



# Algebra - II

Course on Advanced Math for SSC CGL Mains 2020

Abhinay Sharma • Lesson 2 • Aug 26, 2021

Type → 1

$$32\text{ min} - 32\text{ guy} =$$

When no. of variables are more than no. of equations. then all extra variables can be put anything.

Find eq<sup>n</sup> 3(1) variables fixed

$$\begin{array}{rcl} 9 & & \\ \diagup 2 & 8 & \\ x+y = 10 & & \\ \hline \text{Ans } x, y & & \end{array}$$

$$x+y-12 = 3$$

$$xy-yz+zx = 4$$

$$x^2+y^2+z^2$$

$$9, 1$$

$$8, 2$$

$$10, 6$$

$$6, 4$$

$$z=0$$

$$x+y = 3 \quad xy = 4$$

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

$$= 9 - 8 = 1$$

No. of fixed values

$$6, 4$$

If  $a + b + c = 9$ ,  $a^3 + b^3 + c^3 = 3(abc + 34)$ , then what is the value of  $a^2 + b^2 + c^2$ ?

यदि  $a + b + c = 9$ ,  $a^3 + b^3 + c^3 = 3(abc + 34)$  है, तो  $a^2 + b^2 + c^2$  का मान ज्ञात करें?

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

$$34 = 243 - 9ab$$

$$9ab = \underline{\underline{201}}$$

$$c = 0$$

$$a+b=9 \quad a^3+b^3=102$$

$$34+102 = (a+b)((a+b)^2-3ab)$$

$$\frac{136}{9} = (9)(81-3ab)$$

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

$$= 81 - 2 \times \frac{201}{9} = \frac{729 - 402}{9} = \frac{327}{9} = \underline{\underline{36}}$$

2. eq<sup>n</sup>

3. Variable

1. extra

If  $a + b - c = 6$ ,  $a^3 + b^3 - c^3 + 3abc = 342$ , then what is the value of  $ab - bc - ca$  ?

यदि  $\underline{a + b - c} = 6$ ,  $a^3 + b^3 - \cancel{c^3} + 3\cancel{abc} = 342$  है, तो  $ab - \cancel{bc} - \cancel{ca}$  का मान ज्ञात करे ?

- (a) 8      (b) ~~-7~~  
(c) -5      (d) 5

$$(a+b)((a+b)^2 - 3ab) = 342$$

$$6(36 - 3ab) = 342$$

12

~~57~~

19

$$\underline{ab = -7}$$

~~-2 1 1~~  
If  $a+b+c=0$ , then find the value of

$$\frac{b^2+c^2}{bc} + \frac{a^2+c^2}{ca} + \frac{a^2+b^2}{ab}$$

- (a) -1      ~~(b)~~ -3  
(c) 0      (d) 3

b=c=1  
a=-2

$$\frac{-1}{1} + \frac{4+1}{-2} + \frac{4+1}{-2}$$

$$2-5 = -3$$

$$\frac{N}{0 \rightarrow X}$$

$$\frac{0}{0} X$$

$$a+b+c = 0 \quad a \Rightarrow -(b+c)$$

$$b=c=1$$

$$\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = \frac{4}{+} + \frac{1}{-2} + \frac{1}{-2} \quad a = -2$$

$$-2 \quad 1 \quad 1$$

$$a+b+c = 0$$

$$4-1=3$$

$$\frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca} + \frac{(a+b)^2}{ab} \Rightarrow 3 \quad \checkmark$$

$$\frac{4}{1} + \frac{1}{-2} + \frac{1}{-2} = 3$$

If  $\frac{(c-z)y}{bc} = 1$  and  $\frac{(a-x)z}{ca} = 1$ , then what is  $\frac{(b-y)x}{ab}$  equal to?

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

$$(1-z)\cdot 1 = 1$$

$$(1-y)z = 1$$

$$z=2 \quad y=-1$$

$$x=\frac{1}{2}$$

$$\frac{(1-y)x}{ab} \Rightarrow$$

$$(1-1)\cdot\frac{1}{2} = 1$$

$$z \neq 0, 1$$

$$2 \text{ eqn} \rightarrow b$$

$$a=b=c=1$$

यदि  $\frac{a}{b+c} + \frac{b}{a+c} + \frac{c}{a+b} = -3$  और  $a^2 + c^2 + 2b^2$  तो  
 $ab + bc + ac$  का मान ज्ञात कीजिये | (दिया गया है कि  $a + b + c \neq 0$ )

- A) C
- B) C<sup>2</sup>
- C) B<sup>2</sup>/3
- D) -B<sup>2</sup>

If  $x + 3y + 2 = 0$  then value of  $x^2(x+1) + 9y^2(3y+1)$   
-  ~~$12xy + 2$~~  is

(A) 1      (B) 0  
(C) 2      (D) -2

$$\begin{aligned} & 4(-1) + 2 \\ & = -2 \end{aligned}$$

$$y=0$$

$$x=-2$$

If  $a+b+c=1$  and  $a^3+b^3+c^3=4$ , then find  
 $\frac{1}{(a+bc)} + \frac{1}{(b+ac)} + \frac{1}{(c+ab)}$  ?

