Simplification

VBODMAS · Vinculum (-) Brackets of Division multiplication Addition Subtraction.

Rationalization - Squaring by changing the sign

$$\frac{1}{\sqrt{28}-\sqrt{24}} = \frac{1}{\sqrt{28}-\sqrt{24}} \times \frac{\sqrt{28}+\sqrt{24}}{\sqrt{28}+\sqrt{24}} = \frac{\sqrt{28}+\sqrt{24}}{(\sqrt{28})^2-(\sqrt{24})^2} = \frac{\sqrt{28}+\sqrt{24}}{4}$$

Squares & Cubes

$a^b = a^3 \times a^2$

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

$1^2 - 1$
$2^2 - 4$
$3^2 - 9$
$4^2 - 16$
$5^2 - 25$
$6^2 - 36$
$7^2 - 49$
$8^2 - 64$
$9^2 - 81$

Trick for square no.

eg. $(34)^2$

1 - 100

0916

1156

if single digit write as 01, 02

Then multiply all digit.

we get 12

$3 \times 4 \times 1 = 24$

72^2

4904

28

5184

for 3 digits

(109) - $A^2 + d - d$

A

add +9 and -9 so it become 100 and sin outside bar take sqrt of 9

$\frac{100 \times 118}{100} \; | \; 81$

11881

1-12

(212)

12

290 × 224 | 484

224 | 484

if more than 200 just divide by 100

1-22

378

+22

400 × 356 | 484

142 | 84

1

1 2 1

1 3 3 1

1 4 6 4 1

~~(a+b)²~~

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

$(a+b)^2 = a^2 + 2ab + b^2$

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

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \quad (a^3+b^3) + 3ab(a+b)$

$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \quad a^3 - b^3 = 3ab(a-b)$

$a^3 + b^3 = (a+b)^3 - 3ab(a+b)$ or $(a+b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a-b)^3 + 3ab(a-b)$ or $(a-b)(a^2 + ab + b^2)$

$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$\left(a + \frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} + 2 = \left(a - \frac{1}{a}\right)^2 + 4$

$\left(a - \frac{1}{a}\right)^2 = a^2 - 2 + \frac{1}{a^2} = \left(a + \frac{1}{a}\right)^2 - 4$

$\left(a + \frac{1}{a}\right)^3 = a^3 + \frac{1}{a^3} + 3a\frac{1}{a}\left(a^3 + \frac{1}{a^3}\right) = a^3 + \frac{1}{a^3} + 3\left(a + \frac{1}{a}\right)$

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

1) Find the value of $\frac{M-1}{M}$, if $\frac{M+1}{M} = 4$

$\frac{M+1}{M} = 4$

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

$16 = \left(M^2+\frac{1}{M^2}\right)+2$

$\frac{M^2+1}{M^2} = 14$

$\frac{M-1}{M}$

$\left(M^2+\frac{1}{M^2}\right)-2$

$14-2$

12

$2\sqrt{3} = \frac{M-1}{M}$

2) Find the value of $\frac{a^2+2a+b^2}{a^3-2a^2}$ if $a+\frac{b^2}{a} = 2$?

$a^2+b^2 = 2a \quad -①$

$a^2-2a = -b^2 \quad -②$

$\frac{2a+2a}{a^2(a^2-2a)} = \frac{4a}{a(-b^2)} = \frac{4}{-b^2}$

3) Find the value of a^3+b^3+3ab, when value $a+b=1$

$(a+b)^3 = a^3+b^3+3ab(a+b)$

$1 = a^3+b^3+3ab(1)$

1

4) what is the value of $[(3\times3\times3\times3\times3\times3)^{6} \div (3\times3\times3\times3)^{7} \times 3^{4}]$?

$A^m \times A^n = A^{m+n}$ $\quad \frac{A^m}{A^n} = A^{m-n}$

$(3^6)^6 \div (3^4)^7 \times 3^4$

$3^{36} \div 3^{28} \times 3^4$

$3^8 \times 3^4 = 3^{12}$ //

5) what will be value of $\frac{\sqrt{0.0016} \times \sqrt[3]{8000000}}{\sqrt[3]{0.000512} \times \sqrt[3]{0.064}}$

If $\sqrt{}$ has a value it squar will have 2 self explanatory

$\frac{0.04 \times 2\sqrt[3]{1000000}}{0.08 \times 0.4}$

$\frac{0.04 \times 200}{0.08 \times 0.4} = 250$ //

6) what will be the value of c if $a(a+b+c) = 85$; $b(a+b+c) = 96$; $c(a+b+c) = 108$

