## WORKSHEET

**Q1-** Reciprocal of zero is - 0

**Q2-** The multiplicative inverse of $10^{-100}$ is

**Q3-** Zero (0) is the identity of for addition of national numbers

**Q4-** One (1) is the identity for multiplication of national numbers.

**Q5-** Find the least no- by which 1323 must be multiplied so that the product is a perfect cube

Sol-

| 3 | 1323 |
|---|------|
| 3 | 441 |
| 3 | 147 |
| 7 | 49 |
| | 7 |

$1323 = 3 \times 3 \times 3 \times 7 \times 7$

$7 \times 7$ is not in pain so.

$1323 \times 7 = 9,261$

$\therefore 9,261 = 3 \times 3 \times 3 \times 7 \times 7 \times 7$

| 3 | 9,261 |
|---|------|
| 3 | 3,087 |
| 3 | 1029 |
| 7 | 343 |
| 7 | 49 |
| | 7 |

∴ So, we must multiply ~~1323~~ 7 to 1323 to get a perfect cube.

**Q6-** 2.7 is what % of 18?

$$\frac{2.7}{18} \times 100 = \frac{30}{\cancel{270}} \cancel{\cancel{180}2} = \frac{30^{15}}{2} = 15\%$$

Q7- If A and B are two sets such that $n(A) = 15$, $n(B) = 21$, and $n(A \cup B) = 36$ then $(A \cap B)$ equal to

sol- $n(A \cap B) = n(A) + n(B) - n(A \cup B)$

$= 15 + 21 - 36 = 0$

Q8- If $5A \times A = 399$, then the value of A is

sol- In the unit digit the product of $A \times A = 9$

The no. whose sq. is having 9 at its unit digit = 7

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

So, $A = 7$

Q9- If 30 men can do a work in 24 days. How many men will do the same work in 12 days?

sol- Let $x$ men will do the same work in 12 days

| No. of men | 30 | $x$ |
| No. of days | 24 | 12 |

∴ It is a case of inverse variation

$$30 \times 24 = x \times 12$$

=> $x = \dfrac{30 \times 24^{2}}{12} = 60 \text{ days men}$

∴ 60 men will do the same work in 12 days.

Q10- $a + b = b + a$ is called commutative law of addition

Q11- Insert 3 rational no. between 2 and 3

$\dfrac{2}{3} = \dfrac{2 \times 4}{3 \times 4} = \dfrac{8}{12}$    $\dfrac{3}{4} = \dfrac{3 \times 3}{4 \times 3}, \dfrac{9}{12}$    $[\because LCM \text{ of } 3,4 = 12]$

$3 + 1 = 4$

$\dfrac{8}{12} = \dfrac{8 \times 4}{12 \times 4} = \dfrac{32}{48}$    and    $\dfrac{9}{12} = \dfrac{9 \times 4}{12 \times 4}, \dfrac{36}{48}$

∴ 3 rational no.s between 2 and 3 are

$\dfrac{33}{48}, \dfrac{34}{48}, \dfrac{35}{48}$

$= \dfrac{11}{186}, \dfrac{17}{12}, \dfrac{35}{48}$

Q.12. Simplify: $(12)^{-2} \times 4^3$.

$$\frac{1}{12^2} \times 4^3 = \frac{\cancel{4} \times 4 \times 4}{\underset{3}{\cancel{12}} \times \underset{3}{\cancel{12}}} = \frac{4}{9}$$

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

sol.- The length of the nope $= 5\frac{1}{2}$ m $= \frac{11}{2}$ m

Let length of one piece of nope be a

$= 12a = \frac{11}{2}$ m

$y = \frac{11}{2} \times \frac{1}{12}$     $y = \frac{11}{24}$ pieces

∴ The length of one piece of nope is $\frac{11}{24}$ m

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

Additive inverse of 7 = ÷7    Multiplicative inverse of 7 = $\frac{1}{7}$

$$\frac{-7+1}{7} \stackrel{?}{=} \frac{-7+1}{1 \cdot 7} = \frac{-49+1}{7} = \frac{-48}{7}$$

16. 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 and write the fotta.

Ans - Perimeter of the triangle $= 8y^2 - 9y + 4$

Sum of two sides $= 3y^2 - 5y + 4y^2 + 12$

$$= 7y^2 - 5y + 12$$

The third side $= 8y^2 - 9y + 4 - (7y^2 - 5y + 12)$

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

$$= y^2 - 4y - 8$$

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

Sol - A's 1 day work $= \frac{1}{20}$ and B's 1 day work $= \frac{1}{15}$

$\therefore$ (A+B)'s 1 day work $= \frac{1}{20} + \frac{1}{15} = \frac{3+54}{60} = \frac{7}{60}$

$\therefore$ (A+B)'s 6 days work $= \frac{7}{10 \, 60} \times 6 = \frac{7}{10}$

Remaining work $= 1 - \frac{7}{10} = \frac{10-7}{10} = \frac{3}{10}$

$\therefore$ No. of days taken by B to finish the remaining work

$$= \frac{\text{Remaining work}}{\text{B's 1 day work}} = \frac{\frac{3}{10}}{\frac{1}{15}} = \frac{3}{10} \times 15^3 = \frac{9}{2}$$

$\therefore$ Hence B will take $\frac{9}{2}$ no. of days to finish the remaining work.

