

Simplification Solved Sums

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

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

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

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

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

Sub $a = 9, b = 5$

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

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

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

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

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

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

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

$$\frac{4 \times 4 + 5 \times 3}{14 \times 4 + 3 \times 3} = \frac{31}{65}$$

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

$$x * y = x^2 + y^2 - xy$$

$$x^2 + y^2 - xy = (x - y)^2 + xy$$

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

$$\Rightarrow 4 + 99 = 103$$

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

$$= 747$$

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

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

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

$$= 747$$

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

$$= 2$$

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

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

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

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

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

$$A = 835, b = 378$$

$$= \frac{(a+b)^2 + (a-b)^2}{a^2 + b^2}$$

$$= \frac{a^2 + b^2 + 2ab + a^2 + b^2 - 2ab}{a^2 + b^2}$$

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

$$= 2$$

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

$$a : b, b : c$$

$$4 : 5, 15 : 6$$

$$a : b : c$$

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

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

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

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

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

$$X = 324$$

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

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

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

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

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

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

$$= 2$$

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

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

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

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

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

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

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

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

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

\div first

$$5005 - 5000/10 = 4505$$

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

Be ,

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

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

$$=> 998001 + 995$$

$$=> 998996$$

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

Then find x = ?

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

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

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

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

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

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

$$X = 3$$

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

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

equal to 1

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

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

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

$$= 2$$

19) find x and y ?

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

equal two

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

Next ,

$$\frac{5}{20} = \frac{3}{y} \quad y = \frac{20 \times 3}{5}$$

$$Y = 12$$

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

$$(p + 1)^3 = 1$$

$$(p + 1)^3 - 1 = 0$$

$$(1000 - 1) = 0$$

$$= 999$$

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

For 3rd degree

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

$$\Rightarrow 125 - 3(5)$$

$$\Rightarrow 125 - 15$$

$$= 110$$

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

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

$$x - y = ?$$

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

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

multiply 1 and 2 by xy

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

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

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

solving we get ,

$$3x = 45$$

$$x = 15$$

sub x = 15 in 1 we get

$$y = -18$$

$$\text{so } x - y = 15 - (-18)$$

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

formula ,

$$x^4 + x^2 + 1 = (x^2 - x + 1)(x^2 + x + 4)$$

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

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

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

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

$$\Rightarrow 29/19$$

$$26) a + b = ; a - b = 4$$

value of $ab = ?$

$$\Rightarrow a + b = 7$$

$$\Rightarrow a - b = 7$$

$$2a = 4$$

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

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

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

$$\Rightarrow \frac{33}{4}$$

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

$$x = 1; \quad y = 3$$

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

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

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

$$B = 0.02$$

$$\text{So } a^3 + 3a^2b + 3ab^2 + b^3$$

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

$$= 1$$

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

When b = 0

$$b^2 - 4ac = 0$$

$$b^2 = 4ac$$

$$c = \frac{b^2}{4a}$$

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

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

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

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

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

$$=> 3 - 4a > 0$$

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

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

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

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

$$\text{So } \left(x + \frac{1}{x}\right)^2 = (1 + \sqrt{2} + 1 - \sqrt{2})^2 = (2)^2 \\ = 4$$

$$33) \left(-1\frac{2}{7}\right) + \left(-3\frac{5}{7}\right) + \left(6\frac{4}{7}\right) = ? \\ \Rightarrow -\frac{9}{7} - \frac{26}{7} + \frac{46}{7} = \frac{46}{7} - \frac{35}{7} \\ = \frac{11}{7}$$

$$34) \text{ If } 3(t-3) = 5(2t+1) \text{ then } t = ?$$

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

$$3t - 9 = 10t + 5$$

$$-14 = 7t$$

$$-2 = t$$

$$T = -2$$

$$35) \text{ The value of } \frac{1.75 \times 1.75 + 2 \times 1.75 \times 0.75 + 0.75 \times 0.75}{1.75 \times 1.75 - 0.75 \times 0.75}$$

$$\text{Here } a = 1.75 \quad B = 0.75$$

$$\text{So } \frac{a^2 + 2ab + b^2}{a^2 - b^2} = \frac{a+b}{a-b} = \frac{a+b}{(a+b)(a-b)} = \frac{a+b}{a-b}$$

