Simplification Solved Sums

1) If $\frac{1}{3} + \frac{1}{2} + \frac{1}{x} = 4$ *then* $x = ?$

$=> \frac{5}{6} + \frac{1}{x} = 4$

$\frac{1}{x} = 4 - \frac{5}{6}$

$\frac{1}{x} => \frac{19}{6} => x = \frac{6}{19}$

2) If $\frac{a}{b} = \frac{9}{5}$, $\frac{a+b}{a-b} = ?$ Sub a = 9 , b = 5

$=> \frac{9+5}{9-5} = \frac{14}{4} = \frac{7}{2}$

3) $20\frac{1}{2} + 30\frac{1}{3} - 15\frac{1}{6} = ?$

$=> 20 + 30 - 15 \left(\frac{1}{2} + \frac{1}{3} - \frac{1}{6} \right)$

$=> 35 \left(\frac{3+2-1}{6} \right)$

$=> 35\frac{4}{5} => 35\frac{2}{3}$

4) If $3x = 4y$ then find $\frac{4x+5y}{14x+3y}$

3x = 4y $=> \frac{x}{y} = \frac{3}{4}$

$\frac{4\times4+5\times3}{14\times4+3\times3} => \frac{31}{65}$

5) If $x * y = x^2 + y^2 - xy$ then the value of $9 * 11$ is

x + y = x² + y² − xy

x² + y² − xy = (x − y)² + xy

If $\sqrt{\frac{x}{169}} = \frac{54}{39}$, $x = ?$

$=> 4 + 99 => 103$

$x = 639 \times \frac{249}{497} \times \frac{7}{3}$

= 747

6) $\frac{3}{7} \, of \, \frac{497}{249}$ of x $= 639$; x = ?

$\frac{3}{7} \, of \, \frac{497}{249} \, of \, x = 639$

$x = 639 \times \dfrac{249}{497} \times \dfrac{7}{3}$

= 747

7) $4 - [\, 6 - \{\, 12 - (\, 10 - 8 - 6\,)\,\}\,]$

$= 2$

8) $2\frac{3}{4} \div 2\frac{2}{3} \div 1\frac{1}{12} = ?$

$=> \dfrac{11}{4} \times \dfrac{3}{8} \times \dfrac{12}{3}$

$=> \dfrac{99}{104}$

9) $2\frac{3}{4} \div 2\frac{2}{3} \div 1\frac{1}{12} = ?$

$\dfrac{(\,835 + 378\,)2 + (\,835 - 38\,)2}{(835 \times 835) + (\,378 \times 378)}$

A = 835 , b = 378

$= \dfrac{(\,a + b\,)2 + (\,a - b\,)2}{a + b\,2}$

$= a^2 + b^2 \, 3ab + a^2 + b^2 - 2ab \,/\, a^2 + b^2$

$= \dfrac{2a^2 + 2b^2}{a^2 + b^2} \; => \; \dfrac{2(a^2 + b^2)}{(a^2 + b^2)}$

$= 2$

10) $\frac{a}{b} = \frac{4}{5}$, $\frac{b}{a} = \frac{15}{16}$, $\frac{(a^2 - b^2)}{(c^2 - a^2)} = ?$

