

① Reciprocal of 0 is

sol: none of the above as 0 does not have any reciprocal.

② Multiplicative inverse of 10^{-100} is

sol: 10^{100}

③ zero is the identity for

sol: addition of rational nos

④ 1 is the identity for

sol: multiplication of rational nos

⑤ Find the least number by which 1323 must be multiplied so that the product is a perfect cube.

sol:

$$\begin{array}{r} 3 \overline{) 1323} \\ \underline{3441} \\ 3197 \\ \underline{2499} \\ 719 \\ \underline{719} \\ 0 \end{array}$$

$= 3 \times 3 \times 3 \times 7 \times 7$
 $\therefore 7$ should be multiplied (c)

⑥ 2.7 is what % of 18?

• Let the % be x .

$$x\% \text{ of } 18 = 2.7$$

$$\frac{x}{100} \times 18 = 2.7$$

$$x = \frac{2.7}{18} \times 100$$

$$= 15\%$$

⑦ If A & B are two sets such that $n(A) = 15$, $n(B) = 21$ and $n(A \cup B) = 36$. Then, $n(A \cap B)$ is equal to.

sol: $n(A) = 15$, $n(B) = 21$

$$n(A+B) = 21 + 15 = 36$$

$$n(A \cup B) = 36$$

This proves that there are no common

This proves that there are no common elements in set A and B as $n(A+B) = n(A \cup B)$.

\therefore , ~~the~~ $n(A \cap B) = 0$ (b)

⑧ If $5A \times A = 399$, value of A is

Sol: $5A \times A = 399$

$$\begin{array}{r} 5A \\ \times A \\ \hline 399 \end{array}$$

Here, possible values for A are 3 and 7 only as when we do (3×3) and (7×7) we get unit digit 9 in both the products.

$$\begin{array}{r} 53 \\ \times 3 \\ \hline 159 \end{array}$$

\Rightarrow Here, if we check for 3 it is not correct

$$\begin{array}{r} 57 \\ \times 7 \\ \hline 399 \end{array}$$

\Rightarrow Here, if we check for 7, value 399 is obtained.

\therefore , $A = 7$

⑨ If 30 men can do a work in 24 days, How many men will do the same work in 12 days?

Sol: 30 men can do work in 24 days
1 man " " the work in ~~24~~ 24×30 days

No of men " " the work in 12 days = $\frac{24 \times 30}{12}$
= 60 men

⑩ $a + b = b + a$ is called
sol: commutative law of addition

⑪ Insert three rational nos between $\frac{2}{3}$ and $\frac{3}{4}$

= $\frac{2}{3}$ and $\frac{3}{4}$

⇒ LCM of 3 & 4 = 12

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$$

$$\frac{2}{3} < \frac{8}{12} < \frac{9}{12} < \frac{3}{4}$$

⑫ $(12)^{-2} \times 4^3$

= $\frac{1}{12^2} \times 4^3$

= $\frac{1}{144} \times 64 = \frac{4}{9} = \frac{2^2}{3^2} = \left(\frac{2}{3}\right)^2$

⑬ $5\frac{1}{2}$ m long rope is cut into 12 equal pieces. What is the length of each piece?

sol: length of rope = $5\frac{1}{2}$ m = $\frac{11}{2}$ m

No of equal pieces cut = 12

length of each piece = $\frac{11}{2} \div 12 \Rightarrow \frac{11}{2} \times \frac{1}{12} = \frac{11}{24}$ m

14) ~~Which of the~~ Write the following rational nos in the descending order.

$$\frac{8}{7}, -\frac{9}{8}, -\frac{3}{2}, 0, \frac{2}{5}$$

Sol: LCM of 7, 8, 2 & 5 = 280

$$\frac{8}{7} = \frac{8 \times 40}{7 \times 40} = \frac{320}{280}$$

$$-\frac{9}{8} = \frac{-9 \times 35}{8 \times 35} = -\frac{315}{280}$$

$$-\frac{3}{2} = \frac{-3 \times 140}{2 \times 140} = -\frac{420}{280}$$

$$\frac{2}{5} = \frac{2 \times 56}{5 \times 56} = \frac{112}{280}$$

$$\frac{0}{1} = \frac{0 \times 280}{1 \times 280} = \frac{0}{280}$$

$$\begin{array}{|l} 9 \\ \hline 7, 8, 2, 5 \\ \hline 7, 4, 1, 5 \\ \hline = 7 \times 4 \times 5 \times 2 \\ = 280 \end{array}$$

descending order =

$$\frac{320}{280} > \frac{112}{280} > \frac{0}{280} > -\frac{315}{280} > -\frac{420}{280}$$

$$\frac{8}{7} > \frac{2}{5} > 0 > -\frac{9}{8} > -\frac{3}{2}$$

15) Find the sum of additive inverse and multiplicative inverse of 7.