- (a) 1    (b) -1  
(c) -2    (d) 3    V.i.mpl

$$c = 0$$

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{ab}$$

$$\frac{a+b+1}{ab} = \frac{2}{-1} = -2$$

$$a+b=1$$

$$a^3+b^3=4 = (a+b)^3 - 3ab(a+b)$$

$$ab = -1$$

If  $a + b + c = 0$ , then the value of  $(a^2 + b^2 + c^2) / (a^2 - bc)$  is ?

यदि  $a + b + c = 0$  हो, तो  $(a^2 + b^2 + c^2) / (a^2 - bc)$  का मान क्या होगा

?

- (a) 0 (b) 1
- (c) 2 (d) 3

$$\frac{4+1}{1} = 2$$

✓  $c=0$

$b=1$

$a = -1$

if  $x - y - z = 0$ , then the value of ✓  
 $(x^2 + y^2 + z^2) \div (y^2 + xz)$  is:

- (a) -1
- (b) ~~2~~
- (c) -2
- (d) 1

$$\frac{|+|}{|+|} = 2$$

$$z = 0$$

$$x = y = 1$$

1 sec

If  $(\sqrt{a^2 + b^2 + ab}) + \sqrt{a^2 + b^2 - ab} = 1$ , then what is the value of  $(1 - a^2)(1 - b^2)$ ?

- (a)  $1/4$
- (b)  $4/7$
- (c)  $5/4$
- (d)  $3/4$

$$\left(1 - \frac{1}{4}\right)(1 - 0)$$

$$= 3/4$$

$$b = 0$$

$$a + a = 1$$

$$a = 1/2$$

Find  $\underline{ab(a+b) + bc(b+c) + ca(c+a) + 3abc}$ , If  $a+b+c=7$  and  $ab+bc+ca = 9$  ?

