AUTOMN HOLIDAY HOLIDAY HOMEWORK

MATHEMATICS

1) Reciprocal of Zero is
Ans⇒ None of the above
2) The multiplicative inverse of 10^{-100} is
Ans⇒ 10^{100}
3) Zero(0) is
Ans⇒ The identity for addition of rational numbers.
4) One(1) is
Ans⇒ The identity for multiplication of rational numbers.
5) Find the least number by which 1323 must be multiplied so that the product is a perfect cube.
Ans⇒ 7
6) 2.7 is what percent of 18?
Ans⇒ 15%.
7) If A & B are two sets such that $n(A) = 15$, $n(B) = 21$ & $n(A \cup B) = 36$, then $n(A \cap B)$ equals to
Ans⇒ 0
8) If $5A \times A = 399$, then the value of A is
Ans⇒ 7
9) If 30 men can do work in 24 days. How many men will do the same work in 12 days
Ans⇒ 60
10) $a + b = b + a$ is called
Ans⇒ Commutative property.
11) Insert three rational number between $\frac{2}{3}$ and $\frac{3}{4}$
Given number, $= \frac{2}{3}, \frac{3}{4}$

$$\frac{2}{3}, \frac{2+3}{3+7}, \frac{3}{4} = \frac{2}{3}, \frac{5}{10}, \frac{3}{4}$$

$$= \frac{2}{3}, \frac{2+5}{3+10}, \frac{5}{10}, \frac{5+3}{10+4}, \frac{3}{4} = \frac{2}{3}, \frac{7}{13}, \frac{5}{10}, \frac{8}{14}, \frac{3}{4}$$

∴ Three rational numbers between $\frac{2}{3}$ and $\frac{3}{4}$ are $\frac{7}{13}, \frac{5}{10}, \frac{8}{14}$

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

Ans) $= (12)^{-2} \times 4^3 = 144 \times 64 = 9216$

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

Ans) Length of rope $= 5\frac{1}{2}$ m $= \frac{11}{2}$ m

Number of pieces $= 12$

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

14) Write the following rational numbers in descending order.

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

LCM of 8, 7, 2, 5 $= 280$

2	8, 7, 2, 5
2	4, 7, 1, 5
2	2, 7, 1, 5
7	1, 7, 1, 5
5	1, 1, 1, 5
	1, 1, 1, 1

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

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

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

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

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

Ascending order $= \frac{-420}{280}, \frac{-315}{280}, \frac{0}{280}, \frac{112}{280}, \frac{320}{280}$

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

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

Ans) Additive inverse of 7 is -7

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

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

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 triangle = sum of 3 sides.

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

$= 3y^2 + 4y^2 - 5y + 12 = 7y^2 - 5y + 12$

Given,

perimeter of triangle $= 8y^2 - 9y + 4$

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

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

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

$= y^2 - 4y - 8$

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

Ans) A can do piece of work in 15 days

B can do piece of work in 20 days

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

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

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

$(A+B)$'s 6 day work $= \frac{7}{\cancel{60}\,10} \times \cancel{6}\,1 = \frac{7}{10}$

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

B can do 1 work in 15 days

B can do $\frac{3}{10}$ work in $\frac{3}{\cancel{10}\,2} \times \cancel{15}^{3} = \frac{9}{2} = 4\frac{1}{2}$ days

∴ No. of days taken by B to finish the remaining work $= \frac{9}{2}$

18(i) At what rate percent per annum will ₹630 produce an interest of ₹126 in 4 years.

Ans) $P = ₹630$

$I = ₹126$

$T = 4$ years

$R = \frac{100 \times I}{P \times T} = \frac{\cancel{100} \times \cancel{126}}{\cancel{630} \times 4} = 5\%$

(ii) At what rate percent will a sum double itself in 6 years?

Ans) Let $P = ₹100$

Amount $= ₹(2 \times 100) = ₹200$

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

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

$R = \frac{100 \times I}{P \times T} = \frac{\cancel{100} \times \cancel{100} \times 4}{\cancel{100} \times \cancel{25}} = 16\%$

$\therefore R = 16\%$

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

Ans) Here $P = ₹7500$

$R = 8\%$

$T = 2$ years

$S.I = \frac{P \times R \times I}{100} = \frac{\cancel{7500} \times 8 \times 2}{\cancel{100}} = ₹1200$

Now C.I

$A = P + I = P + \frac{PRI}{100} = P\left(1 + \frac{PRI}{100}\right)$

$A = 7500\left(1 + \frac{8}{100}\right) = \cancel{7500} \times \frac{108}{\cancel{100}} = ₹8748$

20) If the price of sugar is increased by 25% today, by what percent should it be decreased tommorow to bring the

price back to original?

Ans) Original price of sugar = ₹100
Increase in the price of sugar = 25%.
Price of sugar fore today = 100+25 = ₹125
In order to bring down the price to original ₹100, the price should be decreased by 125−100 = ₹25
∴ The price should be decreased by ₹25
Re 1, the price should be decreased by ₹ $\frac{25}{125}$
On ₹100, the price should be decreased by $\frac{\cancel{25}^{5}}{\cancel{125}_{5}} \times \cancel{100}^{4} = 20\%$.

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.