Sol: Additive inverse of 7 = -7
 Multiplicative " " " = $\frac{1}{7}$

$$\begin{aligned} \text{Sum} &= \cancel{7} + \frac{1}{7} - 7 \\ &= \frac{1 - 49}{7} = -\frac{48}{7} \\ &= -6\frac{6}{7} \end{aligned}$$

⑩ The perimeter of a triangle is $8y^2 - 9y + 4$ and its two sides are $3y^2 - 5y$ and $4y^2 + 12$. Find its third side.

sol: Perimeter = $8y^2 - 9y + 4$
Sum of two sides = $3y^2 - 5y + 4y^2 + 12$
 $= 7y^2 - 5y + 12$

Third side = $8y^2 - 9y + 4 - 7y^2 + 5y - 12$
 $= y^2 - 4y - 8$

⑪ A can do a piece of work in 20 days and B in ~~20~~¹⁵ days. They worked together on it for 6 days and then A left. How long will ~~to~~ B take to finish the remaining work.

sol: A's one day work = $\frac{1}{20}$
B's one day work = $\frac{1}{15}$

Together (A + B)'s one day work = $\frac{1}{20} + \frac{1}{15}$
 $= \frac{7}{60}$

(A + B)'s 6 days work = $\frac{7}{60} \times 6 = \frac{7}{10}$
done by B
remaining work = $\frac{3}{10}$

B's one day work = $\frac{1}{15}$

B's $\frac{3}{10}$ work = $\frac{3}{10} \div \frac{1}{15}$
 $= \frac{3}{10} \times 15 = \frac{9}{2} = 4\frac{1}{2}$ days

(18) (i) At what rate % pa will ₹630 produce an interest of ₹126 in 4 yrs?

sol: $R = \frac{SI \times 100}{P \times T}$ | $SI = 126$ $T = 4 \text{ yrs}$
 $= \frac{126 \times 100}{630 \times 4}$ | $P = 630$
 $= \frac{315}{105}$
 $= 3$
 $= 5\%$

(ii) At what rate % per year will a sum double itself in 6 yrs?

sol: Let the sum be 100 ₹.
For double of the sum, SI should be equal to Sum.

∴, SI should be 100%.

Interest in 6 yrs = 100%

" " 1 yr = $\frac{100}{6} = \frac{50}{3}\%$

∴, rate of interest is $\frac{50}{3}\%$.

(19) Calculate the difference between CI and SI on ₹7500 in two yrs at 8% pa.

sol: $CI - SI = \frac{PR^2}{100}$
 $= \frac{7500 \times 8^2}{100} = 75 \times 64$
 $= ₹4800$

- 21) In a group of 500 people, 250 can speak French and 300 can speak German. How many can speak both French & German. Represent in venn diagram.

sol: Total people = 500

$$\text{Let } n(\text{French}) = n(A) = 250$$

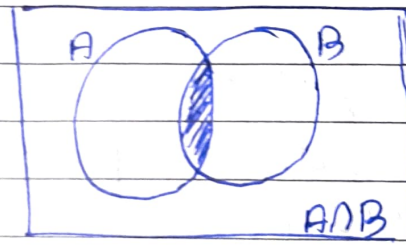
$$" \quad n(\text{German}) = n(B) = 300$$

$$A + B = 550 \text{ (given)} \quad \text{and} \quad A \cup B = 500 \text{ (given)}$$

$$A + B - A \cup B = A \cap B$$

$$\therefore 550 - 500 = 50 \text{ (A} \cap \text{B)}$$

Venn diagram -



- 20) If the price of sugar is ⁱⁿ decreased by 25% today; by what % should it be decreased tomorrow to bring the price back to the original?

sol: Let the price of sugar be ₹ 100.

