



MISSION SSC 2024



TOPIC BOOSTER



MATHS

ALGEBRA (PART 2)

 LIVE 05:00 PM





ALGEBRAIC IDENTITIES

1. $(a + b)^2 = a^2 + 2ab + b^2 = (-a - b)^2$
2. $(a - b)^2 = a^2 - 2ab + b^2$
3. $(a - b)(a + b) = a^2 - b^2$
4. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$
5. $(a + b - c)^2 = a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$
6. $(a - b + c)^2 = a^2 + b^2 + c^2 - 2ab - 2bc + 2ca$
7. $(-a + b + c)^2 = a^2 + b^2 + c^2 - 2ab + 2bc - 2ca$
8. $(a - b - c)^2 = a^2 + b^2 + c^2 - 2ab + 2bc - 2ca$
9. $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$
10. $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$
11. $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$
 $= (a + b)(a^2 - ab + b^2)$
12. $a^3 - b^3 = (a - b)^3 + 3ab(a - b)$
 $= (a - b)(a^2 + ab + b^2)$
13. $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$
if $a + b + c = 0$ then $a^3 + b^3 + c^3 = 3abc$



Q2.If $\frac{P}{q} - \frac{q}{p} = 4$, find the value of $\frac{P^3}{q^3} + \frac{q^3}{p^3}$

a. $34\sqrt{5}$

b. $30\sqrt{5}$

c.30

d.24



Q3. If $x = \sqrt{\frac{\sqrt{5}+1}{\sqrt{5}-1}}$ then the value of $5x^2 - 5x - 1$ will be:

- a. 0
- b. 3
- c. 4
- d. 5



Q4.If $x + \frac{1}{x} = \sqrt{3}$, then the value of $x^{208} + x^{202}$ will be-

- a. 0
- b. 1
- c. $\sqrt{3}$
- d. $-\sqrt{3}$



Q5.If $x=11+6\sqrt{2}$, then find the value of \sqrt{x}

a. $2 + \sqrt{3}$

b. $3 - \sqrt{2}$

c. $1 + \sqrt{2}$

d. $2 - \sqrt{3}$



Q6.If $x=7+4\sqrt{3}$, then find the value of \sqrt{x}

a. $2 + \sqrt{3}$

b. $2 - \sqrt{3}$

c. 0

d. 1



Q7. If $x = \frac{\sqrt{3}}{2}$, then find the value of $\sqrt{1 + x}$.

- a. $\frac{\sqrt{3}}{2} + \frac{1}{2}$
- b. $\frac{\sqrt{3}-1}{2}$
- c. $2 - \sqrt{3}$
- d. $2 + \sqrt{3}$



Q8. If $x^{\frac{1}{4}} + \frac{1}{x^{\frac{1}{4}}} = 1$, then find the value of $x^{1024} + \frac{1}{x^{1024}}$

- a. **0**
- b. **-1**
- c. **1**
- d. **2**



Q9. If $a^3 + b^3 + c^3 - 3abc = 0$ and $a + b + c \neq 0$ find relation

a. $a = b = c$

b. $a + b = c$

c. $a + c = b$

d. $a = b + c$



Q10.If $a=997$, $b=998$ and $c=999$, $a^3+b^3+ c^3-3abc =?$

a. 0

b. 8982

c. 1

d. 4491



Q11. If $x=3+2\sqrt{2}$ and $xy=1$, then find the value of $\frac{x^3+3xy+y^3}{x^2-2xy+y^2}$

- a. $\frac{209}{11}$
- b. $\frac{209}{37}$
- c. $\frac{205}{37}$
- d. $\frac{201}{32}$



Q12.If $a + b=5$ and $a^2+ b^2 =13$, then find the value of $a-b$

- a.* 0
- b.* -1
- c.* 2
- d.* ± 1



Q13. If $\frac{a}{b+c} + \frac{b}{c+a} + \frac{c}{a+b} = 1$, then find value of $\frac{a^2}{b+c} + \frac{b^2}{c+a} + \frac{c^2}{a+b}$

a. 0

b. -1

c. 2

d. 2



Q14.If $x=3^{\frac{1}{3}} + 3^{\frac{-1}{3}}$ then find the value of $3x^3 - 9x$

A -10

B -1

C 1

D 10



Q15.If $x=2 - 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$ then find the value of $x^3 - 6x^2 + 18x + 18$

A 22

B 33

C 40

D 45



Q16.
$$\frac{1}{\sqrt[3]{4} + \sqrt[3]{2} + 1} = a\sqrt[3]{4} + b\sqrt[3]{2} + c$$

a,b,c are rational numbers find a+b+c

A 0

B 1

C 2

D 3



Q17. If $x=2 + \sqrt{3}$ then find the value of x^2-4x+2 .