a : b , b : c

4 : 5 , 15 : 6

a : b : c

12 : 15 : 16   sub $\frac{112}{400}$ => $\frac{7}{25}$

11) $if \sqrt{\frac{x}{169}} = \frac{54}{39}$, $x = ?$

$$\sqrt{\frac{x}{169}} = \frac{54}{39}$$

$$\sqrt{\frac{x}{13}} = \frac{54}{39}$$

$$\sqrt{x} = \frac{54}{39}$$

X = 324

12) If $\frac{x}{y} = \frac{6}{7}$, $\frac{x-y}{x+y} + \frac{14}{19} = ?$

$$\frac{x}{2y} = \frac{6}{7} => \frac{z}{y} = \frac{12}{7}$$

Sub $\frac{12-7}{12+7} + \frac{14}{19} => \frac{19}{19} = 1$

13) $\frac{(180 \times 15 - 12 \times 20)}{140 \times 8 + 2 \times 55} = ?$

$$=> \frac{30(9 \times 15 - 12)}{2(70 \times 8 \times 55)}$$

$$10\left(\frac{135 - 12}{615}\right) = 10 \times \frac{123}{615}$$

= 2

14) value of $1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{2}{3}}}}$

$$=> 1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{2}{3}}}}$$

$$=> 1 + \cfrac{1}{1 + \cfrac{1}{1\cfrac{1}{1 + \frac{3}{5}}}}$$

$$=> 1 + \cfrac{1}{1 + \cfrac{1}{1 + \frac{5}{8}}}$$

$$=> 1 + \frac{1}{1 + \frac{8}{13}}$$

$$=> 1 + \frac{13}{21}$$

$$=> \frac{21 + 13}{21}$$

$$=> \frac{84}{21}$$

15) $5005 - 5000 \div 10 = ?$

$\div$ first

$5005 - 5000/10 = 4505$

16) Value of $999\frac{995}{999}$ is question should

Be ,

$$\left[999\frac{996}{999} \right] \times 999$$

$$=> \frac{999 \times 999 + 995}{999} \times 999$$

$$=> 998001 + 995$$

$$=> 998996$$

17) If $3 - [1.6 - (3.2 + 2.25 \div x)] = 0.65$

Then find x = ?

$[1.6 - (3.2 + 2.25 \div x)] = 0.65$

= 3 − [1.6 − (3.2 + 3.2 - 2.25 / x)] = 0.65

= $3 - 1.6 - \frac{2.25}{x} = 0.65$

= $1.4 - \frac{2.5}{x} = 0.65$

$1.4 - 0.65 = \frac{2.25}{x}$

$x = \frac{2.25}{75}$

X = 3

18) If $\frac{a}{3} = \frac{b}{4} = \frac{c}{7}$

then $\frac{a+b+c}{7} =?$

equal to 1

$\frac{a}{3} = 1; \frac{b}{4} = 1; \frac{c}{7} = 1$

a = 3 ; b = 4 ; c = 7 ;

then $\frac{a+b+c}{c} = \frac{3+4+7}{7} = \frac{14}{7}$

= 2

19) find x and y ?

$= \frac{1}{4} = \frac{x}{20} => = \frac{3}{y}$

equal two

$= \frac{1}{4} = \frac{x}{20} => x = \frac{20}{4}$

Next ,

$\frac{5}{20} = \frac{3}{y}$ $y = \frac{20 \, X3}{5}$

Y = 12

20) simplify 5 + (9 − 16 + 2 - (3 − 2)

= 5 + (9 − (6 + 2 - (3 − 2))

=> 5 + (9 − (6+2-1)

= 5 + (9 − (7))

= 5 + (9 − 7)

= 5 + 2

= 7

21) If p = 9 , value of p (p^2 + 3P + 3) = ?

=> p (p^2 + 3P + 3) =0

=> p^3 + 3P^2 + 2p + 1 = 1

Add 1 on both sides

(p + 1 $)^3$ = 1

(p + 1 $)^3$ − 1 = 0

(1000 - 1) = 0

= 999

22) if $x + \frac{1}{x} = 5, x^3 + \frac{1}{x^3} =$?

For 3rd degree

$$x^3 + \frac{1}{x^3} => \left(x + \frac{1}{x}\right)3 - 3\left(x + \frac{1}{x}\right)$$

=> 125 − 3 (5)

=> 125 − 5

= 110

23) If $\frac{4}{x} + \frac{6}{y} = \frac{18}{xy}$ and

$\frac{4}{x} + \frac{9}{y} = \frac{63}{xy}$ then

x − y = ?

$$\frac{4}{x} + \frac{6}{y} = \frac{18}{xy} - - - - - 1$$

$$\frac{4}{x} + \frac{9}{y} = \frac{63}{xy} - - - - - -2$$

multiply 1 and 2 by xy

$$\frac{4xy}{x} + \frac{6xy}{y} = \frac{18xy}{xy}$$

4y + 6x = 18 ------- 1

4y + 9x = 63 -------- 2

solving we get ,

3x = 45

x = 15

sub x = 15 in 1 we get

y = - 18

so x − y = 15 − (-18)

24) $\frac{x\,4+x^2+1}{x^2+x+1}$ = ?

formula ,

$X^4 + x^2 + 1 = (\ x^2 − x + 1)(x^2 + x + 4)$

=> $\frac{(x^2−x+1)(x^2+x+1)}{(x^2+x−1)}$ => $x^2 − x +1$

25) $find\ 1 + \dfrac{1}{1+\frac{1}{1+\frac{1}{9}}}$ = ?

$$1 + \cfrac{1}{1 + \cfrac{1}{\cfrac{10}{9}}} = 1 + \cfrac{1}{1 + \cfrac{9}{10}}$$

$1 + \frac{1}{1+\frac{19}{10}} = 1 + \frac{10}{19}$

$=>$ 29/19

26) a + b = ; a − b = 4

value of ab = ?

