$ years

father's son's age $= (27)^{1/3} = 3$ years
Ratio of ages (in required sequence) = 63 : 3 : 27 = 21 : 1 : 9
Hence, option D is correct.

5. In the case of compound partnerships, the profits are shared in the ratio of capital invested. Here capital is a unit calculated as capital = (sum invested) × (time period)

Let the amounts initial amounts invested by A and B be 3t and t respectively. A later invested Rs. 2000 for 8 months and B invests Rs. 6000 for 6 months.

It is given that A's share is double of B's share:

$\therefore \dfrac{\text{A"s investment}}{\text{B"s investment}} = \dfrac{2}{1}$

$\therefore \dfrac{3t \times 12 + 2000 \times 8}{t \times 12 + 6000 \times 6} = \dfrac{2}{1}$

$\therefore \dfrac{36t + 16000}{12t + 36000} = \dfrac{2}{1}$

$24t + 72000 = 36t + 16000$
$12t = 56000$

$3t = \dfrac{56000}{4}$

$3t = 14000$
Thus, A's initial investment will be = 3t = Rs. 14000
Hence, option A is correct.

6. Let the no. of girls be x.

So, the no. of boys = 4500 − x

The no. of boys and girls is increased by 12% and 17% respectively. As a result, the strength of the Amity university becomes 5125.

So, we can write now,

$$[(4500 − x) × 12\%] + [x × \frac{17}{100}] = 5125 − 4500$$

$$⇒ 54000 − 12x + 17x = 62500$$

$$⇒ 5x = 62500 − 54000$$

$$⇒ x = \frac{8500}{5}$$

⇒ x = 1700 ∴ The no. of girls = 1700.
So, the no. of boys = 4500 − 1700 = 2800
Difference between no. of boys and girls = 2800 − 1700 = 1100
Hence, option C is correct.

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7. Let the salary of students who got the jobs of HR, CA and PA categories are A, B and C respectively.
The average salary the student who got the job of HR and CA category = 26 lakh per annum

i.e. $\frac{A + B}{2}$ = 26 lakh per annum
therefore, A + B = 26 × 2 = 52 lakh per annum……..(i)
the average salary the student who got the job of CA and PA category = 44 lakh per annum

i.e. $\frac{B + C}{2}$ = 44 lakh per annum
therefore, B + C = 44 × 2 = 88 lakh per annum………(ii)
the average salary the student who got the job of PA and HR category = 34 lakh per annum
i.e. $\frac{C + A}{2}$ = 34 lakh per annum

therefore, C+ A = 34 × 2 = 68 lakh per annum…………(iii)
Adding (i), (ii) and (iii)
2(A+B+C) = 52 + 88 + 68
2(A+B+C) = 208 lakh per annum
A+B+C = 104 lakh per annum
Which means total salary of HR, CA and PA is equal to 104 lakh per annum
Average salary of HR, CA and PA = (A+B+C)/3 = 104/3 = 34.667 lakh per annum = 34.67 lakh per annum
Hence, option C is the correct answer.

8. Let pipe A fill the tank in 2x and pipe B fill it in 3x hours
In one hour they will fill

$$= \frac{1}{2x} + \frac{1}{3x} = \frac{5}{6x}$$

When pipe is also opened then it takes

$$= \frac{6x}{5} + \frac{6x}{5} \times \frac{3}{4} = \frac{42x}{20}$$

When in one hour pipe A, B and C working together fill

$$= \frac{1}{2x} + \frac{1}{3x} - \frac{1}{C} = \frac{20}{42x}$$

$$= \frac{1}{C} = \frac{15}{42x} => C = \frac{42x}{15}$$

So, in 42x/15 hours C can empty the whole tank
Now,

$$\frac{42x}{20} = 30$$

$$x = 30 \times \frac{20}{42}$$

$$x = \frac{100}{7}$$

Time required by pipe C $= \frac{42}{15} \times \frac{100}{7} = 40$ hours

Hence, option B is correct.

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9. Let the years after which government introduced the scheme be x.
Initial interest rate = 18%
New interest rate after the scheme = (18 − 15)% = 3%
So,

$$6000 = 12000 \frac{[18 \times x + 3 \times (8 - x)]}{100}$$

$$6000 = 12000 \frac{(18x + 24 - 3x)}{100}$$

$$6000 = 1800x + 2880$$
$$1800x = 3120$$

$$x = 1\frac{11}{15} \text{ years.}$$

Hence, option B is correct.

10. He takes leave for 6 days. He works for 25 days.

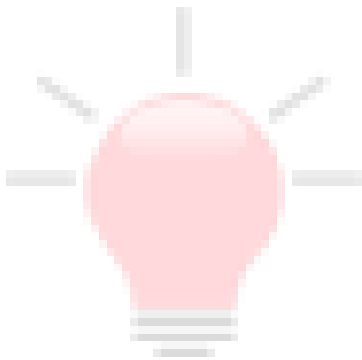Salary without fine = 25 × 180 = Rs. 4500

Fine that he paid = Rs. 5 for 18th

Rs. 10 × 2 = 20 for 15th and 16th

Rs. 15 × 3 = 45 for 20th, 21st, 22nd

Total fine = Rs. (5 + 20 + 45) = Rs. 70

He received Rs. (4500 – 70) = Rs. 4430.

Hence, option C is correct.