simplification

VBUDMAS.
↓
bracket.

Rationalization

$= \frac{1}{\sqrt{28} - \sqrt{24}}$

$= \frac{1}{\sqrt{28} - \sqrt{24}} \times \frac{\sqrt{28} + \sqrt{24}}{\sqrt{28} + \sqrt{24}}$

$= \frac{\sqrt{28} + \sqrt{24}}{4}$

Basic formula:

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

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

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

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

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

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

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

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

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

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

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

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

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

1) value of $m - \frac{1}{m}$ if $m + \frac{1}{m} = 4$

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

$\left(m + \frac{1}{m}\right)^2 = \left(m^2 + \frac{1}{m^2}\right) + 2\left(\cancel{m} \times \frac{1}{\cancel{m}}\right)$

$16 = m^2 + \frac{1}{m^2} + 2$

$14 = m^2 + \frac{1}{m^2}.$

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

$= 14 - 2$

$= 12$

$m - \frac{1}{m} = \sqrt{12}$

$= 2\sqrt{3}$

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

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

$a^2 + b^2 = 2a$ — ①.

$a^2 - 2a + b^2 = 0$ — ②.

$a^2 - 2a = -b^2.$

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

$= -\frac{4}{b^2}$

3) value of a^3+b^3+3ab when value of $a+b=1$?

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

$1^3 = a^2+b^3+3ab(1)$

Ans = 1.

4) $[(3\times3\times3\times3\times3\times3)^6 \div (3\times3\times3\times3)^7 \times 3^4]$

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

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

$= 3^{36-28} \times 3^4$

$= 3^8 \times 3^4$

$= 3^{12}$

5) $$\frac{\sqrt{0.0016} \times \sqrt[3]{8000000}}{\sqrt[3]{0.000512} \times \sqrt[3]{0.064}}$$

$$= \frac{0.\cancel{04} \times \cancel{200}^{100}}{0.\cancel{08}_{2} \times 0.\cancel{4}}$$

$= 250.$

$\sqrt[3]{8000000}$

$= 2\sqrt{1000000}$

$= 2\times100$

$= 200.$

$\sqrt[3]{0.000512}$

$= 0.08$

$= 0.08.$

$= \sqrt{0.0064}$

$= 0.4$

6) $a(a+b+c) = 85$

$b(a+b+c) = 92$

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

value of $c = ?$

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

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

$(a+b+c)^2=289.$

$a+b+c=17.$

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

$c=108/17$

7) $\left(13.8\times1.9\div5.7+11.2 \text{ of } \frac{1}{16}-\frac{1}{20}\right)$

2nd

O - 1st

$11.2 \text{ of } \frac{1}{16}.$

$11.2\times\frac{1}{16}\Rightarrow 0.7$

$=\left(13.8\times\frac{1.9}{5.7}+0.7-\frac{1}{20}\right)$

$=\left(13.8\times\frac{1.9}{5.7}+0.7-0.05\right)$

$=13.8\times\frac{1}{3}+0.70-0.05$

$=4.6+0.65$

$=5.25$

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

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

$28 - 6\sqrt{3} = (\sqrt{3}+n)^2 \Rightarrow a^2 + 2ab + b^2$

$2ab = -6\sqrt{3}$.

$ab = \cancel{2} - 3\sqrt{3}$, $\quad a = 3$

$= -3\sqrt{3} = (-1)(3\sqrt{3})$

9) $(1-\frac{1}{2})(1-\frac{1}{3})(1-\frac{1}{4})\ldots(1-\frac{1}{100})$

$\frac{1}{2} \times \frac{\cancel{2}}{\cancel{3}} \times \frac{\cancel{3}}{4} \ldots \frac{\cancel{99}}{100} = \frac{1}{100}$

$= 0.01$

10) $4^{61}+4^{62}+4^{63}+4^{64}+4^{65}$ is divisible by?

$4^{61}(1+4+16+64+256)$

$4^{61} \times 341$

options.

11) $a = 4.36 \quad b = 2.39 \quad c = 1.97 \qquad a^3 - b^3 - c^3 - 3abc$

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

0 $\times$ Anything,

$a^3 + (-b)^3 + (-c)^3 = 4.36 - 2.39 - 1.97$

$= 0$

Answer = 0

12) $a*b = 2a+3b$. value of $2*3 + 3*4$ is

$a*b = \cancel{2a3}$.

$2a+3b$

$2*3$.

$a=2$ $b=3$.

$4+9$.

$= 13 + 6 + 12$

$= 31$.

13) $1^2+2^2+\dots+10^2 = 385$ then $3^2+6^2+9^2+\dots+30^2 = ?$

$3^2(1^2+2^2+3^2\dots+10^2) = 9\times 385$

$=$

14) simplify

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

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

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

$= 0.72 - 0.39$.

$=$

15) $\frac{x}{15} \times \frac{x}{135} = 1.$

$x^2 = 15 \times 135$

$= 5 \times 3 \times 5 \times 27$

$= 5 \times 3 \times 5 \times 3^3$

$= 5 \times 3 \times 3$

$= 45$

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

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

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

$= -1 + \cancel{\sqrt{2}} - \cancel{\sqrt{2}} + \sqrt{3} \dots + \cancel{\sqrt{15}} - \cancel{\sqrt{15}} + \sqrt{16}.$

$= -1 + 4 = 3.$

17) $25.25 - \quad 23.23 + 24.24\ ?$

$= 25 - 23 + 24.$

$= 26. \quad 0.26.$