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# WORKSHEET

1. Reciprocal of zero is

Ans- none of the above (undefined)

2. The multiplicative inverse of $10^{-100}$ is

Ans- $10^{100}$

3. zero (0) is the identity for addition of rational numbers.

Ans- a) identity for addition of rational numbers

4. One (1) is the

Ans- identity for multiplication of rational number

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

Ans- c) 7

6. 2.7 is what percent of 18?

Ans- b) 15%

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

Ans- b) 0

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

Ans- b) 7

9. If 30 men can do a work, How many

Ans- b) 60

10. $a + b = b + a$ is called

Ans- a) commutative law of addition

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

Ans- Given 2 rational number = $\frac{2}{3}, \frac{3}{4}$

$$x_1 = \frac{2}{3} + \frac{3}{4} = \frac{5}{7}$$

$$x_2 = \frac{5}{7} + \frac{2}{3} = \frac{7}{10}$$

$$x_3 = \frac{7}{10} + \frac{5}{7} = \frac{12}{17}$$

∴ Three rational no between $\frac{2}{3}$ and $\frac{3}{4}$ are $\frac{5}{7}, \frac{7}{10}$ and $\frac{12}{17}$.

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

Ans

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

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

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

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

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

$$= \frac{1}{9} \times 4$$

$$= \frac{4}{9}$$

13. Incomplete Questions

14. Write the following rational numbers in the descending order.

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

Ans- LCM of 7, 8, 2, 5 = 280

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

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

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

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

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

$320 > 112 > 0 > -315 > -420$

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

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

Ans- Additive inverse of $7 = -7$

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

Sum of additive inverse and multiplicative inverse is

$$-7 + \frac{1}{7}$$

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

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.

Ans- Perimeter of $\Delta = 8y^2 - 9y + 4$

Two sides $= 3y^2 - 5y$ and $4y^2 + 12$

Third side = Perimeter − Sum of two sides.

~~$= 8y^2 - 9y + 4 - (3y$~~

$$= 8y^2 - 9y + 4 - (3y^2 - 5y + 4y^2 + 12)$$

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

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

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

$= y^2 - 4y - 8$

$\therefore$ third side is $y^2 - 4y - 8$.

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?

Ans- A can do a piece of work = 20 days

A's 1 day work $= \frac{1}{20}$.

B can do a piece of work in = 15 days

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

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

$= \frac{3+4}{60} = \frac{7}{60}$

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

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

$= \frac{10-7}{10} = \frac{3}{10}$

No of day taken by B to finish the remaining work $= \frac{\text{Remaining work}}{\text{B's 1 day work}}$

$= \frac{\frac{3}{10}}{\frac{1}{15}} = \frac{3}{\cancel{10}_{2}} \times \overset{3}{\cancel{15}} = \frac{9}{2} = 4\frac{1}{2}$ days

18(i) At what rate per cent annum will be ₹630 produce an interest ₹126 in 4 years?

Ans — $P = ₹630$

$T = 4$ years

$SI = ₹126$

$R = ?$

$R = \frac{100 \times SI}{P \times T}$

$= \frac{\overset{5}{\cancel{100}} \times \overset{42}{\cancel{126}}}{\underset{21}{\cancel{630}} \times \underset{2}{\cancel{4}}} = 5\%$

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

Ans- Let P be = ₹100

As per questions, sum will be double

i.e, 2×100 = ₹200

Interest = A − P

= ₹(200 − 100) = ₹100

T = 6 years

$$R = \frac{100 \times SI}{P \times T} = \frac{\overset{50}{\cancel{100}} \times 100}{\cancel{100} \times \cancel{6}_{3}} = \frac{50}{3} = 16\frac{2}{3}\%$$

