Cube identities in 2 variables

$$(a+b)^3 = (a+b)^2 \times (a+b)$$

$$(a-b)^3$$

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

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

$b \rightarrow (-b)$

$(-b)^{even} = +b$

$(-b)^{odd} = -b$

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

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

$$a^3 \oplus b^3 = \underline{(a+b)^3} - \underline{3ab(a+b)} \checkmark$$

$$= (a+b)\left[(a+b)^2 - 3ab\right]$$

$$= (a+b)\left(a^2 + b^2 - ab\right) \checkmark$$

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

$$= (a-b)\left[(a-b)^2 + 3ab\right]$$

$$= (a-b)\left(a^2 + b^2 + ab\right) \checkmark$$

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

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

65. If $p - 2q = 4$, then the value of $p^3 - 8q^3 - 24pq - 64$ is

अगर $p - 2q = 4$, तो $p^3 - 8q^3 - 24pq - 64$ का मान:

a) 2　　　　b) 0　　　　c) 3　　　　d) -1

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

$$(p-2q)^3 = 4^3$$

$$\Rightarrow p^3 - 8q^3 - 3 \times p \times 2q \times 4 = 64 \quad (a-b)$$

$$\Rightarrow \underline{p^3 - 8q^3 - 24pq - 64 = 0}$$

66. If $m - 5n = 2$, then the value of $(m^3 - 125n^3 - 30mn)$ is

अगर $(m - 5n)^3 = 2$, तो $(m^3 - 125n^3 - 30mn)$ का मान:

a) 6   b) 7   c) 8   d) 9

$$m^3 - 125n^3 - 3 \times m \times 5n \times 2 = 8$$

$$\Rightarrow m^3 - 125n^3 - 30mn = 8$$

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

67. If $x = \boxed{\sqrt[3]{5}} + 2$, then the value of $x^3 - 6x^2 + 12x - 13$ is

अगर $x = \sqrt[3]{5} + 2$, तो $x^3 - 6x^2 + 12x - 13$ का मान:

a) -1   b) 1   c) 2   d) 0

$(x-2)^3 = \left(\sqrt[3]{5}\right)^3$

$\Rightarrow x^3 - 8 + 12x - 6x^2 = 5$

$\Rightarrow x^3 - 6x^2 + 12x - 13 = 0$

7

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

Value

If $5x + 9y = 5$ and $125x^3 + 729y^3 = 120$, then the value of the product of x and y is

अगर $(5x + 9y)^3 = 5^3$ और $125x^3 + 729y^3 = 120$ तो x और y का गुणनफल क्या होगा?

a) 45   b) $\frac{1}{9}$ c) $\frac{1}{135}$ d) 135

$125x^3 + 729y^3 + 3 \cdot 5x \cdot 9y \cdot 5 = 125$

$= 120$

$xy = \frac{1}{135}$

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

i) 2 perfect cubes

ii) 2 terms containing 3

iii) power in A P

$$(a^2+b^2)^3 = a^6 + 3a^4b^2 + 3a^2b^4 + b^6 \times a^0$$

$(a+b)^3$ में $b = 1$

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

Perfect Cubes

69. If $p = 999$, then the value of $\sqrt[3]{p(p^2 + 3p + 3) + 1}$ is

अगर $p = 999$, तो $\sqrt[3]{p(p^2 + 3p + 3) + 1}$ का मान:

a) 1000   b) 999   c) 998   d) 1002

$$\sqrt[3]{p^3 + 3p^2 + 3p + 1}$$

$$= \sqrt[3]{(p+1)^3}$$

$$= p + 1 = 999 + 1 = 1000$$

70. If $p = 124$, then $\sqrt[3]{p(p^2 + 3p + 3) + 1} = ?$

अगर $p = 124$, तो $\sqrt[3]{p(p^2 + 3p + 3) + 1} = ?$

a) 5   b) 7   c) 123   d) 125

$$\sqrt[3]{(p+1)^3}$$

$$= p + 1$$

$$= 124 + 1 = 125$$

$$p^3 + 3p^2 + 3p + 1 - 1$$

$$100 - 1 = 99$$
$$1000 - 1 = 999$$

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

$$= (100)^3 - 1$$

$$= 1000000 - 1$$

72. If $p^3 + 3p^2 + 3p = 26$, then the value of $p^2 + 2p$ is:

यदि $p^3 + 3p^2 + 3p = 26$ है, तो $p^2 + 2p$ का मान ज्ञात कीजिए|

a) 8   b) 12   c) 10   d)15

$4 + 4 = 8$

$(p+1)^3 = 27$

$p+1 = 3$

$p = 2$

73. If $m = -9$, $n = 8$, then the value of $m^3 - 3m^2 + 3m + 3n + 3n^2 + n^3$ is

अगर $m = -9$, $n = 8$, तो $m^3 - 3m^2 + 3m + 3n + 3n^2 + n^3$ का मान:

a) 271　　　　b) -271　　　　c) -1　　　　d) 0

$$-1 \quad +1$$

$$= (m-1)^3 + (n+1)^3$$

$$= -1000 + 729$$

$$= -271$$

15

74. If $x + y + z = 2s$ find $(s-x)^3 + (s-y)^3 + 3(s-x)(s-y)z = ?$

यदि $x + y + z = 2s$ है, तो $(s-x)^3 + (s-y)^3 + 3(s-x)(s-y)z$ का मान ज्ञात करो |

a) z^3 b) $-z^3$ c) 0   d) $2z^3$

$$x + y + z = S + S$$

$$Z = \underbrace{(S-x)}_{a} + \underbrace{(S-y)}_{b}$$

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

$$\Rightarrow z^3 = (S-x)^3 + (S-y)^3 + 3(S-x)(S-y)z$$

16

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

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

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

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

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

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

75. If $(8x^3 + 27y^3) \div (2x + 3y) = (Ax^2 + Bxy + Cy^2)$, then the value of $(5A + 4B + 3C)$ is

यदि $(8x^3 + 27y^3 \div (2x + 3y) = (Ax^2 + Bxy + Cy^2)$ तो $(5A + 4B + 3C)$ का मान है:

a) 27   b) 24   c) 23   d) 71

$\dfrac{(2x)^3 + (3y)^3}{a \qquad b} + b \qquad a^2 - ab + b^2$

$4x^2 - 6xy + 9y^2$

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

$\qquad = a^2 - ab + b^2$

$\begin{array}{r} 20 \\ -24 \\ \hline 27 \end{array}\Big) \begin{array}{l} 23 \\ \ \\ +3 \end{array}$

$A = 4$
$B = -6$
$C = 9$

76. If $8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + 6xy)$, then $(A + B + C - D)$ is equal to:

यदि $8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + 6xy)$ है, तो $(A + B + C - D)$ निम्नलिखित में से किसके बराबर है?

a) -12   b) 12   c) 15   d) 9

$$\left(\frac{2x}{a}\right)^3 - \left(\frac{3y}{b}\right)^3$$

$$2 - 3 + 4 + 9$$
$$= 12$$

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

$$(2x)^3 - (3y)^3 = (2x - 3y)(4x^2 + 9y^2 + 6xy)$$

$$A = 2 \quad B = -3 \quad C = 4 \quad D = -9$$

17. If $2\sqrt{2}x^3 - 3\sqrt{3}y^3 = (\sqrt{2}x - \sqrt{3}y)(Ax^2 + By^2 + Cxy)$, then the value of $A^2 + B^2 - C^2$ is:

यदि $2\sqrt{2}x^3 - 3\sqrt{3}y^3 = (\sqrt{2}x - \sqrt{3}y)(Ax^2 + By^2 + Cxy)$ है, तो $A^2 + B^2 - C^2$ का क्या मान है:

a) 11   b) 7   c) 19   d) 10

$$2x^2 + 3y^2 + \sqrt{6}\,xy$$

$$\left(\frac{\sqrt{2}x}{a}\right)^3 - \left(\frac{\sqrt{3}y}{b}\right)^3 =$$

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

$$4 + \frac{9 - 6}{3}$$

$$= 7$$

coaching center

78. If $24\sqrt{3}x^3 + 5\sqrt{5}y^3 = (2\sqrt{3}x + \sqrt{5}y) \times (Ax^2 + Bxy + Cy^2)$, then what is the value of $(A^2 - B^2 + C^2)$?