$$a+b=7$$

$$ab = 9$$

$$c=0$$

$$ab(a+b) = 9 \times 7 = 63$$

Find  $yz - x(y+z)$  if  $x - y - z = 11$  and  $x^2 + y^2 + z^2 = 59$ ,

$$x = 0$$

$$yz = ?$$

$$y+z = -11$$

$$y^2 + z^2 = 59$$

$$y^2 + z^2 + 2yz = 121$$

$$\begin{aligned}2yz &= 121 - 59 \\&= 62\end{aligned}$$

$$yz = \underline{\underline{31}}$$

IF  $A+B+C = -7$ , THEN WHAT IS THE VALUE OF

$$\frac{(A+4)^3 + (B+5)^3 + (C-2)^3}{(A+4)(B+5)(C-2)}$$

- (A) 343      (B) -  
(C) 0      (D) 343

$$B=C=0$$

$$A = -7$$

$$\frac{-27 + 125 - 8}{-3 \times 5 \times -2} = \frac{90}{30} = 3$$

$$x=1$$

$$A^3 - B^3 = 1$$

$$A^3 + B^3 = 1$$

---

$$2A^3 = 2$$

$$A = 1$$

$$B = 0$$

$$\text{IF } X^3 + 3/X = 4(A^3 + B^3)$$

$$3X + 1/X^3 = 4(A^3 - B^3)$$

$$\text{FIND } \frac{2A^2 - 1}{2B^2 + 1} = \frac{2-1}{0+1} = 1$$

**IF**  $X = P+1/P$ ,  $Y = P-1/P$   
**THEN**  $\frac{(X^2 - Y^2)^2(Y^2 + 2)}{X^2 - 2} = ?$

$$\begin{aligned}P &= 1 \\x &= 2 \\y &= 0\end{aligned}$$

$$\frac{(4^2)(4)}{2} = \underline{\underline{16}}$$

$$B=2$$

$$2A=1$$

$$C=-1$$

**IF  $AB-B+1=0$ ,  $BC-C+1=0$ ,**  
**THEN  $(AC-A)/ABC=?$**

$$\frac{-\frac{1}{2} - \frac{1}{2}}{\frac{1}{2}x - y} = -\frac{1}{1} = 1$$

$$\left\{ \frac{c-1}{bc} \right\}$$

$$\frac{-1-1}{-2} = -1$$

If  $pq + 1 - q = 0$ ;  $qr + 1 - r = 0$  then

Find  $p = \underline{1}_2$   $r = -1$

$$pqr^2 + qr = ?$$

$$q = \underline{\underline{2}}$$

$$1 + (-2) = \underline{\underline{-1}}$$

$$\text{If } ab + 3 - 3b = 0; bc - c + 1 = 0$$

Find  $a = 3$   
 $c = -1$   
 $abc = ?$

$$a = \frac{3}{2}$$

$$\frac{3}{2} \times 2 \times -1 = \underline{\underline{-3}}$$

2-eq<sup>n</sup>

3-variable

$$b = \underline{\underline{2}}$$

If  $\underline{abc} = \underline{1}$ ; then

$$\begin{matrix} c = b = 1 \\ a = 1 \end{matrix}$$

Find

$$\frac{(bc)^{-1}}{c^{-1} + a + 1} + \frac{(ac)^{-1}}{a^{-1} + b + 1} + \frac{(ab)^{-1}}{b^{-1} + c + 1}$$

$$\frac{1}{1+1+1} + \frac{1}{1+1+1} + \frac{1}{1+1+1} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \textcircled{1}$$

If  $a + b + c = 0$ ; then  $a = -b$   $c = 0$

Find

$$\frac{a^2}{2a^2 - c^2 - ac} + \frac{b^2}{2b^2 - a^2 - ab} + \frac{c^2}{2c^2 - b^2 - bc}$$

$$\frac{1}{2} + \frac{b^2}{2b^2 - b^2 - b^2}$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

~~$\frac{0}{b}$~~

If  $p^3 - q^3 + r^3 + 3pqr = 7$ ;  $p^3 = 7$

$a = r - q$ ;  $b = r + p$ ;  $c = p - q$ ; then

Find  $a = 0$   $b = p$   $c = p$

~~$a^3 + b^3 + c^3 - 3abc$~~  = ?

$$b^3 + b^3 = 2b^3 = 2 \times 7 = \underline{\underline{14}} \checkmark$$

If  $xy = 1 + yz + zx$ ; then

Find

$$\frac{1 + y^2}{(x + y)(y - z)} = ?$$

$$\begin{array}{c} \cancel{x+y} \\ \cancel{1+yz} \\ \cancel{zx} \end{array}$$

$$z = 0$$

$$xy = 1$$

$$\frac{1+y^2}{xy-y^2} = 1$$

$$x = 0 \quad yz = -1$$

$$\frac{1+y^2}{y^2 - yz} = \frac{1+y^2}{y^2 - (-1)} = 1$$

$$y = 0$$

$$zx = -1$$

$$\frac{1}{-zx} = 1$$

If  $4(4 - x - y - z) + xyz = 0$ ; then

Find

$$\frac{1}{2-x} + \frac{1}{2-y} + \frac{1}{2-z} = ?$$

$$\frac{1}{-2} + \cancel{\frac{1}{2}} + \frac{1}{2} = \boxed{\frac{1}{2}}$$

$$y = z = 0$$

$$x = 4$$



## Question

from Abhishek

hple jo expression poocha tha sirji usme bhi alg alg variable  
alg value rkhne pe ans alg to ni ana chiye tha na ?

If  $ab - b + 1 = 0$ ;  $bc - c + 1 = 0$ ; then

Find

$$abc + ac - a = ?$$

R.w

IF X AND Y ARE NATURAL NUMBERS SUCH THAT  $x + y = 2017$ , THEN WHAT IS THE VALUE OF  $(-1)^x + (-1)^y$ ?

- (A) 2      (B) -2  
(C) 0      (D) 1

R. w.

IF  $(X + Y - Z) = 0$ , THEN WHAT IS THE VALUE OF  $(3Y^2 + X^2 + Z^2) / (2Y^2 + XZ)$ ?