19. Calculate the difference between the compound interest and simple interest on ₹7500 in 2 years and at 8% per annum.

Ans P = ₹7500

R = 8%

T = 2 years

$$SI = \frac{PRT}{100}$$

$$= \frac{7500 \times 8 \times 2}{\cancel{100}}$$

= 1200

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$= 7500\left(1+\frac{8}{\cancel{100}\,25}\right)^2$$

$$= 7500\left(1+\frac{2}{25}\right)^2$$

$$= 7500\left(\frac{25+2}{25}\right)^2$$

$$= 7500\left(\frac{27}{25}\right)^2$$

$$= \cancel{7500}^{\cancel{300}\,12} \times \frac{27}{\cancel{25}} \times \frac{27}{\cancel{25}}$$

$$= 12 \times 27 \times 27 = 8748$$

$CI = A - P$

$= ₹(8748 - 7500) = ₹1248$

∴ Difference of CI and SI $= ₹(1248 - 1200)$

$= ₹48$

20. If the price of sugar is increased by 25% today, by what percent should it be decreased tomorrow to bring the price back to the original?

Ans- Let the original price of sugar be ₹100.

∴ Today's price = 100 + 25 = ₹125

In order to bring down the price, original price should be decreased by

= 125 − 100 = ₹25

i.e, on ₹125 price should be decreased by = ₹25

⇒ ₹1 " " " " " = $\frac{25}{125}$

₹100 " " " " "

$= \frac{25}{125} \times \frac{20}{100}$

$= 20\%$

∴ the price should be decreased by 20%.

2. In a group of 500 people, 250 can speak French & 300 can speak German. How many can speak both French & German. Represent it in Venn diagram.

Ans ← Let F set of people speak French and
G " " " " " German

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

As per problem.

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

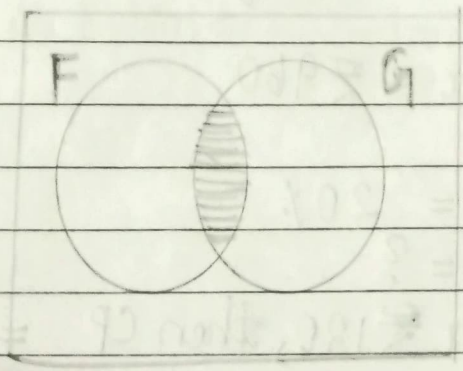
$\Rightarrow 500 = 250 + 300 - n(F \cap G)$

$\Rightarrow 500 = 550 - n(F \cap G)$

$\Rightarrow n(F \cap G) = 550 - 500$

$\Rightarrow n(F \cap G) = 50$

Venn diagram:



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?

SP

Ans. Here, SP of John's = CP of Peter

and CP of Mohan's = SP of Peter

∵ Mohan's given to Peter

SP of Peter = ~~₹912~~ ₹912

Loss = 5%

When SP is ₹95, CP = ₹100

When SP is ₹1, " = $\frac{100}{95}$

" " " ₹912, " = $\frac{\cancel{100}^{20}}{\cancel{95}_{19}} \times \cancel{912}^{48} = ₹960$

∵ SP of John = CP of Peter

∴ SP of John = ₹960

Profit % = 20%

CP of John's = ?

When SP of John ₹120, then CP = ₹100

SP

When ~~SP~~ of ~~Rs~~ ₹1, then CP will be $= \frac{100}{120}$

When SP ~~is~~ ₹960, then CP will be $= \frac{100}{120} \times 960^{8}$

$= ₹800$

Hence, John bought the article for ₹800.

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:

Ans. Rajesh sold scooter to Rahim at 8% Loss

Rahim sold scooter to Prem at 5% profit

CP of Prem = 14490

CP of Prem will be SP of Rahim that is ₹14490

So, CP of Rahim $= \frac{100}{100 + \text{gain\%}} \times SP$

$= \frac{100}{100+5} \times 14490 = \frac{100}{105} \times 14490^{138}$

$= ₹13800$

Now, CP of Rahim will be SP of Rajesh that is ₹13800.

$\therefore$ CP of Rajesh $= \frac{100}{100-L\%} \times 13800$

$= \frac{100}{100-8} \times 13800 = \frac{100}{92} \times 13800^{150}$

$= ₹15000$

So, we get

(i) SP of Rahim = ₹14490
CP of Rahim = ₹13800

(ii) SP of Rajesh = ₹13800
CP of Rajesh = ₹15000

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

Ans $\frac{5}{6}$ and $\frac{8}{9}$, 6 rational numbers.