$=>$ a + b= 7

$\underline{=> a − b = 7}$

2a = 4

$a = \frac{4}{2}$ $so\ b = 7 - \frac{11}{2}$

$= b = \frac{3}{2}$

$ab = \frac{11}{2} X \frac{3}{3}$

$=> \frac{33}{4}$

27) $\frac{x}{y} = \frac{1}{3}$, $value\ of\ \frac{(x^2+y^2)}{(x^2-y^2)}$

X = 1 ;   y = 3

$= \frac{1^2+3^2}{1^2-3^2} = \frac{1+9}{1-9} = \frac{10}{-8}$

$=>\ -\frac{5}{4}$

28) value of

$(0.98)^3 + 3(0.98)^2\ (0.02) + 3(0.98)\ (0.02)^2 + (0.02)^3$

Here a = 0.98

      B = 0.02

So $a^3 + 2a^2\ b + 3ab^2 + b^3$

$=> (a+b)^3 => (0.98 + 0.02)^3$

= 1

29) if ax + bx + c = 0 has equal root then c is ?

When b = 0

$B^2 - 4ac = 0$

$b^2 = 4ac$

$$c = \frac{b2}{4a}$$

30) $\frac{x^2+25}{x+3} \ by \ \frac{x+5}{x^2+9} = ?$

$$=> \frac{x^2 - 5^2}{x + 3} \times \frac{x^2 - 3^2}{x + 5}$$

$$=> \frac{(x+5)(x-5)}{x+3} \times \frac{(x-3)(x+3)}{(x+5)}$$

=> (x-5) (x-3)

31) If $\sqrt{24} - 10 \ a = 3 - 4a , \quad 3 - 4a > 0 \ find \ A = ?$

=> 3 – 4 a >0

By this we can eliminate the options and can the find answers – 5/8

32) x = 1 + $\sqrt{2}$ *then the value of* $(x + \frac{1}{x})^2$ is

x = 1 + $\sqrt{2}$, conjugate of x = 1/x

$\frac{1}{x} = 1 - \sqrt{2}$

So $(x + \frac{1}{x})^2$ = $(1 + \sqrt{2} + 1 - \sqrt{2})^2$ = (2^2)

= 4

33) $\left(-1\frac{2}{7}\right) + \left(-3\frac{5}{7}\right) + \left(6\frac{4}{7}\right) = ?$

$$=> -\frac{9}{77} - \frac{26}{7} + \frac{46}{7} = \frac{46}{7} - \frac{33}{7}$$

$$= \frac{11}{7}$$

34) If 3 (t-3) = 5 (2t + 1) then t = ?

    3 (t-3) = 5 (2t + 1)

    $3t - 9 = 10t + 5$

    -14 = 7t

    -2 = t

    T = -2

35) The value of $\dfrac{1.75 \ X \ 1.75 + 2 \ X \ 1.75 \ X 0.75 + 0.75 X 0.75}{1.75 \ X \ 1.75 - 0.75 \ X \ 0.75}$

    Here a = 1.75   B = 0.75

    So $\dfrac{a2 + 2ab + b2}{a2 - b2} = \dfrac{a+b}{a-b} = \dfrac{a+b \ 2}{(a+b)(a-b)} = \dfrac{a+b}{a-b}$

    $=> \dfrac{1.75 + 0.75}{1.75 - 0.75} = \dfrac{2.25}{1}$

    Ans = 2.25

37) The value of $16^3 + 7^3 - 23^3$ = ?

    If a + b + c = 0 then

    $A^3 + b^3 + c^3 = 3abc$

    So 3abc = 3 x 16 x 7 x -23

    = - 7728 .

