Mathematics Holiday Homework
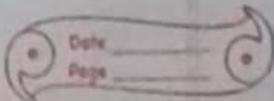
1. None of the above

2. 10^{100}

3. is the identity for addition of rational numbers

4. the identity for multiplication of rational numbers

5. 7.

6. 15%

7. 0

8. 7

9. 60

10. commutative law of addition

11. Given numbers $= \dfrac{2}{3}$ and $\dfrac{3}{4}$

$$= \dfrac{2}{3}, \dfrac{2+3}{3+4}, \dfrac{3}{4}$$

$$= \dfrac{2}{3}, \dfrac{5}{7}, \dfrac{3}{4}$$

$$= \dfrac{2}{3}, \dfrac{2+5}{3+7}, \dfrac{5}{7}, \dfrac{5+3}{7+4}, \dfrac{3}{4}$$

$$= \dfrac{2}{3}, \dfrac{7}{10}, \dfrac{5}{7}, \dfrac{8}{11}, \dfrac{3}{4}$$

∴ Required rational numbers between $\frac{2}{3}$ and $\frac{3}{4}$

are $\frac{7}{10}$, $\frac{5}{7}$ and $\frac{8}{11}$

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

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

$= \frac{1}{144} \times 64$

$= \frac{4}{9}$

13. [Incomplete question]

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

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

$[\because$ LCM of 7, 8, 2 and 5 is 280$]$

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

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

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

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

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

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

15. Additive inverse of $7 = -7$

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

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

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

First side $= 3y^2 - 5y$

Second side $= 4y^2 + 12$

Third side $= ?$

$\Rightarrow$ Perimeter of the triangle $=$ Sum of all sides

$\Rightarrow$ Third side $=$ Perimeter $-$ Sum of other two sides

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

$$= [8y^2 - 9y + 4] - [3y^2 - 5y + 4y^2 + 12]$$

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

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

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

Hence, the third side of the triangle is $y^2 - 4y - 8$

17. Given, A can do the work in $= 20$ days

B can do the work in $= 15$ days

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

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

(A+B)'s one day work $= \dfrac{1}{20} + \dfrac{1}{15} = \dfrac{3+4}{60} = \dfrac{7}{60}$

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

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

B can do 1 work in $= 15$ days

∴ B can do $\dfrac{3}{10}$ work in $= 15 \times \dfrac{3}{10}$ days

$\qquad\qquad\qquad\qquad = \dfrac{9}{2}$ days

$\qquad\qquad\qquad\qquad = 4\dfrac{1}{2}$ days

Hence, B will take $4\dfrac{1}{2}$ days to complete the

remaining work.

18.(i) Given, Principal (P) $= ₹ 630$
$\qquad\qquad$ Time (T) $= 4$ years
$\qquad\qquad$ Interest (I) $= ₹ 126$
$\qquad\qquad$ Rate (R) $= ?$

Rate $= \dfrac{100 \times I}{P \times T} = \dfrac{100 \times 126}{630 \times 4} = \dfrac{100}{20} = 5\%$

(ii) Let the Principal be = ₹ 100

∴ Amount (A) = 2 × Principal (P) = 2 × 100 = ₹ 200

Interest (I) = A - P = 200 - 100 = ₹ 100

Time (T) = 6 years

$$Rate\ (R) = \frac{100 \times I}{P \times T} = \frac{100 \times 100}{100 \times 6} = \frac{50}{3} \%$$

19. Principal (P) = ₹ 7500

Rate (R) = 8% p.a.

Time (T) = 2 years

$$\therefore Simple\ interest = \frac{P \times R \times T}{100} = ₹\left(\frac{7500 \times 8 \times 2}{100}\right)$$

$$= ₹ 1200$$

$$\therefore Compound\ interest\ for\ 1^{st}\ year = ₹\left(\frac{7500 \times 8 \times 1}{100}\right)$$

$$= ₹ 600$$

Amount at the end of 1st year = ₹ (7500 + 600)

$$= ₹ 8100$$

Principal (P) = 8100

$$\therefore Compound\ interest\ for\ 2^{nd}\ year = ₹\left(\frac{8100 \times 8 \times 1}{100}\right)$$

$$= ₹ 648$$

Amount at the end of 2nd year = ₹ (8100 + 648)

= ₹

$$\therefore Compound\ interest\ for\ 2\ years = ₹ (600 + 648)$$

$$= ₹ 1248$$

∴ Difference between C.I. and S.I. for 2 years
$$= ₹ (1248 - 1200)$$
$$= ₹ 48$$

20. Let original price of sugar be $= ₹ 100$
∴ Price of sugar for today $= ₹ 100 + 25\%$ of 100
$$= ₹ (100 + 25)$$
$$= ₹ 125$$

In order to bring down the price to original i.e. $₹ 100$, its price should be decreased by
$$= ₹ (125 - 100) = ₹ 25$$

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

On $₹ 100$, the price should be decreased by $= ₹ \dfrac{25}{125} \times 100$
$$= ₹ 20$$

∴ Price should be decreased by 20%.

21. Let F be the set of people who speak French, and G be the set of people who speak German.

No. of people who speak French $= n(F) = 250$
No. of people who speak German $= n(G) = 300$
Total no. of people $= n(F \cup G) = 500$

No. of people who can speak both French and German
$$= n(F \cap G) = ?$$

Now

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

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

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

$\Rightarrow n(F \cap G) = 550 - 500 = 50$

Thus, 50 people can speak both French and German.