Ans) 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 number of people = n(F ∪ G) = 500

$n(F \cup G) = n(F) + n(G) - n(F \cap G)$
$500 = 250 + 300 - n(F \cap G)$
$500 = 450 - n(F \cap G)$
$n(F \cap G) = 500 - 450 = 50$

No. of people can speak both the french and germa = n(F ∩ G)

22) John sold an article to Peter at 20% profit and Peter sold it to Mohan at 5% loss. If Mohan paid ₹912 fore the article, find how much did John paid fore it.

Ans) Mohan paid fore the article = ₹912
∴ Peter sold the article to Mohan =
Fore Peter
S.P price = ₹912
Loss = 5%.
$C.P = \left(\frac{100}{100 - \text{Loss}\%}\right) \times S.P =$

C.P = $\left(\frac{100}{100-5\%}\right) \times 912 = \frac{100}{95} \times 912 = 960$

John sold same article to Peter

For John

C.P price = Profit = 20%.

$C.P = \left(\frac{100}{100+\text{gain\%}}\right) \times S.P$

$= \left(\frac{100}{100+20}\right) \times 960$

$= \left(\frac{100}{120}\right) \times 960 = 800$

∴ John paid 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 the

(i) the S.P and the C.P of the scooter for Rahim.

Ans) Rajesh sold scooter to Rahim = 8% loss

Rahim sold same scooter to Prem = 5% gain

C.P of prem = ₹14,490.

C.P of prem will be S.P of Rahim i.e 14490

C.P of Rahim = $\left(\frac{100}{100+\text{gain\%}}\right) \times S.P$

$= \left(\frac{100}{100+5}\right) \times 14,490$

$= \frac{100}{105} \times 14490 = 13800$

C.P of Rahim will be S.P of Rajesh i.e 13800

C.P of Rajesh $= \left(\frac{100}{100 + \text{loss}\%}\right) \times S.P$

$= \left(\frac{100}{100-8}\right) \times 13800$

$= \frac{100}{92} \times 13800 = 15000$

i) The S.P of the scooter for Rahim = ₹14,490
C.P of the scooter for Rahim = 13,800

(ii) The S.P of the scooter for Rajesh = ₹13,800
C.P of the scooter for Rajesh = ₹15,000

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

Ans) LCM of 6 and 9 = 18

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

2	6, 9
3	3, 9
3	1, 3
	1, 1

Multiply the numerator and denominator of each rational number by 6 + 1 = 7

$\frac{15}{18} = \frac{15 \times 7}{18 \times 7} = \frac{105}{126}$, $\frac{16}{18} = \frac{16 \times 7}{18 \times 7} = \frac{112}{126}$

Req. rational numbers between $\frac{5}{6}$ & $\frac{8}{9}$ are

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

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

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

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

$= \sqrt{\frac{784}{100}} + \sqrt{784 \times 100} = \frac{28}{10} + 28 \times 100$

$= 2.8 + 280 = 282.8$

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

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

$= \frac{28}{100} + \frac{28}{1000} = 0.28 + 0.028 = 0.308$

26) Find, which of the following sets are singleton sts:

(i) The set of points of intersection of two non-parallel straight lines on the same plane

Ans) 

It is a singleton sets

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

$= 7x - 3 = 11$

$= 7x = 11 + 3 = 14$

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

∴ Given set is singleton sets

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

$2y + 1 < 3$

Subtracting 1 to both sides

$2y + 1 - 1 < 3 - 1$

$2y < 2$

Dividing 2 to both sides

$\frac{2y}{2} < \frac{2}{2}$

$y < 1 = \{0\}$

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) S.P of bicycle = ₹637

Loss = 9%.

$C.P = \left(\frac{100}{100 - \text{Loss}\%}\right) \times S.P$

$= \left(\frac{100}{100-9}\right) \times 637$

$= \frac{100}{91} \times \overset{7}{\cancel{637}} = ₹700$

Profit = 5%.

$S.P = \left(\frac{100 + \text{profit}\%}{100}\right) \times C.P$

$= \left(\frac{100+5}{100}\right) \times 700 = \frac{105}{\cancel{100}} \times \overset{7}{\cancel{700}} = 735$

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

Ans⇒ 3 men = 6 boys

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

4 men = $\frac{6}{3} \times 4 = \frac{24}{3} = 8$ boys

4 men + 12 boys = 8 boys + 12 boys = 20 boys.

Since 6 boys can do work in 20 days

1 boy will do the work = $20 \times 6 = 120$ days

20 boy will do the work = $\frac{120}{20} = 6$ days.

∴ 4 men and 12 boys will complete the work in 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⇒ A family of 5 persons can be maintained for ₹2480 = 20 days

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

A family of 5 person can be maintained for ₹6944 with
$\frac{20}{2480} \times 6944 = 56$ days
+124

A family of 1 person can be maintained with ₹6944
$= \frac{56 \times 5}{1} = 280$ days

A family of 8 person can be maintained with ₹6944
$= \frac{56 \times 5}{8} = 35$

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

$x^2 - 9x - 10 = 0$
$x^2 - 10x + x - 10 = 0$
$x(x-10) + 1(x-10) = 0$
$(x-10)(x+1) = 0$
$x - 10 = 0, \quad x = 10$
$x + 1 = 0, \quad x = -1$
$\therefore x = 10$
$\therefore x = 10, -1$
$\therefore$ Given sets $= \{-1, 10\}$
Proper subset of this set $= \emptyset, \{-1\}, \{10\}$