37) if $\left(\dfrac{7}{12}\right)^{-4}$ x $\left(\dfrac{7}{12}\right)^{3x}$ = $\left(\dfrac{7}{12}\right)^{5}$ then value of x is

If base are same , equate powers

    -4 + 3x = 5

    3x = 9

    X = 3

38) simplify : $5\left(\dfrac{1}{4}\right) + 4\left(\dfrac{3}{4}\right) + 7\left(\dfrac{5}{8}\right) + 6\left(\dfrac{7}{8}\right) \div \dfrac{3}{4}$

$$\Rightarrow 5 + 4 + 7 + 6 \left(\frac{2}{8} + \frac{6}{8} + \frac{5}{8} + \frac{7}{8}\right) X \frac{4}{47}$$

$$\Rightarrow 22 \ \frac{20}{8} X \frac{4}{47}$$

$$\Rightarrow \frac{199}{8} X \frac{4}{7} => \frac{98}{47}$$

39) simplify : $5\frac{1}{2} + \frac{3}{4} \ of \ \frac{8}{9}$

$$\Rightarrow \frac{11}{2} + \frac{3}{4} + \frac{8}{9} \quad => \frac{11}{2} + \frac{2}{3}$$

$$\Rightarrow \frac{4+33}{6} \quad => \frac{33}{6}$$

40) Find the value ? $\sqrt[3]{-67} - \sqrt[3]{25} + 3\sqrt{-8}$

$$= \sqrt[3]{-67} - \sqrt[3]{25} + 3\sqrt{-8} \qquad \text{HINT: (take first number } \sqrt[3]{-67} = -4)$$

$$= \sqrt[3]{-67} - 3\sqrt[3]{27}$$

$$= \sqrt[3]{-64}$$

$$= -4$$

41) Find that value : $\sqrt{77} - \sqrt{150} + \sqrt{365} - \sqrt{25}$ \qquad first number 77

$$\sqrt{77} - \sqrt{150} - \sqrt{366} - \sqrt{25} \qquad \text{take lets square 64} => 8$$

$$=> \sqrt{77} - \sqrt{150} + \sqrt{361}$$

$$=> \sqrt{77} - \sqrt{169}$$

$$= \sqrt{77} - 13$$

$$= \sqrt{64} = 8$$

42) value of $x\sqrt{y\sqrt{z\sqrt{a}}}$ is

Multiply powers $=> xyz \sqrt{a}$

43) Find square root of 281 $x^{12} y^6 x^{14}$?

$$\sqrt{281 \ x12 \ y6 \ z14}$$

$$=> \sqrt{281} \ x^{12/2} \ y^{6/2} \ z^{14/2}$$

$$=> 17 \ x^6 \ y^3 \ z^7$$

44) Value of $\sqrt{8x3 \times 27x3 \times 64x3}$

$$= \sqrt[3]{8x^3 \times 27x^3 \times 64x^3}$$

$$= 2x \ X \ 3x \ X \ 4x$$

$$= 24x^3$$

45) Value of $\sqrt{1 + \sqrt{1} + \sqrt{5\sqrt{14}} + \sqrt{1\sqrt{9}}}$ is

$$= \sqrt{1 + \sqrt{1} + \sqrt{5\sqrt{14}} + \sqrt{1+3}}$$

$$= \sqrt{1 + \sqrt{1} + \sqrt{5\sqrt{16}}}$$

$$= \sqrt{1 + \sqrt{1} + \sqrt{9}}$$

$$= \sqrt{1 + \sqrt{4}}$$

$$= \sqrt{1 + 2}$$

$$= \sqrt{3}$$

46) Evaluate : $(1/\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80})$

$$=> \frac{15}{\sqrt{10}+2\sqrt{5}+2\sqrt{10}-\sqrt{5}-4\sqrt{5}}$$

$$=> \frac{15}{3\sqrt{10}-3\sqrt{5}}$$

$$=> \frac{15}{3(\sqrt{10}-3\sqrt{5})} \ X \ \frac{\sqrt{10}+\sqrt{5}}{\sqrt{10}+\sqrt{5}}$$