a. **0**

b. -1

c. **1**

d. **2**



Q18. If $a + \frac{1}{a} = 3$, then $a^6 + \frac{1}{a^6}$ is equal to:

(a) 322

(b) 730

(c) 319

(d) 780



Q19.If $x + \frac{1}{16x} = 3$, then the value of $16x^3 + \frac{1}{256x^3}$ is:

(a)441

(b)414

(c)423

(d)432



Q20.If $16x^2 + 9y^2 + 4z^2 = 24(x - y + z) - 61$, then the value of $(xy + 2z)$ is:

(a)1

(b)3

(c)2

(d)5



Q. If $x + y + z = 19$, $x^2 + y^2 + z^2 = 133$ and $xz = y^2$, then the difference between z and x is

(a) 10

(b) 12

(c) 9

(d) 15



If $x^4 + x^{-4} = 194$, $x > 0$, then the value of $(x - 2)^2$

- (a) 1
- (b) 2
- (c) 6
- (d) 3



If $x = 2 - \sqrt{3}$ then the value of $x^3 - x^{-3}$ is

- (a) $-30\sqrt{3}$ (b) $30\sqrt{2}$
(c) $30\sqrt{3}$
(d) $-30\sqrt{3}$



$(x + y)^{\frac{1}{3}} + (y + z)^{\frac{1}{3}} = -(z + x)^{\frac{1}{3}}$, then $x^3 + y^3 + z^3$ can

be expressed as:

- (a) $\frac{1}{8}xyz$
- (b) $\frac{3}{8}(x + y)(y + z)(z + x)$
- (c) $(x + y)(y + z)(z + x)$
- (d) $3xyz$



If x is real, and $x^2 - 5x^2 - 1 = 0$, then the value of

$(6x^3 - 3x^2 + \frac{3}{x^2} - \frac{1}{x^6} + 1)$ is:

(a) 110

(b) 116

(c) 126

(d) 96



If $8(x + y)^3 - (x - y)^3 = (x + 3y)(Ax^2 + Cy^2 + Bxy)$,

then the value of $(A - B - C)$ is

(a)-6

(b)14

(c)-2

(d)10



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

(a) 10

(b) 4

(c) 2

(d) 11



If $x = (\sqrt{5} - \sqrt{3} / \sqrt{5} + \sqrt{3})$ and y is the reciprocal of x , then what is the value of $(x^3 + y^3)$?

(a) 504

(b) 476

(c) 488

(d) 472



If $(3x - 1)^3 + (4x - 3)^3 + (2x + 1)^3 = 3(3x - 1)(4x - 3)(2x + 1)$ and $x \neq 1/3$, then $x = ?$

(a) $1/2$

(b) $1/4$

(c) 2

(d) 1



If $x^2 - 3x - 1 = 0$, then the value of $(x^2 + 8x - 1)\{x^3 + x^{-1}\}^{-1}$ is:

(a) $3/8$

(b) 1

(c) 0

(d) 3



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(a) 18

(b) 19

(c) 21

(d) 16



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

- a. $x^6 + \frac{1}{x^6}$
- b. $x^8 + \frac{1}{x^8}$
- c. $x^8 - \frac{1}{x^8}$
- d. $x^6 - \frac{1}{x^6}$



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If $a = \sqrt{7} + 2\sqrt{12}$ and $b = \sqrt{7} - 2\sqrt{12}$, then $(a^3 + b^3)$ is equal to

- a. 40
- b. 44
- c. 48
- d. *not*



If $x = \sqrt[3]{2 + \sqrt{3}}$, then the value of $x^3 + \frac{1}{x^3}$ is

- a. 8
- b. 9
- c. 2
- d. 4



If $x + \frac{1}{x} = \sqrt{3}$, then the value of $x^{60} + x^{90}$ will be-

- a. 0
- b. 1
- c. $\sqrt{3}$
- d. $-\sqrt{3}$



If $x = 11 + 6\sqrt{2}$, then find the value of \sqrt{x}

a. $2 + \sqrt{3}$

b. $3 + \sqrt{2}$

c. $1 + \sqrt{2}$

d. $2 - \sqrt{3}$



If $x=97+8\sqrt{6}$, then find the value of \sqrt{x}

a. $4\sqrt{6} + \sqrt{1}$

b. $4\sqrt{6 + 1}$

c. $4\sqrt{6} - \sqrt{1}$

d. $4\sqrt{6} + \sqrt{5}$



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If $x + \frac{1}{x} = \sqrt{3}$ then find $x^{506} + x^{500} + x^{384} + x^{190} + x^{184} + x^{18} + x^{12}$