यदि $24\sqrt{3}x^3 + 5\sqrt{5}y^3 = (2\sqrt{3}x + \sqrt{5}y) \times (Ax^2 + Bxy + Cy^2)$ है, तो $(A^2 - B^2 + C^2)$ का मान क्या होगा ?

a)108   b)128   c)109   d)139

$12x^2 - 2\sqrt{15}xy + 5y^2$

$\textcircled{5}\sqrt{7}$

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

$2\sqrt{3} \downarrow \downarrow$
4

$A = 12$

$B = (-2\sqrt{15})^2 =$

$C = 5$

$\dfrac{144 - 60 + 25}{84} = 109$

19. If $250\sqrt{2}x^3 - 5\sqrt{5}y^3 = (5\sqrt{2}x - \sqrt{5}y)(Ax^2 + Bxy + Cy^2)$, then the

(HW) value of $(A + C - \sqrt{10}B)$ is:

यदि $250\sqrt{2}x^3 - 5\sqrt{5}y^3 = (5\sqrt{2}x - \sqrt{5}y)(Ax^2 + Bxy + Cy^2)$ है, तो $(A + C - \sqrt{10}B)$ का मान है:

a) 10   b) 5   c) $5\sqrt{2}$ a d) $2\sqrt{5}$ $50x^2 + 5\sqrt{10}xy + 5y^2$

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

$A = 50$

$B = 5\sqrt{10}$

$C = 5$

$50 + 5 - 50 = 5$

80. If $(135\sqrt{5}x^3 - 2\sqrt{2}y^3) \div (3\sqrt{5}x - \sqrt{2}y) = Ax^2 + By^2 + \sqrt{10}Cxy$, then the value of $(A + B - 9C)$ is:

यदि $(135\sqrt{5}x^3 - 2\sqrt{2}y^3) \div (3\sqrt{5}x - \sqrt{2}y) = Ax^2 + By^2 + \sqrt{10}Cxy$ तो $(A + B - 9C)$ का मान है:

a) 20   b) 18   c) 10   d) 12

a b

$45x^2 + 2y^2 + 3\sqrt{10}\,xy$

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

$A = 45$

$B = 2$

$\sqrt{10}\,C = 3\sqrt{10}$

$45 + 2 - 27 = 20$

8l. If $x^6 - 512y^6 = (x^2 + Ay^2)(x^4 - Bx^2y^2 + Cy^4)$, then what is the value of $(A + B - C)$?

अगर $x^6 - 512y^6 = (x^2 + Ay^2)(x^4 - Bx^2y^2 + Cy^4)$, तो $(A + B - C)$ का मान क्या है?

a) -72 b) 72
c) -80 d) 48

$(x^2 - 8y^2)(x^4 + 8x^2y^2 + 64y^4)$

$(x^2)^3 - (8y^2)^3$
  a b

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

$A = -8$
$B = -8$ $\Big]$ -16
$C = 64$

$-8 - 8 - 64 = -80$

82. If $\left[8(x+y)^3 - 27(x-y)^3\right] \div (5y-x) = Ax^2 + Bxy + Cy^2$ then the value of $(A+B+C)$ is:

यदि $\left[8(x+y)^3 - 27(x-y)^3\right] \div (5y-x) = Ax^2 + Bxy + Cy^2$ तो $(A+B+C)$ का मान है:

a) 27   b) 24   ~~c) 16~~   d) 18

$6(x^2 - y^2)$

$$\left[\underbrace{2(x+y)}_{a}\right]^3 - \left[\underbrace{3(x-y)}_{b}\right]^3$$

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

$a - b = 2x + 2y - 3x + 3y$

$$\frac{a-b = 2x+2y}{-3x+3y}$$
$$(5y-x)$$

$a^2 = 4x^2 + 4y^2 + 8xy$
$+ b^2 = 9x^2 + 9y^2 - 18xy$
$+ ab = 6x^2 - 6y^2$
_____