18. At what rate % per annum will ₹630 produce an interest of ₹126 in 4 years?

**Sol-** Given $P = ₹630$  $T = 4$ years  $I = ₹126$  R o/o = R

So, $126 = \dfrac{630 \times 4 \times R}{100}$

$R = \dfrac{\overset{\cancel{63}}{\cancel{126}} \times \overset{5}{\cancel{100}}}{\cancel{630} \times \cancel{4} \, 8} = 5\%$

**ii-** **Qn** At what rate o/o per year will a sum double itself in 6 years?

**sol.** Let $P = ₹100$

$\therefore A = 2 \times ₹100 = ₹200$

$I = A - P$

$\quad = ₹200 - ₹100 = ₹100$

$T = 6\frac{1}{4}$ years $= \frac{25}{4}$ years

$R = \dfrac{100 \times I}{P \times T} = \dfrac{100 \times 100}{100 \times \frac{25}{4}} \, o/o = \dfrac{\overset{4}{\cancel{100}} \times \cancel{100} \times 4}{\cancel{100}_{120} \, \cancel{25}} = 16\%$

**19** Calculate the difference between the C.I and S.I on ₹7,500 in two years and at 8 o/o per annum.

**sol.** $P = ₹7,500$  $T = 2$ years  R o/o = 8 o/o

$S.I = \dfrac{7,500 \times 2 \times 8}{100} = ₹1,200$

I for the first year $= \dfrac{7,500 \times 8 \times 1}{100} = ₹600$

$\therefore$ Amount at the end of first year $= P + S.I = ₹7500 + ₹600$

$\qquad = ₹8100$

P. for the second year $= ₹8,100$

$\therefore$ I for the second year $= \dfrac{8100 \times 8 \times 1}{100} = ₹648$

$\therefore$ Total C.I for 2 year $= ₹600 + ₹648 = ₹1248$

$\therefore$ Diff. between C.I and S.I for 2 years $= ₹1248 - ₹1200$

$\qquad = ₹48$

**20-** If the price of sugar is increased by 25 o/o today. by what o/o should it be decreased tomorrow to bring the price back to the original?

Let the original price of sugar be 100.

Today's price. = ₹100 + ₹25 = ₹125

In order to bring down the price to original to ₹100, it's price should be decreased by ₹125

₹125 - ₹100 = ₹25 on ₹125

i.e. On ₹125, the price should be decreased by ₹25

$\Rightarrow$ On ₹1, the price should be decreased by $₹\dfrac{25}{125}$

and on ₹100, the price should be decreased by $₹\dfrac{\cancel{25}^{5}}{\cancel{125}_{\cancel{25}}} \times \cancel{100}^{20}$

∴ Hence, The price should be decreased by 20% = 20%

**21.** In a Group of 500 people, 250 can speak french and 300 can speak German. How many can speak both french and German. Represent it in Venn diagram.

**Sol.** Let F denote the set of people speaking French
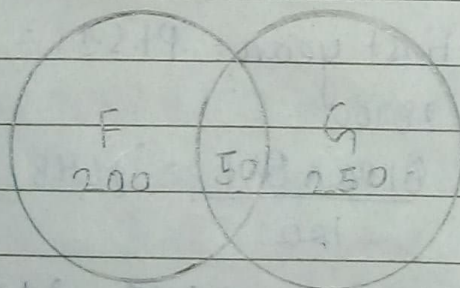
Let G denote the set of people speaking German.

$n(F) = 250$ , $n(G) = 300$ and $n(F \cup G) = 500$

$n(F \cup G) = n(F) + n(G) - n(F \cap G)$

$\Rightarrow n(F \cap G) = n(F) + n(G) - n(F \cup G)$

$\Rightarrow \qquad\qquad 250 + 300 - 500 = 50$

Hence, 50 people can speak both french and German.

200 people can speak only French

250 people can speak only German

50 people can speak both French and German.



F 200  50  G 250

**22.** 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.** S.P. of the article for Peter = ₹912

loss = 5%

$$C.P. = \frac{100}{100-5\%} \times ₹912 = \frac{\overset{20}{\cancel{100}}}{\underset{19}{\cancel{95}}} \times \overset{48}{\cancel{912}} = ₹960$$

S.P. of the article for John = ₹960

Profit = 20%

$$C.P. = \frac{100}{100+20\%} \times ₹960 = \frac{100}{\underset{}{\cancel{120}}} \times \overset{8}{\cancel{960}} = ₹800$$

∴ Hence John paid ₹800 for the article

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**23-** Rajesh sold his scooter to Rahim at 8% loss and Rahim, in turn, sold the same scooter to Prem at 5% gain. If Prem paid ₹14,490 for the scooter; find:

i. S.P. and the C.P. of the scooter to for Rahim.