After increase of 25%, price of sugar = ₹ 125

$$\text{For back into original price, i.e. ₹ 100,} = \frac{100}{125} \times 100$$

$$= 80\% \text{ should be decreased.}$$

- 29) John sold an article to Peter at 20% profit and Peter sold it to Mohan at 5% loss. If Mohan paid ₹ 912 for the article, Find how much did John pay for it?

sol: SP for Peter = ₹912
 Loss % = 5%
 CP for Peter = $\frac{100}{95} \times 912$
 = ₹960

CP for Peter = SP for John

SP for John = ₹960

Profit % = 20%

CP for John = $\frac{100}{120} \times 960$
 = ₹800

(23) Rajesh sold his scooter to Rahim at 8% loss and Rahim sold it to Prem at 5% gain. If Prem paid ₹14,490 for scooter, find.

(i) the SP and CP of the scooter for Rahim

sol: SP for Rahim = ₹14,490 (given)
 CP for Rahim = $\frac{100}{105} \times 14490$
 $\frac{21}{7} \times 966$
 3×138
 = ₹13800

(ii) the SP and CP for Rajesh

sol: SP for Rajesh = ₹13800
 CP " " = $\frac{100}{92} \times 13800$
 = ₹15000

24) Insert 6 rational numbers between $\frac{5}{6}$ and $\frac{8}{9}$.

sol: $\frac{5}{6}$ and $\frac{8}{9}$, LCM of 6 and 9 = 18

$$= \frac{5}{6} = \frac{5 \times 3}{6 \times 3} = \frac{15}{18}$$

$$\frac{8}{9} = \frac{8 \times 2}{9 \times 2} = \frac{16}{18}$$

$$\frac{15}{18} = \frac{30}{36} \quad \frac{15}{18} = \frac{90}{108}$$

$$\frac{16}{18} = \frac{32}{27} \quad \frac{16}{18} = \frac{96}{108}$$

6 rational nos between them are.

$$\frac{91}{108}, \frac{92}{108}, \frac{93}{108}, \frac{94}{108}$$

$$\frac{95}{108}, \frac{96}{108}$$

6

25) If $\sqrt{784} = 28$, find.

i) $\sqrt{7.84} + \sqrt{78400}$

$$= \sqrt{7.84} = 2.8 \quad \sqrt{784} = 28$$

$$= \sqrt{78400} = 280 \quad \sqrt{784} = 28$$

ii) $\sqrt{0.0784} + \sqrt{0.000784}$

$$= 0.28 + 0.028$$

$$= 0.308$$

26) sol: All are singleton sets.

27) If John sells his cycle for ₹ 637, he will suffer a loss of 9%. For how much should it be sold, if he desires a profit of 5%?

sol: $\text{SP of cycle} = ₹ 637$
Loss = 9%

$$\text{CP of cycle} = \frac{100}{91} \times 637$$

$$= ₹ 700$$

CP = ₹ 700

P = 5%

SP should be = $\frac{105}{100} \times 700$

$$= ₹ 735$$

28) If 3 men or 6 boys can finish a work in 20 days, how long will 4 men and 12 boys take to finish the same work?

sol: $3m = 6b$
 $1m = \frac{6b}{3}$
 $= 2 \text{ boys}$

$4 \text{ men} = 4 \times 2$
 $= 8 \text{ boys}$

$12 + 8 = 20 \text{ boys}$

6 boys	can finish work in 20 days
1 "	" " " " " in 20×6 days
20 "	" " " " work in $\frac{20 \times 6}{20}$ days

$= 6 \text{ days}$

29) A family of 5 persons can be maintained for 20 days with ₹ 9480. Find, for how long ₹ 6944 will maintain a family of 8 persons.

sol: 5 persons can be maintained for 20 days with ₹ 2480
 1 " " " " " 1 day with ~~₹ 2480~~

$$= \frac{2480 \times 5}{100}$$

Maintenance for 8 persons = $\frac{248 \times 8^4}{10^5}$

$$= \frac{992}{5}$$

Q No of days ₹ 6944 maintained for 8 persons ~~is~~

$$= \frac{6944}{\frac{992}{5}} \Rightarrow 6944 \times \frac{5}{992}$$

$$= ₹ 35 \text{ days.}$$

(30) Find the proper subsets of $\{x : x^2 - 9x - 10 = 0\}$

$$= x^2 - 9x - 10 = 0$$

$$= x^2 - 10x + x - 10 = 0$$

$$= x(x-10) + 1(x-10) = 0$$

$$= (x+1)(x-10) = 0$$

$$= (x+1) = 0, \quad x = -1$$

$$= (x-10) = 0, \quad x = 10$$

$$A = \{-1, 10\}$$

Proper subsets = $\emptyset, \{-1\}, \{10\}$