22. Mohan paid for the article = ₹ 912

∵ Peter sold the article to Mohan

∴ For Peter: S.P = ₹ 912

Loss = 5%

$$C.P. = \frac{100}{(100 - loss\%)} \times S.P. = ₹\left[\frac{100}{(100 - 5)} \times 912\right]$$

$$= ₹\left[\frac{100 \times 912}{95}\right]$$

$$= ₹ 960$$

∵ John sold the same article to Peter.

∴ For John: S.P = ₹ 960

Profit = 20%

$$C.P. = \frac{100}{(100 + profit\%)} \times S.P = ₹\left[\frac{100}{(100 + 20)} \times 960\right]$$

$$= ₹\left[\frac{100 \times 960}{120}\right]$$

$$= ₹ 800$$

Hence, John paid ₹ 800 for the article.

23. Let the C.P. of the scooter for Rajesh = ₹ 100x

S.P. for Rajesh = $\dfrac{100x \times 92}{100}$ = ₹ 92x

Then, C.P. for Rahim = 92x

Gain = 5%

S.P. for Rahim = $\dfrac{92x \times 105}{100}$ = $\dfrac{966x}{10}$

This will be,

C.P. for Prem = ₹ 14,490

∴ $\dfrac{966x}{10}$ = 14490

⇒ $x = \dfrac{14490 \times 10}{966}$

⇒ $\boxed{x = 150}$

(i) C.P. of scooter for Rahim = 92x = 92 × 105

= ₹ 13800

S.P of scooter for Rahim = $\dfrac{966x}{10}$ = $\dfrac{966 \times 150}{10}$

= ₹ 14490

(ii) C.P of scooter for Rajesh = 100x = 100 × 150

= ₹ 15000

S.P of scooter for Rajesh = 92x = 92 × 105

= ₹ 13800

24. $\dfrac{5}{6}$ and $\dfrac{8}{9}$

$\Rightarrow \dfrac{5 \times 3}{6 \times 3} = \dfrac{15}{18}$ $[\because \text{LCM of 6 and 9} = 18]$

$\Rightarrow \dfrac{8 \times 2}{9 \times 2} = \dfrac{16}{18}$

$\therefore \dfrac{15 \times 7}{18 \times 7} = \dfrac{105}{126}$ and $\dfrac{16 \times 7}{18 \times 7} = \dfrac{112}{126}$

$\Rightarrow$ Required rational numbers between $\dfrac{5}{6}$ and $\dfrac{8}{9}$ are

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

$= \dfrac{53}{63}, \dfrac{107}{126}, \dfrac{6}{7}, \dfrac{109}{126}, \dfrac{55}{63}$ and $\dfrac{37}{42}$

25. (i) Given: $\sqrt{784} = 28$

To find: $\sqrt{7 \cdot 84} + \sqrt{78400}$

$= \sqrt{\dfrac{784}{100}} + \sqrt{784 \times 100}$

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

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

$= \dfrac{28 + 2800}{10}$

$= \dfrac{2828}{10} = 282 \cdot 8$

(ii)   Given : $\sqrt{784} = 28$

To find : $\sqrt{0.0784} + \sqrt{0.000784}$

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

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

$$= \frac{280 + 28}{1000}$$

$$= \frac{308}{1000} = 0.308$$

26. (i) Singleton set
   (ii) Singleton set
   (iii) Singleton set

27.   S.P of the bicycle $= ₹\ 637$
          Loss $= 9\%$

$$\therefore\ C.P. = \frac{100 \times S.P.}{100 - loss\%} = \frac{100 \times 637}{100 - 9}$$

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

$$= ₹\ 700$$

Profit $= 5\%$
$$S.P. = \frac{(100 + Profit)}{100} \times C.P.$$

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

$$= \frac{105 \times 700}{100} = ₹\ 735$$

So, John should sold it for ₹ 735, if he desires a profit of 5%.

28.   3 men = 6 boys
4 men = $\frac{6}{3} \times 4$ boys = 8 boys

Total boys in second case:
= 4 men + 12 boys = 8 + 12 = 20 boys

Then, let 20 boys will do the same work in x days

∴   6 : 20 :: 20 : x ...... [More boys, less day]
⇒   6 : 20 :: x : 20 ...... [By inverse proportion]
⇒   x = $\frac{20 \times 6}{20}$
⇒   x = 6

∴ They will do the work in 6 days.

29. A family of 5 persons can be maintained with ₹ 2480
for = 20 days

A family of 5 persons can be maintained with ₹ 1
for = $\frac{20}{2480}$ days

A family of 5 persons can be maintained with ₹ 6944
for = $\frac{20}{2480} \times 6944$ days
= 56 days

A family of 1 person can be maintained for
= 56 × 5 days

∴ A family of 8 persons can be maintained for

$$= \frac{56 \times 5}{8} \text{ days} = 35 \text{ days}$$

30. $\{x : x^2 - 9x - 10 = 0\}$

$\Rightarrow \quad x^2 - 9x - 10 = 0$

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

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

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

∴ Either $\quad x - 10 = 0$

$\Rightarrow x = 10$

or, $\quad x + 1 = 0$

$\Rightarrow x = -1$

Given set $= \{-1, 10\}$

Proper subsets of this set $= \phi, \{-1\}, \{10\}$

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