sol. S.P. of the scooter = ₹14,490 for Rahim

gain = 5%

$$C.P. = \frac{100}{100+5\%} \times 14,490 = \frac{100}{\underset{}{\cancel{105}}} \times \overset{138}{\cancel{14,490}} = ₹13,800$$

ii- S.P. and the C.P. of the scooter for Rajesh.

sol- S.P. of scooter for Rajesh = ₹13,800     loss = 8%

$$C.P. = \frac{100}{100-5\%} \times 13,800 = \frac{\overset{20}{\cancel{100}}}{\underset{19}{\cancel{95}}} \times 13,800$$

$$\frac{100}{\underset{92}{}} \times \overset{150}{\cancel{13,800}} = 15,000$$

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**24.** Insert six rational no.s between $\frac{5}{6}$ and $\frac{8}{9}$

sol - LCM of 6 and 9 = 18

$$\frac{5}{6} = \frac{5\times3}{6\times3} = \frac{15}{18} \qquad \frac{8}{9} = \frac{8\times2}{9\times2} = \frac{16}{18}$$

$$\frac{15}{18} = \frac{15\times7}{18\times7} = \frac{105}{126} \qquad \text{and} \quad \frac{16}{18} = \frac{16\times7}{18\times7} = \frac{112}{126}$$

⇒ Req'd. rational no.s between $\frac{5}{6}$ and $\frac{8}{9}$ are:

$$\frac{\overset{53}{\cancel{106}}}{\underset{63}{\cancel{126}}}, \frac{107}{126}, \frac{\overset{6}{\cancel{108}}}{\underset{7}{\cancel{126}}}, \frac{109}{126}, \frac{\overset{55}{\cancel{110}}}{\underset{63}{\cancel{126}}}, \frac{\overset{37}{\cancel{111}}}{\underset{42}{\cancel{126}}} = \frac{53}{63}, \frac{107}{126}, \frac{6}{7}, \frac{109}{126}, \frac{55}{63}, \frac{37}{42}$$

25. If $\sqrt{784} = 28$, find the value of

i. $\sqrt{7.48} + \sqrt{78400}$

Sol.
$$\sqrt{\frac{748}{100}} + \sqrt{784 \times 100}$$

$$\frac{28}{10} + 28 \times 10 = 28 + 280$$

$$= 282.8$$

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

sol.
$$\sqrt{\frac{784}{10^4}} + \sqrt{\frac{784}{10^6}}$$

$$\frac{28}{10^2} + \frac{28}{10^3} = 0.28 + 0.028$$

$$= 0.308$$

26. Find, which of the following sets are singleton sets:

i. The set of points of intersection of two non-parallel straight lines in the same plane. Singleton set

ii. $A = \{x : 7x - 3 = 11\} = \{2\}$ Singleton set

iii. $B = \{xy : 2y + 1 < 3 \text{ and } y \in w\}$ $\{0\}$ Singleton set

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

Sol. S.P of bicycle = ₹637

$\Rightarrow$ Loss % = 9%

$\Rightarrow$ C.P. $= \frac{100}{100 - 9\%} \times 637 = \frac{100 \times 637}{91} = 700$

C.P = ₹700, profit = 5%

S.P. $= \frac{100 + 5\%}{100} \times 700 = \frac{105 \times 700}{100} = 105 \times 7 = ₹735$

Hence,

∴ It should be sold for ₹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. According to the amount of work done, in the same time, 3 men are equal to 6 boys

3 men = 6 boys

$$1 \text{ men} = \frac{6 \text{ boys}}{3}$$

and $4$ men $= \frac{6}{3} \times 4 = \frac{2 \times 8}{3} = 8$ boys

$\therefore$  $4$ men $+ 12$ boys $= 8$ men $+ 12$ boys $= 20$ boys

Since, $6$ boys take to finish the same work in $20$ days

$\Rightarrow$ $1$ boy will do work in $\frac{6 \times 20}{20} = 6$ days

$\therefore$ Hence, $4$ men and $12$ boys take $6$ days to finish the work.

29. A family of $5$ persons can be maintained for $20$ days with ₹ $2,480$. Find, for how long ₹ $6,944$ will maintain a family of $8$ persons.

**Sol.** $5$ persons can be maintained for $20$ days with ₹ $2,480$

$\Rightarrow$ $5$ persons can be maintaind for $1$ day with $\frac{2480 \text{ days}}{20}$

$\Rightarrow$ $1$ person can be maintained for $1$ day with $= \frac{\cancel{80} \times 5}{\cancel{2480}} = \frac{5}{124}$

$\xrightarrow{}$ $8$ persons can be maintained with ₹ $6,944 = \frac{5}{124} \times \cancel{6944}$

$35$ days

$\therefore$ Hence, $8$ persons can be maintained for $35$ days in $\cancel{2480}$ ₹ $6,944$.

30- **B.** Find the proper subsets of $\{x : x^2 - 9x - 10 = 0\}$

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

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

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

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

$x - 10 = 0$

$x = 10$     on

$x + 1 = 0$    $x = -1$

$x = 10$ on $-1$     $x = \{10, -1\}$    Proper subset $= \phi, \{10\}, \{-1\}$