Simply add things in there scenario

$a(a+b+c) + b(a+b+c) + c(a+b+c) = 85+96+108$

$(a+b+c)(a+b+c) = 289$

$(a+b+c)^2 = 17$

$a+b+c = 17$

$c(17) = 108$ $\quad c = 108$ //

7.) what is the value of $(13.8 \times 1.9 \div 5.7 + 11.2 \text{ of } \frac{1}{16} - \frac{1}{20})$

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$13.8 \times 1.9 \div 5.7 + 0.7 - \frac{1}{20}$

$13.1 \times \frac{1}{3} + 0.7 - 0.05$

$4.6 + 0.7 - 0.05$

5.25

//

8.) what will be value of $(m+n)$ if we know $\sqrt{28 - 6\sqrt{3}} = \sqrt{3}m + n$

$28 - 6\sqrt{3} = (\sqrt{3}m + n)^2$

$a^2 + 2ab + b$

$a^2 + b^2 = 28$

$ab = 3\sqrt{3}$

$a = 3 \quad b = \sqrt{3}$

$a = 3\sqrt{3} \quad b = 1$ ✓

$(\sqrt{3}m + n)^2 = a^2 - 3\sqrt{3} + b^2$

$(\sqrt{3}m + n)^2 = (a - b)^2$

$(\sqrt{3}m + n) = (3\sqrt{3} - 1)$

$m = 3 \quad n = 1$

//

9) on simplification of following, the result will be
$\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\cdots\left(1-\frac{1}{100}\right)$

$\frac{1}{2}\times\frac{2}{3}\times\frac{99}{100} = \frac{1}{100} = 0.01$

10) $4^{61}+4^{62}+4^{65}$ is divisible by

$4^{61}\left(4^1+4^2+4^3+4^4+4^5\right)$

$4^{61}\left(\frac{341}{31}\right)$ =

11) If $a=4.36$ $b=2.39$ $c=1.97$, then value of $a^3-b^3-c^3-3abc$

$(-b)^3 = -b^3$

$a^3+(-b)^3+(-c)^3-3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

Now this of the formal

0

12) If $a*b = 2a+3b$, then value of $2*3+3*4$ is?

$a*b \neq a\times b$

$2(2)+3(3)+2(3)+3(4)$

$13+18$

31

13) If $1^2+2^2+3^2+\cdots+10^2 = 385$, then $3^2+6^2+\cdots+30^2$ equals

$3^2\times1^2 + (3\times2)^2 \cdots (3\times10)^2$

$3^2(1^2+2^2\cdots+10^2)$

$3^2(385)$

$9(385) = 3465$ //

14) Simplify

$$\frac{0.72\times0.72\times0.72 - 0.39\times0.39\times0.39}{0.72\times0.72 + 0.72\times0.39 + 0.39\times0.39}$$

$$\frac{a^3-b^3}{a^2+ab+b^2} = \frac{(a-b)(a^2+ab+b^2)}{a^2+ab+b^2}$$

0.33 //

15) For what value of $*$, the statement $\frac{*}{15} = \frac{*}{135}$?

$*^2 = 15\times135$

$*^2 = 2025$

$* = 45$ ✓

16) The value of

$$\frac{1}{1+\sqrt{2}} + \frac{1}{2+\sqrt{3}} \cdots + \frac{1}{\sqrt{15}+\sqrt{16}}$$

$$\frac{1}{1+\sqrt{2}} \times \frac{1-\sqrt{2}}{1-\sqrt{2}} + \frac{1}{2+\sqrt{3}} \times \frac{1-\sqrt{3}}{1-\sqrt{3}} \cdots \frac{1}{\sqrt{15}+\sqrt{16}} \times \frac{\sqrt{15}-\sqrt{16}}{\sqrt{15}-\sqrt{16}}$$

$$\frac{1-\sqrt{2}}{1-2} + \frac{\sqrt{2}-\sqrt{3}}{2-3} \cdots \frac{\sqrt{15}-\sqrt{16}}{15-16}$$

$$-(1-\sqrt{2}) + (\sqrt{2}-\sqrt{3}) \cdots + \sqrt{15} - \sqrt{16}$$

$$-1 + \sqrt{2} - \sqrt{2} + \sqrt{3} \quad + \sqrt{16}$$

$$-1+4 = 3$$

17) The value of $25.25 - 23.23 + 24.24 ; ?$

Take values by and after decimal & add

$$\begin{array}{r} 25 \\ -23 \\ \hline 24 \\ \hline 26 \end{array} \qquad 26.26$$