

Componendo & Dividendo Rule :-

if, $\frac{a}{b} = \frac{c}{d}$ तौ $\frac{a+b}{a-b} = \frac{c+d}{c-d}$ या $\frac{a}{a-b} = \frac{c}{c-d}$

$$\frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a}{b} + 1 = \frac{c}{d} + 1 \Rightarrow \frac{a+b}{\cancel{b}} = \frac{c+d}{\cancel{d}}$$

$$\frac{a}{b} = \frac{c}{d} \Rightarrow \frac{a}{b} - 1 = \frac{c}{d} - 1 \Rightarrow \frac{a-b}{\cancel{b}} = \frac{c-d}{\cancel{d}}$$

$$\frac{a+b}{a-b} = \frac{c+d}{c-d}$$

Componendo & dividendo Rule:-

$$\text{If, } \frac{a+b}{a-b} = \frac{x}{y} \quad \text{तो} \quad \frac{a}{b} = \frac{x+y}{x-y}$$

$$\text{If, } \frac{a+b}{a-b} = \frac{19}{7} \quad \text{तो} \quad \frac{a}{b} = \frac{19+7}{19-7} = \frac{26}{12} = \frac{13}{6}$$

Componendo & dividendo Rule:-

॥ यदि, $\frac{a+b}{a-b} = \frac{x}{y}$

$$\rightarrow \frac{(\cancel{a+b}) + (\cancel{a-b})}{(\cancel{a+b}) - (\cancel{a-b})} = \frac{x+y}{x-y}$$

$$\rightarrow \frac{\cancel{2a}}{\cancel{2b}} = \frac{x+y}{x-y}$$

$$\rightarrow \frac{a}{b} = \frac{x+y}{x-y} \checkmark$$

55. If $(m+n):(m-n)=7:3$, then $(m^3+n^3):(m^3-n^3)=?$
यदि $(m+n):(m-n)=7:3$ तो $(m^3+n^3):(m^3-n^3)=?$

RRB NTPC 16/02/2021 (Evening)

133 : 117

[A] 117:133

[B] 133:117

[C] 17:133

[D] 117:13

$$\frac{m+n}{m-n} = \frac{7}{3}$$

$$\Rightarrow \frac{m}{n} = \frac{7+3}{7-3} = \frac{5}{2}$$

56. If $(x^3+y^3):(x^2-xy+y^2)=3:1$ and $(x^2-y^2):(x+y)=5:6$, then what is $2x:3y$?

यदि $(x^3+y^3):(x^2-xy+y^2)=3:1$ और $(x^2-y^2):(x+y)=5:6$ है, तो $2x:3y$ का मान क्या है?

[A] 36:43

[B] 38:47

[C] 45:32

~~[D] 46:39~~

$$\frac{x+y}{x-y} = \frac{18}{5}$$

$$\Rightarrow \frac{2x}{3y} = \frac{23 \times 2}{13 \times 3}$$

$$\begin{aligned}x^3+y^3 &= (x+y)(x^2+y^2-xy) \\x^3-y^3 &= (x+y)(x-y)\end{aligned}$$

यदि $x = \frac{4ab}{a+b}$ तो $\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b} = 2$

$$x = \frac{4ab}{a+b}$$

$$x = \frac{2a \times 2b}{a+b}$$

$$\frac{x}{2a} = \frac{2b}{a+b} \Rightarrow \frac{x+2a}{x-2a} = \frac{2b+a}{b-a}$$

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

$$\begin{aligned} & \frac{3b+a}{b-a} + \frac{3a+b}{a-b} \\ &= \frac{3b+a}{b-a} - \frac{3a+b}{b-a} = \frac{2b-2a}{b-a} \\ &= \frac{2(b-a)}{b-a} \\ &= 2 \end{aligned}$$