- (A) ~~2~~
- (B) 1
- (C)  $3/2$
- (D)  $5/3$

$$\frac{3y^2 + y^2}{2y^2} = \underline{\underline{2}}$$

$Z = 0$

$X = -Y$

$$x^3 = 6$$

$$P = -x$$

$$Q = x$$

IF  $x^3 - y^3 - z^3 = 3(xy + yz + zx)$ ,  $P + \cancel{Y} + Z + X = 0$ ,  $Q = X + Y - Z$   
AND  $R = X - Y + Z$ , THEN WHAT IS THE VALUE OF  $P^3 + Q^3 + R^3 - 3PQR$ ?

$$R = x$$

$$Y = Z = 0$$

$$-y^3 + x^3 + y^3 + 3x^3$$

$$= 4x^6$$

$$= 24$$

IF  $(X - Y) = 2Z$ , THEN WHAT IS THE VALUE OF  $[Y/(Y + Z)] + [X/X - Z]$ ? imp

- (A) 0      (B) 1  
~~(C) 2~~      (D) -1

$$\frac{Y}{Y} + \frac{X}{1}$$

$$1 + 1$$

$$= 2$$

$$z = 0$$

$$Y = Y$$

IF  $\sqrt{(1-P^2)(1-Q^2)} = \sqrt{3}/2$ , THEN WHAT IS THE VALUE OF

$\sqrt{2P^2+2Q^2+2PQ} + \sqrt{2P^2+2Q^2-2PQ}$  ?

$$Q = 0$$

(a) ~~2~~

(B)  ~~$\sqrt{2}$~~

(C) 1

(D) NONE OF THESE

$$\sqrt{1-P^2} = \frac{\sqrt{3}}{2}$$

$$1-P^2 = \frac{3}{4}$$

$$P^2 = \frac{1}{4}$$

$$P = \frac{1}{2}$$

$2\sqrt{P}$

$2 + \sqrt{2} \cancel{1}$

$= \sqrt{2}$

IF  $A + B = 1$ , THEN  $A^4 + B^4 - A^3 + B^3 - 2A^2B^2 - AB$  IS  
EQUAL TO

- (A) 1
- (B) 2
- (C) 4
- (D) 0

If  $ab + bc + ca = 0$ , then the value of

$$\frac{1}{a^2 - bc} + \frac{1}{b^2 - ac} + \frac{1}{c^2 - ab}$$

$$\frac{a^2}{a^2 - bc} + \frac{b^2}{b^2 - ac} + \frac{c^2}{c^2 - ab} \longrightarrow 1$$

$$\frac{a^2}{a^2 + ab + ca} + \frac{b^2}{b^2 + bc + ab} + \frac{c^2}{c^2 + ca + ba} = \frac{a}{a+b+c} + \frac{b}{a+b+c} + \frac{c}{a+b+c}$$

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

$$-bc = ab + ca$$

$$b=c=2 \quad a=-1$$

$$\frac{1}{1+4} + \frac{4}{4+2} + \frac{4}{4+2} \\ -\frac{1}{3} + \frac{2}{3} + \frac{2}{3} = \frac{1}{3}$$

$$ab \neg b \leftarrow (a = 0)$$

$$c = b = 1$$

$$a \neg 1 + a = 0$$

$$a = -1$$

---  
yz

$$\begin{array}{r} 4 \\ 2 \\ 3 \end{array} \leftarrow \begin{array}{r} 2 \\ 1 \\ 1 \end{array} = 0$$

$$\begin{array}{r} b = c = 2 \\ a = -1 \end{array}$$

-2 1 1

IF  $A+B+C=0$ , THEN  $2A^2/(B^2+C^2-A^2) + 2B^2/(A^2+C^2-B^2) + 2C^2/(A^2+B^2-C^2)$  IS EQUAL TO

- (A) 3      ~~(B) -3~~  
(C) -4      (D) 0

$$\frac{8}{2-4} + \frac{2 \times 1}{4} + \frac{2}{4}$$

$$-4 + \frac{1}{2} + \frac{1}{2}$$

$$-4 + 1 = -3$$

30 min - 24- Sawaf Uyl.

if  $a^3 + b^3 + c^3 - 3abc = 250$  and  $a + b + c = 10$ , then what will be the value of  $\frac{1}{5}(\underline{ab} + bc + ca)$ ?  $c = 0$

- (a) 25  
(c) 10

~~(b) 5~~  
~~(d) 15~~

$$\frac{1}{5}(ab) = \frac{1}{5} \times 25$$

$$a^3 + b^3 = 250$$

$$a + b = 10$$

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

$$250 = 1000 - 3ab(10)$$

$$3ab = 75$$
$$ab = 25$$

if  $x + y + z = 4$ ,  $xy + yz + zx = 1$  and  $x^3 + y^3 + z^3 = 34$ , then what is the value of  $2xyz$  ?