$$\Rightarrow \frac{1.75+0.75}{1.75-0.75} = \frac{2.25}{1}$$

$$\text{Ans} = 2.25$$

$$37) \text{ The value of } 16^3 + 7^3 - 23^3 = ?$$

$$\text{If } a + b + c = 0 \text{ then}$$

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

$$\text{So } 3abc = 3 \times 16 \times 7 \times -23$$

$$= -7728$$

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

If base are same , equate powers

$$-4 + 3x = 5$$

$$3x = 9$$

$$X = 3$$

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

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

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

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

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

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

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

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

$$= \sqrt[3]{-67} - \sqrt[3]{25} + 3\sqrt{-8}$$

HINT: (take first number $\sqrt[3]{-67} = -4$)

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

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

$$= -4$$

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

$$\sqrt{77} - \sqrt{150} - \sqrt{366} - \sqrt{25}$$

$$\Rightarrow \sqrt{77} - \sqrt{150} + \sqrt{361}$$

$$\Rightarrow \sqrt{77} - \sqrt{169}$$

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

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

first number 77

take lets square 64 $\Rightarrow 8$

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

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

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

$$\sqrt{281 x^{12} y^6 z^{14}}$$

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

$$\Rightarrow 17 x^6 y^3 z^7$$

44) Value of $\sqrt{8x^3 \times 27x^3 \times 64x^3}$

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

$$= 2x \times 3x \times 4x$$

$$= 24x^3$$

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

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

$$\Rightarrow \frac{15}{3\sqrt{10} - 3\sqrt{5}}$$

$$\Rightarrow \frac{15}{3(\sqrt{10} - 3\sqrt{5})} \times \frac{\sqrt{10} + \sqrt{5}}{\sqrt{10} + \sqrt{5}}$$

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

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

47) The value of $\sqrt{a} - 1 \times \sqrt{b} - 1 \times \sqrt{c} - 1 \times \sqrt{a}$

$$\Rightarrow \sqrt{b/a} \times \sqrt{c/b} \times \sqrt{a/c}$$

$$\Rightarrow 1$$

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

$$\Rightarrow \sqrt{248} \sqrt{52} + 12$$

$$\Rightarrow \sqrt{248 + 82}$$

$$\Rightarrow \sqrt{256}$$

$$\Rightarrow 16$$

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

$$\Rightarrow \sqrt{609 + \sqrt{248} + \sqrt{60} + \sqrt{7} + \sqrt{4}}$$

All are '+' sign nearest square

Value of 609 is 625

$$\text{So } \sqrt{625} = 25$$

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

$$\Rightarrow \sqrt[3]{128} + \sqrt[3]{64}$$

$$\Rightarrow \sqrt[3]{64 \times 2} + \sqrt[3]{64}$$

$$\Rightarrow \sqrt[3]{64} + \sqrt[3]{2} + \sqrt[3]{64}$$

$$\Rightarrow 4 \times \sqrt[3]{2} + 4$$

$$\Rightarrow 4 \sqrt[3]{2} + 4$$

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

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

$$b^y = c \Rightarrow y = \log_b c$$

$$c^z = a \Rightarrow z = \log_c a$$

$$xyz = (\log_a b \cdot \log_b c) \cdot \log_c a$$

$$= \log_c a \cdot \log_c a$$

$$= \log_a a$$

$$= 1$$

By identify $A^x = b$, $b^y = c$, $c^z = a$

$$xyz = 1$$

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

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

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

$$= 928000$$

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

$$\Rightarrow 87 \times \frac{96}{4.8}$$

$$\Rightarrow 87 \times 960/48$$

$$\Rightarrow 1740$$

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

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

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

$$\text{Sub } x = 3, \quad y = 4$$

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

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

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

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

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

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) $11^2 - 4^2 / 4 \times 2 = ?$

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

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

59) Evaluate : $(8-1)(8-2)\dots\dots(8-9)(8-10)$

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 $4 \div 3 = ?$

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

$$\Rightarrow 169$$