Example :-

$$x = \frac{4\sqrt{30}}{\sqrt{6} + \sqrt{5}}$$

तो

$$\frac{x + 2\sqrt{6}}{x - 2\sqrt{6}} + \frac{x + \sqrt{20}}{x - \sqrt{20}} = 2$$

$$x = \frac{4\sqrt{6} \times \sqrt{5}}{\sqrt{6} + \sqrt{5}}$$

$$x = \frac{\sqrt{3} \times \sqrt{2}}{\sqrt{3} + \sqrt{2}}$$

$$\frac{x}{\sqrt{3}} = \frac{\sqrt{2}}{\sqrt{3} + \sqrt{2}} \Rightarrow \frac{x + \sqrt{3}}{x - \sqrt{3}} = \frac{\sqrt{3} + 2\sqrt{2}}{-\sqrt{3}}$$

$$\frac{x}{\sqrt{2}} = \frac{\sqrt{3}}{\sqrt{3} + \sqrt{2}} \Rightarrow$$

$$\frac{y}{\sqrt{6}} = \frac{\sqrt{2} \times \sqrt{3}}{\sqrt{2} \times \sqrt{3}}$$

57. If $x = \frac{\sqrt{6}}{\sqrt{3} + \sqrt{2}}$, then $\frac{x + \sqrt{3}}{x - \sqrt{3}} - \frac{x + \sqrt{2}}{x - \sqrt{2}} = ?$

यदि $x = \frac{\sqrt{6}}{\sqrt{3} + \sqrt{2}}$, तो $\frac{x + \sqrt{3}}{x - \sqrt{3}} - \frac{x + \sqrt{2}}{x - \sqrt{2}} = ?$

MTS 2020

[A] ~~2~~

~~[B]~~ $\sqrt{\frac{2}{3}}$

[C] $\sqrt{\frac{3}{2}}$

[D] $\frac{1}{\sqrt{6}}$

-4+6

$\div \sqrt{2}$

$$\frac{\sqrt{3} + 2\sqrt{2}}{-\sqrt{3}} + \frac{2\sqrt{3} + \sqrt{2}}{\sqrt{2}}$$

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

$$= \frac{2}{\sqrt{6}} = \frac{\sqrt{2}}{\sqrt{3}}$$

58. If $\frac{a+b}{b+c} = \frac{c+d}{d+a}$ where $a \neq c$, then which of the following is correct?

अगर $\frac{a+b}{b+c} = \frac{c+d}{d+a}$ जहां $a \neq c$ है, तो निम्नलिखित में से कौन सा सही है?

[A] $a+b=c+d$

[B] $a+c=b+d$

[C] $a-b-c+d=0$

[D] $a+b+c+d=0$

(CDS)

$$\frac{a+b}{b+c} = \frac{c+d}{d+a}$$

$$\Rightarrow \frac{a+b}{\cancel{a-c}} = \frac{c+d}{\cancel{-c+a}}$$

$$a+b = -(c+d)$$

$$a+b+c+d=0$$

59. Find the value of x in the given equation

$$\frac{\sqrt{7+x} + \sqrt{7-x}}{\sqrt{7+x} - \sqrt{7-x}} = 4$$

(SSC CGL PRE 2025)

~~[A]~~ $\frac{56}{17}$
[c] $\frac{46}{17}$

[B] $\frac{46}{27}$
[D] $\frac{56}{27}$

~~$$\frac{\sqrt{7+x} + \sqrt{7-x}}{\sqrt{7+x} - \sqrt{7-x}} = 4$$~~

~~$$\frac{\sqrt{7+x}}{\sqrt{7-x}} = \frac{4+1}{4-1}$$~~

~~$$\frac{7+x}{7-x} = \frac{25}{9}$$~~

~~$$\Rightarrow \frac{7}{x} = \frac{25+y}{25-y}$$~~

~~$$\frac{7}{x} = \frac{17}{8} \Rightarrow \frac{56}{17} = x$$~~

if $\frac{a+b}{a-b} = \frac{x}{y} \Rightarrow \frac{a}{b} = \frac{x+y}{x-y}$

$$\frac{b + \sqrt{b^2 - 2bx}}{b - \sqrt{b^2 - 2bx}} = \frac{a}{1}$$

$$\Rightarrow \frac{b}{\sqrt{b^2 - 2bx}} = \frac{a+1}{a-1}$$

$$\frac{b^2}{b^2 - 2bx} = \frac{(a+1)^2}{(a-1)^2}$$

$$\Rightarrow \frac{b^2}{2bx} = \frac{(a+1)^2}{24a}$$

$$\frac{2ab}{(a+1)^2} = x$$

60. What is the value of x , if $\frac{b + \sqrt{b^2 - 2bx}}{b - \sqrt{b^2 - 2bx}} = a$?

यदि $\frac{b + \sqrt{b^2 - 2bx}}{b - \sqrt{b^2 - 2bx}} = a$ है तो x का मान ज्ञात करें।

