

19. The factors of $a^2 - 1 - 2x - x^2$ are _____.

$a^2 - 1 - 2x - x^2$ के गुणखंड _____ हैं।

← a) $(a - x - 1)(a - x - 1)$

b) $(a - x + 1)(a - x - 1)$

c) $(a + 1 + x)(a - 1 - x)$

d) $(a - x + 1)(a - x + 1)$

$$a^2 - (1 + 2x + x^2)$$

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

$$= (a+x+1)(a-x-1)$$

$$(1+x)^2$$

$$(x+1)^2$$

coaching center

20. If $x = \cancel{b} + \cancel{c} - 2a$, $y = \cancel{c} + \cancel{a} - 2b$, $z = \cancel{a} + \cancel{b} - 2c$, then the value of $x^2 + y^2 - z^2 + 2xy$ is

अगर $x = b + c - 2a$, $y = c + a - 2b$, $z = a + b - 2c$, तो $x^2 + y^2 - z^2 + 2xy$ का मान:

a) 0

b) $a + b + c$

c) $a - b + c$

d) $a + b - c$

$(x+y)^2 - z^2$

$= (x+y+z)(x+y-z)$

$= 0 \times () = 0$

coaching center

21. How many pairs of natural numbers are there such that the difference of their squares is 35? $+ve \rightarrow \text{Sum} > \text{diff}$

प्राकृतिक संख्याओं के कितने जोड़े ऐसे हैं जिनके वर्गों का अंतर 35 है?

a) 1

b) 2

c) 3

d) 4

$$a^2 - b^2 = 35$$

$$(a+b)(a-b) = 35$$

$$35 \times 1$$

$$7 \times 5$$

i) $35 \times 1 \rightarrow a = \frac{35+1}{2} = 18, b = \frac{35-1}{2} = 17$ (18, 17)

ii) $7 \times 5 \rightarrow a = \frac{7+5}{2} = 6, b = \frac{7-5}{2} = 1$ (6, 1)

22. What is the value of $1006^2 - 1007 \times 1005 + 1008 \times 1004 - 1009 \times 1003$?

$1006^2 - 1007 \times 1005 + 1008 \times 1004 - 1009 \times 1003$ का मान क्या है? - $(1006+1)(1006-1) + (1006+2)(1006-2) - (1006+3)(1006-3)$

a) 6

b) 3

c) 12

d) 24

$$= \cancel{1006^2} - \cancel{1006^2} + 1^2 + \cancel{1006^2} - 4 - \cancel{1006^2} + 9$$
$$= 6$$

Unit digit

$$6 - 5 + 2 - 7 = 8 - 2 = 6 \leftarrow \text{Unit digit}$$

Unit digit'

$$4 - 3 + 0 - 6 = 4 - 9 = -5 + 10 = 5$$

$$\cancel{1018^2} - \cancel{1018^2} + 1 + \cancel{(10135)^2} - (15)^2 - \cancel{(10135)^2} + (25)^2$$

$$= 1 - \underbrace{2.25 + 6.25}_4 = 5$$

23. The value of $(1018)^2 - 1019 \times 1017 + 1015 \times 1012 - 1016 \times 1011$ is: $(1018+1)(1018-1) (1013.5+1.5) (1018)^2 - 1019 \times 1017 + 1015 \times 1012 - 1016 \times 1011$ का मान ज्ञात करें।
a) 1 b) 4 c) 3 d) 5

$$(1013.5 - 1.5) - (1013.5 + 2.5)(1013.5 - 2.5)$$

$$1013.5 = \frac{1015 + 1012}{2}$$

4 coaching center

$$(a^{16} - b^{16}) = (a^8 + b^8)(a^4 + b^4)(a^2 + b^2)(a+b)(a-b)$$

A tree diagram illustrating the factorization of $(a^8 + b^8)(a^8 - b^8)$. The root node is $(a^8 + b^8)(a^8 - b^8)$. It branches into $(a^4 + b^4)$ and $(a^4 - b^4)$. The $(a^4 - b^4)$ node further branches into $(a^2 + b^2)$ and $(a^2 - b^2)$. Finally, the $(a^2 - b^2)$ node branches into $(a+b)$ and $(a-b)$. A red circle highlights the entire tree structure.

$$(a^8 + b^8)(a^8 - b^8)$$
$$(a^4 + b^4) \quad (a^4 - b^4)$$
$$(a^2 + b^2) \quad (a^2 - b^2)$$
$$(a+b) \quad (a-b)$$

$$a^{16} - b^{16} = (a^8 + b^8)(a^4 + b^4)(a^2 + b^2)(a^2 - b^2)$$

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

$$x^8 - 1^8 = (x^4 + 1)(x^2 + 1)(x + 1)(x - 1)$$

$$2^8 - 1^8 = (2^4 + 1)(2^2 + 1)(2 + 1)(2 - 1)$$

coaching center

24. $2^{32} - (2+1)(2^2+1)(2^4+1)(2^8+1)(2^{16}+1)$ is equal to

$2^{32} - (2+1)(2^2+1)(2^4+1)(2^8+1)(2^{16}+1)$ किसके समान है?