- (a) - 6
- (b) - 12
- (d) 8
- (d) 18

if  $8a^3 + b^3 = 16$  and  $2a + b = 4$ , then find the value of  $16a^4 + b^4$ .

- (a) 32  
(c) 28

- (b) 36  
(d) 38

$$\Rightarrow 16 - 16 = 32$$

$$8a^3 + b^3 = (2a+b)^3 - 6ab(2a+b)$$

$$16 = 64 - 24ab$$

$$ab = 2$$

$$2a+b = 4$$

$$4a^2 + b^2 = 16 - 4ab = 8$$

$$16a^4 + b^4 = 64 - 8a^2b^2$$

$$= 32$$

if  $x + y = 5$  and  $\frac{1}{x} + \frac{1}{y} = \frac{20}{9}$ , then the value of  $(x^3 + y^3)$  will be:

(a)  $\frac{205}{4}$

$\therefore$

~~$\frac{x+y}{xy} = \frac{20}{9}$~~

$$xy = \frac{9}{4}$$

~~$x^2 + y^2$~~

~~$3x^3$~~

~~$9x^2$~~

(b)  $\frac{635}{8}$

(c)  $\frac{635}{4}$

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

$$= 125 - 3 \cdot \frac{9}{4} \cdot 5$$

$$\frac{500 - 135}{4} =$$

$$\frac{729}{8} + \frac{1}{8}$$

$$= \frac{365}{4}$$

108  
L

~~if  $x + y + z = 5$ ,  $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$ ,  $xyz = 12$  and  $x^3 + y^3 + z^3 = 151$ , then the value of  $(x^2 + y^2 + z^2)$  is :~~

~~(a) 24~~

~~(b) 23~~  
~~(c) 22~~  
~~(d) 21~~

$$\begin{aligned} & (x+y+z)^2 \\ &= 25 \end{aligned}$$

UyI.

$$xy+yz+zx=6$$

3-v4r

4-q1

||

if  $a^2 + b^2 = 25$ ,  $x^2 + y^2 = 17$  and  $ax + by = 8$ , then what is the value of  $(ay - bx)$ ?

- (a) 33
- (b) 25
- (c) 21
- (d) 19

$$(a^2 + b^2)(x^2 + y^2) = (ax + by)^2 + (ay - bx)^2$$

$$425 = 64 + (ay - bx)^2$$

$$ay - bx = \sqrt{361} = \underline{\underline{19}}$$

$$a^2x^2 + b^2y^2 + 2abxy = (ax + by)^2 + (ay - bx)^2$$
$$(a^2x^2 + b^2y^2) - 2abxy$$
$$+ (ay - bx)^2$$

*if*  $2x^2 - 6x = 1$ , *then*  $x^2 + \frac{1}{4x^2} = ?$

- (a) 9
- (b) 10
- (c) 8
- (d) 12

if  $3x - 2y + 3 = 0$ , then what will be the value of  $27x^3 + 54xy + 30 - 8y^3$ ?

- (a) -2
- (b) 57
- (c) -57
- (d) 3

$$y=0$$

$$x = -1$$

$$-2 + -13$$

*if  $x - y - z = 0$ , then the value of  $(x^2 + y^2 + z^2) \div (y^2 + xz)$  is:*

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

if  $x^2 - 3x + 1 = 0$ , then the value of  $2\left(x^8 + \frac{1}{x^8}\right) - 5\left(x^2 + \frac{1}{x^2}\right)$  is:

- (a) 3479
- (b) 4379
- (c) 4370
- (d) 4279

*if  $x^4 + x^{-4} = 47, x > 0$ , then the value of  $(2x - 3)^2$  is :*

- (a) 9
- (b) 3
- (c) 5
- (d) 7

if  $a - \frac{24}{a} = 5$ , where  $a > 0$ , then the value of  $a^2 + \frac{64}{a^2}$  is :

- (a) 45
- (b) 56
- (c) 60
- (d) 65

if  $x^4 + y^4 + x^2y^2 = 117$  and  $x^2 + y^2 - xy = 3(4 + \sqrt{3})$ ,  
then the value of  $(x^2 + y^2)$  will be:

- (a) 9
- (b)  $6\sqrt{3}$
- (c) 12
- (d)  $13\sqrt{3}$

if  $(3x + 2y)^3 + (3x - 2y)^3 = 3kx(3x^2 + 4y^2)$ , then the value of  $k$  will be :

(a) 18

(b) 9

(c) 3

(d) 6

$$27+27 = 9K$$

$$Y=6$$

$$K=6$$

$$X=1$$

if  $x + \frac{81}{x} = 18$  where  $x > 0$ , the value of  $x^2 + \frac{162}{x^2}$  is :

- (a) 78
- (b) 83
- (c) 85
- (d) 81

if  $a + b - c = 0$ , then what is the value of  $\frac{(b-c)^2}{4bc} \frac{(c-a)^2}{4ca} \frac{(a+b)^2}{4ab}$  ?