[A] $\frac{ab}{a+b}$

[B] $\frac{2ab}{a+1}$

[C] $\frac{2ab}{(a+1)^2}$

[D] $\frac{ab}{(a+b)^2}$

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

~~$$\frac{1+qae}{1-qae} = \frac{(1+bae)^2}{(1-bae)^2}$$~~

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

$$\Rightarrow \frac{1}{qae} = \frac{2 \cdot (1+bae^2)}{2 \cdot 4 \cdot 1 \cdot bae}$$

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

61. $\frac{1-px}{1+px} \times \sqrt{\frac{1+qx}{1-qx}} = 1$, then $x=?$

[A] ~~$\pm p \sqrt{\frac{2p-q}{q}}$~~

~~[C] $\pm \frac{1}{q} \sqrt{\frac{2p-q}{q}}$~~

[B] ~~$\pm q \sqrt{\frac{2q-p}{p}}$~~

[D] $\pm \frac{1}{p} \sqrt{\frac{2p-q}{q}}$

$$(a+b)^2 - (a-b)^2 = 4ab$$

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


$$(V \cdot V \cdot V \cdot V \cdot 1000)$$

[A] $\frac{a}{b} = \frac{c}{d}$

[C] $\frac{a}{b} = \frac{d}{c}$

$$\begin{array}{l} \text{[B]} \quad \frac{a}{d} = \frac{c}{b} \\ \text{[D]} \quad \frac{4a}{7b} = \frac{c}{d} \end{array}$$

$$\frac{4a+7b}{4a-7b} = \frac{4c+7d}{4c-7d}$$

$$\Rightarrow \frac{4a}{7b} = \frac{4c}{7d}$$

63. If $(3a + 6b + c + 2d) \times (3a - 6b - c + 2d) = (3a - 6b + c - 2d) \times (3a + 6b - c - 2d)$, then which one of the following is correct?

यदि $(3a+6b+c+2d) \times (3a-6b-c+2d) = (3a-6b+c-2d) \times (3a+6b-c-2d)$ तो निम्नलिखित में से कौन सा सही है?

(CDS 2023)

[A] $ab=cd$

[B] $ad=bc$

[C] $ac=bd$

[D] $ad+bc=0$

$$\frac{(3a+6b)+(c+2d)}{(3a+6b)-(c+2d)} = \frac{(3a-6b)+(c-2d)}{(3a-6b)-(c-2d)}$$

$$\Rightarrow \frac{3a+6b}{c+2d} = \frac{3a-6b}{c-2d}$$

$$\Rightarrow \frac{3a+6b}{3a-6b} = \frac{c+2d}{c-2d} \Rightarrow \frac{3a}{6b} = \frac{c}{2d} \Rightarrow \frac{a}{b} = \frac{c}{d}$$

64. If the ratio of sum of two numbers, difference of two numbers and product of two numbers are $13 : 3 : 160$, then find the sum of Squares of two numbers.

यदि दो संख्याओं के योग, अंतर और गुणनफल का अनुपात $13 : 3 : 160$ है, तो उन दो संख्याओं के वर्ग का योग ज्ञात कीजिए?

[A] 1921

[C] 2000

~~1024 + 400~~

[B] 1424

[D] 1536

$a+b$

$a-b$

ab

$$\frac{a+b}{a-b} = \frac{13}{3}$$

$$\Rightarrow \frac{a}{b} = \frac{8}{5}$$

$$a = 8x = 32$$

$$b = 5x = 20$$

$13 : 3 : 160$

$13x : 3x : 40x$

$$x = 4$$