a) $2^{(2-1)}$

b) 2^{16}

c) 0

d) 1

$$2^{32} - 1^{32}$$

$$(2^2 - 1^2)$$

$$(2^4 - 1)$$

$$\cancel{2^{32}} - \cancel{2^{32}} + 1 = 1$$

coaching center

25. $(2 + 1)(2^2 + 1)(2^4 + 1)(2^8 + 1)(2^{16} + 1)(2^{32} + 1)(2^{64} + 1)$ is:
~~(2-1)~~ a) $2^{256} - 1$ b) $2^{256} + 1$ ~~c) $2^{128} - 1$~~ d) $2^{128} + 1$

$$= 2^{128} - 1^{128}$$

coaching center

26. What is the simplified value of $(3 + 1)(3^2 + 1)(3^4 + 1)(3^8 + 1)(3^{16} + 1)$?

$(3-1)(3 + 1)(3^2 + 1)(3^4 + 1)(3^8 + 1)(3^{16} + 1)$ का सरलीकृत मान क्या है ?

~~a) $\frac{(3^{32}-1)}{2}$~~ $(3-1)$

b) $\frac{(3^{16}-1)}{2}$

c) $\frac{(3^{64}-1)}{2}$

d) $\frac{(3^{128}-1)}{2}$

$$= \frac{3^{32} - 1}{2}$$

coaching center

27. What is the simplified value of $(x^{128} + 1)(x^{32} + 1)(x^{64} + 1)(x^{16} + 1)(x^8 + 1)(x^4 + 1)(x^2 + 1)(x + 1)$?

$(x^{128} + 1)(x^{32} + 1)(x^{64} + 1)(x^{16} + 1)(x^8 + 1)(x^4 + 1)(x^2 + 1)(x + 1)$ का सरलीकृत मान क्या है ? $(x-1)$

a) $x^{256} - 1$

b) $\frac{x^{128}-1}{x-1}$

c) $\frac{x^{64}-1}{x-1} (x-1)$

d) $\frac{x^{256}-1}{x-1}$

$$\frac{x^{256} - 1}{(x-1)}$$

coaching center

28. What is $\frac{1}{a-b} - \frac{1}{a+b} - \frac{2b}{a^2+b^2} - \frac{4b^3}{a^4+b^4} - \frac{8b^7}{a^8-b^8}$ equal to?

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

किसके बराबर है ?

a) $a+b$

b) $a-b$

c) 1

d) 0 ✓

$$a+b - a+b$$

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

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

$$= \frac{2b}{a^2-b^2} - \frac{2b}{a^2+b^2} - \frac{4b^3}{a^4-b^4} - \frac{4b^3}{a^4+b^4} - \frac{8b^7}{a^8-b^8} - \frac{8b^7}{a^8-b^8} = 0$$

$$P-Q = (2^2 - 1^2) + 6^2 - 5^2 + 10^2 - 9^2$$

$$+ \dots + \underline{82^2 - 81^2} + \underline{86^2 - 90^2} + 94^2$$

$$= (2+1)(2-1) + (6+5)(6-5) + \dots$$

$$= \overbrace{3+11+19}^{+8 \quad +8} + \overbrace{163}^{\frac{160}{8} + 1 = 21} + \underline{86^2 - 90^2 + 94^2}$$

$$\frac{166}{2} \times 21 +$$

$$= 43 + 96 + 00 + 36 = 75$$

29. If $P = 2^2 + 6^2 + 10^2 + 14^2 + \dots + 94^2$ and $Q = 1^2 + 5^2 + 9^2 + \dots + 81^2$, then what is the value of $P - Q$?

यदि $P = 2^2 + 6^2 + 10^2 + 14^2 + \dots + 94^2$ तथा $Q = 1^2 + 5^2 + 9^2 + \dots + 81^2$, है तो $P - Q$ का मान क्या है?

- a) 24645
c) 29317

- b) 26075
d) 31515

$$14^2 = \underline{196}$$

← last 2 digits

$$m(m^4 - 2^4)$$
$$= m(m^2 + 4)(m + 2)(m - 2)$$

30. Factors of $m^5 - 16m$

$m^5 - 16m$ के गुनखंड होंगे-

a) $m(m - 1)(m - 3)$

b) $m(m - 2)(m + 2)(m^2 + 4)$

c) $m(m - 1)(m - 2)(m + 2)$

d) None of these

coaching center

31. $(a+1)^4 - a^4$ is divisible by

$(a+1)^4 - a^4$ विभाजित है :

a) $-2a^2 + 2a - 1$

b) $2a^3 - 2a - 1$

c) $2a^3 - 2a + 1$

d) $2a^2 + 2a + 1$

$$[(a+1)^2 + a^2][(a+1)+a][a+1-a]$$

$$= \underline{(2a^2 + 2a + 1)(2a + 1)}$$

coaching center

32. A complete factorization of $x^4 + 64$ is

$x^4 + 64$ का सम्पूर्ण गुणखंडन करें :