- (a)  $\frac{1}{2}$     (b)  $-\frac{3}{4}$     (c)  $-\frac{1}{2}$     (d)  $\frac{3}{4}$

$$\begin{aligned}
 & a = -1 \\
 & \left( -\frac{a^2}{4bc} + \frac{b^2}{4ca} + \frac{c^2}{4ab} \right) - \frac{(b-c)^2}{4bc} - \frac{(c-a)^2}{4ca} + \frac{(a+b)^2}{4ab} \\
 & = -\frac{1}{4 \times 2} - \frac{(2)^2}{4(-1)} + \frac{(1)^2}{4(-2)} \\
 & = -\frac{1}{8} + \cancel{\frac{1}{4}} - \frac{1}{-8} = 1 - \frac{1}{4} = \frac{3}{4}
 \end{aligned}$$

if  $(4x - 5)^3 + (x - 2)^3 + 27(2x - 5)^3 = 9(4x - 5)(x - 2)(2x - 5)$ ,

then the value of  $\left(x + \frac{3}{2}\right)$  will be:

- (a)  $\frac{3}{2}$
- (b)  $\frac{1}{2}$
- (c)  $\frac{7}{2}$
- (d)  $\frac{5}{2}$

*if*  $9a^2 + 4b^2 + 49c^2 + 18 = 2(2b + 28c - 2a)$ ,

*then the value of*  $(a + 2b - c)$  *will be:*

- a)  $\frac{11}{21}$
- b)  $\frac{2}{21}$
- c)  $\frac{26}{21}$
- d)  $\frac{5}{21}$

If  $9x^2 - 6x + 1 = 0$ , then the value of  $27x^3 + 27x^3)^{-1}$  will be: –

- (a) 8
- (b) 4
- (c) 2
- (d) 1

If  $2x + 3y + 4z = 11$ ,  $8x^3 + 27y^3 + 64z^3 = 105$  and  $xyz = 1$ ,  
then the value  $4x^2 + 9y^2 + 16z^2 - 6xy - 12yz - 8xz$  is:

- (a) 3
- (b) 4
- (c) 5
- (d) 6

If  $1 + 4x^2 + 16x^4 = 512$ , and  $1 - 2x + 4x^2 = 64$ ,  
then the value of  $1 + 2x + 4x^2$  is:

- (a) 6
- (b) 8
- (c) 12
- (d) 10

*Using algebraic identities, simplify the following expression.*

$$\frac{(x^4 + x^2 + 1)}{(x^2 + x + 1)}$$

- (a)  $(x^2 - 2x + 1)$
- (b)  $(x^2 + x + 1)$
- (c)  $(x^2 + 2x + 1)$
- (d)  $(x^2 - x + 1)$

If  $a + b + c = 7$  and  $a^3 + b^3 + c^3 - 3abc = 301$ , then  $ab + bc + ca = ?$

- (a) - 4
- (b) - 2
- (c) 3
- (d) 2

$$a+b=7$$

$$\begin{array}{r} 3 \\ a+b \\ \hline 301 \end{array}$$

$$c=0$$

$$\cancel{(a+b)} \left( (a+b)^2 - 3ab \right) = \cancel{301}$$

$$49 - 3ab = 43$$

$$ab = 2$$

If  $x^2 + 1 - 2x = 0, x > 0$ , then  $x^2(x^2 - 2) = \underline{\hspace{2cm}}$ .

- (a) 1
- (b)  $\sqrt{2}$
- (c) -1
- (d) 0

If  $x^2 + 4y^2 + 3z^2 + \frac{19}{4} = 2\sqrt{3}(x + y + z)$ ,

then the value of  $(x - 4y + 3z)$  is:

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

**IF**  $\frac{A^2}{A^2+BC} + \frac{B^2}{B^2+CA} + \frac{C^2}{C^2+AB} = 2$

**THEN**  $\frac{BC}{A^2+BC} + \frac{CA}{B^2+CA} + \frac{AB}{C^2+AB} = ?$        <sup>any</sup>

R.W