$\Rightarrow 19x^2 + 7y^2 - 10xy$

$A = 19,\ B = -10,\ C = 7$

25

$x = y = 1$

$16 = \dfrac{64 - 0}{4}$

$= A + B + C$

$$\left[8(x+y)^3 - 27(x-y)^3\right] \div (5y - x) = Ax^2 + Bxy + Cy^2$$

$x = 1 \ \& \ y = 0,$ $A = \dfrac{8 - 27}{-1} = 19$

$x = 0, \ y = 1$

$C = \dfrac{8 + 27}{5} = 7$

$x = 1, y = 1$ 16

$\dfrac{64 - 0}{4} = 26 + B$

$-10 = B$

83. If $8(a + b)^3 + (a - b)^3 = (3a + b)(Aa^2 + Bab + Cb^2)$, then what is the value of $(A + B - C)$?

यदि $8(a + b)^3 + (a - b)^3 = (3a + b)(Aa^2 + Bab + Cb^2)$ है, तो $(A + B - C)$ का मान क्या होगा ?

a) 2   b) 4   c) 10   d) 11

$$\underbrace{[2(a+b)]^3}_{x} + \underbrace{[a-b]^3}_{y}$$

$$x^3 + y^3 = (x+y)(x^2 + y^2 - xy)$$

$$3a + b$$

$$4a^2 + 4b^2 + 8ab$$
$$a^2 + b^2 - 2ab$$
$$\dfrac{-2a^2 \mp 2b^2}{3a^2 + 7b^2 + 6ab}$$

$$A = 3, C = 7, B = 6$$

$$8(a+b)^3 + (a-b)^3 = (3a+b)(Aa^2 + Bab + Cb^2)$$

$a = 0, \ b = 1 \quad \rightarrow \quad 8 - 1 = C \quad \Rightarrow \quad C = 7$

$a = 1, \ b = 0 \quad \rightarrow \quad \dfrac{8 + \cancel{1}}{3} = \cancel{3} \times A$

$a = 1, \ b = 1 \quad \rightarrow \quad \dfrac{\cancel{64+0}}{16} = \cancel{4} \times (3 + B + 7 \ )$

$\qquad\qquad\qquad\qquad\qquad 6 = B$

84. If $8(x + y)^3 - (x - y)^3 = (x + 3y)(Ax^2 + Bxy + Cy^2)$, then the value of $(A - B - C)$ is :

यदि $8(x + y)^3 - (x - y)^3 = (x + 3y)(Ax^2 + Bxy + Cy^2)$ है, तो $(A - B - C)$ का मान है:

a) 2   b) -6   c) 10   d) 14

$A = 7, B = 6, C = 3$

$$\frac{2(x+y)}{a} \quad \frac{(x-y)}{b}$$

$$x + 3y$$

$$a^2 = 4x^2 + 4y^2 + 8xy$$
$$+ b^2 = x^2 + y^2 - 2xy$$
$$+ ab = \frac{2x^2 - 2y^2}{7x^2 + 3y^2 + 6xy}$$

85. Given that $(2x + y)^3 - (x + 2y)^3 = (x - y)[A(x^2 + y^2) + Bxy]$, the value of $(2A - B)$ is:

$(2x + y)$ → a, $(x + 2y)$ → b

दिया गया है कि $(2x + y)^3 - (x + 2y)^3 = (x - y)[A(x^2 + y^2) + Bxy]$ है, तो $(2A - B)$ का मान ज्ञात करें।

a) 7   b) 6   c) 0   d) 1

$2x^2 + 4xy + xy + 2y^2$

$$a^2 = 4x^2 + y^2 + 4xy$$
$$+ b^2 = x^2 + 4y^2 + 4xy$$
$$+ ab = 2x^2 + 2y^2 + 5xy$$
$$\overline{ 7x^2 + 7y^2 + 13xy}$$
$$= 7(x^2 + y^2) + 13xy$$

$A = 7, \ B = 13$

Weakness

$x = 1, \ y = -1$

$$1 + 1 = x(2A - B)$$