~~a) $(x^2 + 8)^2$~~

~~b) $(x^2 + 8)(x^2 - 8)$~~

~~c) $(x^2 - 4x + 8)(x^2 - 4x - 8)$~~

d) $(x^2 + 4x + 8)(x^2 - 4x + 8)$

$x=0 \rightarrow 64$

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

$$(x^2)^2 + (8)^2 = (x^2 + 8)^2 - 2 \times 8 \times x^2$$

$$a^2 - b^2$$

$$= (x^2 + 8)^2 - (4x)^2$$

$$= (x^2 + 8 + 4x)(x^2 + 8 - 4x)$$

33. The value of $\frac{4.669 \times 4.669 - 9 \times (0.777)^2}{(4.669)^2 + (2.331)^2 + 14(0.667)(2.331)}$ is

$$\frac{a^2 - b^2}{a^2 + b^2 + 2ab} = \frac{a^2 - b^2}{(a+b)^2} = \frac{(a+b)(a-b)}{(a+b)^2} = \frac{a-b}{a+b} (1-k), \text{ where } k = ?$$

$$\frac{4.669 \times 4.669 - 9 \times (0.777)^2}{(4.669)^2 + (2.331)^2 + 14(0.667)(2.331)} = \frac{a-b}{a+b} (1-k), \text{ जहाँ } k = ?$$

- a) 0.666 b) 0.334
 c) 1 d) 2.338

$$a^2 \times b^2 = (ab)^2$$

$2 \times 7 \times 0.667 \times 2.331$
 का मान $a = ?$ है b
 $3^2 \times (.777)^2$
 $(3 \times .777)^2$
 $= (2.331)^2$
 \downarrow
 b

$$\frac{.334}{2.338} = 1 - k$$

$$k = 1 - .334 = .666$$

coaching center

34. x and y are positive integers. If $x^4 + y^4 + x^2y^2 = 481$ and $xy = 12$, then what is the value of $x^2 - xy + y^2$?

x तथा y एक धनात्मक पूर्णांक हैं। यदि $x^4 + y^4 + x^2y^2 = 481$ तथा $xy = 12$ है, तो $x^2 - xy + y^2$ का मान क्या है?

a) 16

~~b) 13~~

c) 113

d) 15

$$(x^2 + y^2)^2 = 625$$

$$x^2 + y^2 = 25$$

$$25 - 12 = 13$$

$$x^2 + y^2 - xy$$

$$(x^2 + y^2)^2 = x^4 + y^4 + 2x^2y^2$$

$$xy = 12$$

$$x^2y^2 = 144$$

coaching center

35. The value of $\frac{4x^3-x}{(2x-1)(6x+3)}$ when $x = 9999$ is

HW

$\frac{4x^3-x}{(2x-1)(6x+3)}$ का मान अगर $x = 9999$

a) 1111 b) 2222 c) 3333 d) 6666

$$\frac{x(4x^2-1)}{(2x-1)3(2x+1)}$$

$$= \frac{x \cancel{[(2x)^2 - (1)^2]}}{3 \cancel{(2x-1)(2x+1)}} = \frac{9999}{3} = 3333$$

coaching center

36. What is $\frac{(x^2+y^2)(x-y)-(x-y)^3}{x^2y-xy^2}$ equal to?

HW

$\frac{(x^2+y^2)(x-y)-(x-y)^3}{x^2y-xy^2}$ किसके बराबर है ?

a) 1

~~b) 2~~

c) 4

d) -2

$$\frac{\cancel{(x-y)} \left[x^2 + y^2 - \cancel{(x-y)}^2 \right]}{xy \cancel{(x-y)}}$$

$$= \frac{2xy}{xy} = 2$$

coaching center

37. The factors of $(x^2 - 1 - 2a - a^2)$ are :

(HW) $(x^2 - 1 - 2a - a^2)$ के गुणखंड ज्ञात करो ।

a) $(x - a + 1)(x - a - 1)$

b) $(x + a - 1)(x - a + 1)$

c) $(x + a + 1)(x - a - 1)$

d) None of these

$x^2 - (1 + 2a + a^2)$

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

$= (x + 1 + a)(x - 1 - a)$

coaching center

$$A = \frac{(x^4+1)(x^4-1)}{x^4+1} = x^4-1 = 2^4-1=15$$

$$B = \frac{(y^2+1)(y^2-1)}{y^2+1} = y^2-1 = 9^2-1 = 80$$

38. $A = \frac{x^8-1}{x^4+1}$ and $B = \frac{y^4-1}{y^2+1}$. If $x = 2$ and $y = 9$, then what is the value of $A^2 + 2AB + AB^2$?

यदि $A = \frac{x^8-1}{x^4+1}$ तथा $B = \frac{y^4-1}{y^2+1}$ है। यदि $x = 2$ तथा $y = 9$ है, तो $A^2 + 2AB + AB^2$ का क्या मान है?

- a) 96475
- c) 92425

- b) 98625
- d) 89125

$$A(A+2B+B^2)$$

$$= 15(6575)$$

$$= \underline{625}$$

last 3 digits

$$\begin{array}{r} 15 \\ 160 \\ \hline 6400 \end{array}$$

coaching center