- a. 3
- b. **1**
- c. 84
- d. *not*



If $x^{\frac{1}{8}} + \frac{1}{x^{\frac{1}{8}}} = 1$, then find the value of $x^{\frac{1}{512}} + \frac{1}{x^{\frac{1}{512}}}$

- a. **0**
- b. **-1**
- c. **1**
- d. **2**



If $x^{1/3} + y^{1/3} = z^{1/3}$

Find the value $(x+y-z)^3 + 27xyz$

a. 1

b. 0

c. 2

d. -1



If $a=25$, $b=15$ and $c= -10$, $a^3+b^3+ c^3-3abc/(a-b)^2 +(b-c)^2 +(c-a)^2$

a. 15

b. 10

c. 1

d. 0



If $x=5+2\sqrt{6}$ and $xy=1$, then find the value of $\frac{x^3+3xy+y^3}{x^2-2xy+y^2}$

- a. $\frac{209}{93}$
- b. $\frac{973}{97}$
- c. $\frac{205}{37}$
- d. not



If $x=16$, find the value of $x^4-17x^3+17x^2-17x+17$

a. 0

b. -1

c. 2

d. 1



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If $\frac{a}{1-a} + \frac{b}{1-b} + \frac{c}{1-c} = 1$, then find value of $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c}$

a. 0

b. -1

c. 4

d. 2



If $x^4 + \frac{1}{x^4} = 194$ then find the value of $x^3 - \frac{1}{x^3}$.

a. $30\sqrt{3}$

b. $30\sqrt{2}$

c. 14

d. 25



If $x + \frac{1}{x} = 5$ then find the value of $x^2 - \frac{1}{x^2}$

- a. $5\sqrt{21}$
- b. 5
- c. $-5\sqrt{21}$
- d. 7



$$\text{if } x = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}$$

And $xy=1$ then find the value of $\left(\frac{x-y}{x+y}\right)^2$

- a. $3/7$
- b. $3/4$
- c. 0
- d. 1



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$x + \frac{1}{x} = 1$ then find the value of $x^{17} + \frac{1}{x^{17}}$

- a.* 1
- b.* -1
- c.* 0
- d.* not



$4^{2x-y} = 4^{x+y} = \sqrt{64}$ find the value of x

- a.* 1
- b.* 0
- c.* 2**
- d.* not



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

- a. 13/6
- b. 6/13
- c. 13
- d. *not*



if $a + b + c = 0$ then the value of the $\frac{a^2 + b^2 + c^2}{c^2 - ab}$

a. 2

b. 1

c. $a + b + c$

d. *not*



If $a + b + c = 0$ then the value of the
 $a^2/bc + b^2/ca + c^2/ab$

- a. 3
- b. 1
- c. 2
- d. *not*



$$a + b + c = 0, (a^3 + b^3 + c^3)^2 = ?$$

- (1) $3a^2 b^2 c^2$
- (2) $9abc$
- (3) $27abc$
- (4) $9a^2 b^2 c^2$



If $x = \sqrt{3} + \sqrt{4} + \sqrt{5}$ then

$$x^4 - 8x^3 + 8x^2 + 32x = ?$$

A- 36

B- 39

C-40

D- 54



If $(a^{28} + 1) / a^{14} = 23$
then $(a^{42} + 1) / a^{21} = ?$

A-110

B- 29

C- 52

D- 59



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If $\{(a^2 + b^2 + c^2) / (a^2 - b^2 - c^2)\} + \{(b^2 + c^2 + a^2) / b^2 - c^2 - a^2\} + \{(c^2 + a^2 + b^2) / (c^2 - a^2 - b^2)\} = ?$

A- 0

B- 1

C-3

D-1



If $x = 1 / x = \sqrt{5}$ than $\sqrt{x} (\sqrt{x} - 1) = ?$

A- $\frac{\sqrt{5}}{2}$

B- $\frac{\sqrt{5}}{4}$

C- 1

D- $\frac{10}{\sqrt{5}}$



If $x = (1 / \sqrt{5} - 2)$ then
 $x^4 + 16x^2 - 8x^3 = ?$

A- -1

B - $\sqrt{5}$

C- $2\sqrt{5}$

D- $\sqrt{5} + 2$



If $x = (1 / \sqrt{5} - 2)$ then
 $2x^3 - 5x^2 - 14x - 3 = ?$

A - 0

B - 1

C - 5

D - 3



If $x + (1/x) = 1$ then

$$x^{50} + x^{51} + x^{52} + x^{53} + x^{54} + x^{55} = ?$$

A – 3

B – 6

C – 2

D – 0



If $x + (1 / x) = 0$ then $x^{12} + x^{14} + x^{16} + x^{18} = ?$

A - 0

B - 1

C - 2

D - 4