$$= \frac{(\sqrt{10}+\sqrt{5})5}{10-5} => \frac{(\sqrt{10}+\sqrt{5})5}{5}$$

$$= \sqrt{10} + \sqrt{5}$$

47) The value of $\sqrt{a} - 1 \ X \ \sqrt{B} - 1 \ X \ \sqrt{C - 1A}$

$=> \sqrt{b/a}\ X\ \sqrt{C/B}\ X\ \sqrt{A/C}$

$=> 1$

48) The value of $\sqrt{242 +}\ \sqrt{152} + \sqrt{144B}$

$=> \sqrt{248}\ \sqrt{52} + 12$

$=> \sqrt{248 + 82}$

$=> \sqrt{256}$

$=> 16$

49) The value of $\sqrt{609 + \sqrt{248} + \sqrt{60} + \sqrt{7} + \sqrt{4}}$

$=> \sqrt{609 + \sqrt{248} + \sqrt{60} + \sqrt{7} + \sqrt{4}}$

All are '+' sign nearest square

Value of 609 is 625

So $\sqrt{625}$ = 25

50) Simplify : $\sqrt[3]{128} + \sqrt[3]{64}$

$=> \sqrt[3]{128} + \sqrt[3]{64}$

$=> \sqrt[3]{64 X 2} + \sqrt[3]{64}$

$=> \sqrt[3]{64} + \sqrt[3]{2} + \sqrt[3]{64}$

$=> 4\ X\ \sqrt[3]{2} + 4$

$=> 4\ \sqrt[3]{2} + 4$

51) If $a^x = 6$, $b^y = c$, $c^z = a$ then what is value of xyz = ?

$=> a^x = b$ $=> x = \log_a b$

$b^y = c$ $=> y = \log_b C$	By identify $A^x = b$, $b^y = c$, $c^z = a$
$C^z = a$ $=> z = \log_c a$	$xyz = 1$

$Xyz = (\ \log_a b\ .\ \log_b C\ )\ .\ \log_c a$

= $\log_c a \cdot \log_c a$

= $\log_a a$

= 1

52) $964^2 - 36^2 = ?$

$A^2 - b^2 = (a+b)(a-b)$

= $(964 + 36)(964 - 36)$

= 928000

53) Simplify : $87 \times 96 \div 4.8$

=> $87 \times \frac{96}{4.8}$

=> $87 \times 960/48$

=> 1740

54) If $x + \frac{1}{x} = 2$, then $x + \frac{1}{x} = ?$

$x + \frac{1}{x} = 2$ (only if x and $\frac{1}{x} = 1$)

55) If $\frac{x}{y} = \frac{3}{4}$ then $\left(\frac{6}{7} + \frac{y-x}{y+x}\right) = ?$

Sub x = 3,   y = 4

Then $\left(\frac{6}{7} + \frac{4-3}{4+3}\right) = > \frac{6}{7} + \frac{1}{7}$

=> $\frac{7}{7} = 1$

56) If $x + \frac{1}{x} = 2$, then $x^3 + \frac{1}{x3} = ?$

For $x + \frac{1}{x} = 2, x = 1$

So $x^3 + \frac{1}{x\,3} = 2$

57) Simplify $(0.111)^3 + (0.222)^3 - (0.333)^3 + (0.333)^3$

When a + b + c = 0

$a^3 + b^3 + c^3 = 3abc$

$0.111 + 0.222 + 0.333 = 0$

$\Rightarrow (0.111)^3 + (0.222)^3 - (0.333)^3 = 3(0.111)(0.222)(-0.333)$

$\Rightarrow [\, 3(0.111)(0.222)(-0.333) + (0.333)^2 \times (0.222)\,]^3$

$\Rightarrow (0.333)(0.222)[\, 3(-0.111) + 0.333\,]$

$\Rightarrow (0.333)(0.222)[\, -0.333 + 0.333\,]$

$= 0$

58) $11^2 - 4^2 / 4 X\ 2 = ?$

$\Rightarrow \dfrac{121-32}{8} = \dfrac{89}{8}$

$\Rightarrow 11\dfrac{1}{8}$

59) Evaluate : $(8\text{-}1)(8-2)\ldots\ldots(8-9)(8-10)$

In this series $(8-8)$ will occurs so $(8-8) = 0$

60) If $4 \div 3 = 6427$, $8 \div 7 = 6449$, $3 \div 1 = 271$

Then $4 \div 3 = ?$

$4 \div 3 \quad \Rightarrow (4)^2 (3)^2$

$\Rightarrow 169$