LCM of 6 and 9 = 18

$\frac{5}{6} = \frac{5 \times 3}{6 \times 3} = \frac{15}{18}$, $\frac{8}{9} = \frac{8 \times 2}{9 \times 2} = \frac{16}{18}$

Since, we have to find out six rational numbers. Let's multiply numerator and denominator of each rational numbers by $\Rightarrow 6+1=7$

$$\frac{15}{18} = \frac{15\times7}{18\times7} = \frac{105}{126}$$

$$\frac{16}{18} = \frac{16\times7}{18\times7} = \frac{112}{126}$$

∴ Required rationals numbers between $\frac{5}{6}$ and $\frac{8}{9}$ are

$$\frac{106}{126}, \frac{107}{126}, \frac{108}{126}, \frac{109}{126}, \frac{110}{126}, \frac{111}{126}$$

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

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

Ans- $= \sqrt{7.84} + \sqrt{78400}$

$= \sqrt{\frac{784}{100}} + \sqrt{28\times28\times10\times10}$

$= \sqrt{\frac{28\times28}{10\times10}} + 28\times10$

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

$= 2.8 + 280 = 282.8$

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

$= \sqrt{\frac{784}{10000}} + \sqrt{\frac{784}{1000000}}$

$= \sqrt{\frac{28 \times 28}{100 \times 100}} + \sqrt{\frac{28 \times 28}{1000 \times 1000}}$

$= \frac{28}{100} + \frac{28}{1000}$

$= 0.28 + 0.028$

$= 0.308$

26. Find, which of the following sets are :

(i) The set of points of intersection of two non-parallel st. lines in the same plane.

(ii) $A = \{x : 7x - 3 = 11\}$

(iii) $B = \{y : 2y + 1 < 3 \text{ and } y \in W\}$

Answer

(i) This is a singleton set because the points of intersection of two non-parallel st. lines is 1.

(ii) $A = \{x : 7x - 3 = 11\}$

$\Rightarrow 7x - 3 = 11$

$\Rightarrow 7x = 11 + 3$

$\Rightarrow 7x = 14$

$\Rightarrow x = \frac{14}{7}^{2}$

$\Rightarrow x = 2$ Yes, it is a singleton set.

(iii) $B = \{y : 2y + 1 < 3 \text{ and } y \in W\}$

Ans Let,

$y = 0$, $2y + 1 = 2 \times 0 + 1 = 1$

$y = 1$, $2 \times 1 + 1 = 3$

$y = 2$, $2 \times 2 + 1 = 5$

No, it is not a 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%?

Ans SP of bicycle = ₹ 637

Loss % = 9 %

$$CP = \frac{100}{100 - L\%} \times SP$$

$$= \frac{100}{100 - 9} \times 637$$

$$= \frac{100}{91} \times 637^{7}$$

$$= ₹700$$

CP = ₹700 and Profit % = 5%

$$SP = \frac{100 + g\%}{100} \times CP$$

$$= \frac{100 + 5}{100} \times 700$$

$$= \frac{105}{100} \times 700$$

$$= ₹735$$

So, Selling price is ₹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?

Ans- 3 men = 6 boys

1 man = $\frac{6}{3}$ = 2 boys

6 men and 8 boys = ~~(2×6+8)~~ = (2×4+12)
~~= 20 boys~~ = 20 boys

If 6 boys can do a job in 20 days

20 boys can do a job in 1 day = $\frac{6 \times 20}{20}$ = 6 days

29. A family of 5 persons can be maintained for 20 days, with ₹2480. Find, for how long ₹6944 will maintain a family of 8 persons.

Ans- 5 persons maintained for 20 days with ₹2,480.

Then, 1 person maintained at $\frac{2480}{20 \times 5} = \frac{2480}{100}$
= ₹24.80

So, the maintenance of 8 persons = 24.80 × 8
= ₹198.40/day

So, the number of days ₹6944 can be maintained 8 persons will be

$$\frac{6944}{198.40} = \frac{6944 \times 100}{1984} = 35$$

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

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

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

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

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

$\Rightarrow x = 10, -1$

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

So, proper subsets are $\phi$, $\{10\}$, $\{-1\}$