Sarvasamavakyanga

Question.1. [Marks :(6)]

1,2,3....are natuaral numbers and 2,4,6 , ... are even numbers.
If n is a natuaral number then, 2n is an even number. Then 2n- 1 is an odd number. $(2n-1)^2 = 4n^2 - 4n + 1 = 4n(n-1) + 1$

If n is odd , n - 1 is even. There fore n(n - 1) is even number. And 4n (n - 1) is a multiple of 8. From this we can understand that $(2n-1)^2$ leaves reminder 1 on dividing by 8

After reading the above concept answer the following question

a) Which is the 50^{th} even number?.

b) How many odd numbers are there below 100?

c) Find 11 x 11.

d) which is the multiple of 8 just below 11 x 11

e) Expand $(2n+1)^2$

f) What is the reminder on dividing $19^2 + 39^2$ by 8

Ans.

100	*(1)*
50	*(1)*
121	*(1)*
120	*(1)*
$4n^2 + 4n + 1$	*(1)*
2	*(1)*

Question.2. [Marks :(4)]

Find the missing terms in the following question

a) $(y+5)^2 = y^2 + \ldots\ldots + 10y$

b) $(2y+3)^2 = 4y^2 + 9 + \ldots\ldots$

c) $(3y + \ldots.)^2 = 9y^2 + \ldots\ldots + 24y$

d) If we add or subtract a natuaral number from $12^2 + 5^2$, we will get a perfect square. Which is the natuaral number?

Ans.

25 *(1)*
2 x 2y x 3 = 12y *(1)*

(3y + .4...) ² = 9y ² + .16..... + 24y *(1)*
2 x 12 x 5 = 120 *(1)*

Question.3. [Marks :(6)]

1,2,3....are natuaral numbers. It can be divides as even and odd numbers. 1,3,5,..... are the odd numbers. The difference of two consecuive numbers is 1. There fore the difference of the squares of two consecutive natuaral numbers is equal to their sum.
For example
$10^2 - 9^2 = (10 + 9)(10 - 9)$,
$10 - 9 = 1$, therefore $10^2 - 9^2 = 19$
After reading the above concept answer the following question
a) Which is the next natuaral number to 9999?.

b) find $100^2 - 99^2$
c) What is the difference between two consecuive odd natuaral numbers?.
d) Find $101^2 - 99^2$
e) If a and b are two cosecutive odd numbers and $a^2 - b^2 = (a + b) \times k$, what is the value of k

Ans.

10000 *(1)*
199 *(1)*
2 *(1)*
2(101 + 99) = 400 *(1)*
k = 2 *(1)*

Question.4. [Marks :(3)]

a) Write $m^2 - n^2$ as the product of sum and difference of two numbers
b) Find $168^2 - 167^2$

Ans.

$m^2 - n^2 = (m + n)(m - n)$ *(1)*
$168^2 - 132^2 = (168 + 132)(168 - 132)$ *(1)*
$= 200 \times 36$
$= 7200$ *(1)*

Question.5. [Marks :(2)]

a). If $(x+2)(x-2) = x^2 - k$,then what is the value of k

b).Find $168^2 - 167^2$

Ans.

k = 4 (1)

$168^2 - 167^2 = (168 + 167)(168 - 167)$ (1)

$= 335 \times 1$

$= 335$

Question.6. [Marks :(5)]

a). Write the expansion of $(x+y)^2$ and $(x-y)^2$

b). Find $(x+y)^2 - (x-y)^2$

c) Write 12 as the difference of two perfect square

Ans.

a) $(x+y)^2 = x^2 + y^2 + 2xy$. (1)

$(x-y)^2 = x^2 + y^2 - 2xy$. (1)

b) $(x+y)^2 - (x-y)^2 = 4xy$. (1)

c) $12 = 4 \times 3 \times 1 = (3+1)^2 - (3-1)^2$ (1)

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

Question.7. [Marks :(3)]

a). $(x+y)^2 = x^2 + y^2 + \ldots\ldots\ldots$ *complete this equation*

b). Expand $(2x+3)^2$

Ans.

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

(b) $(2x+3)^2 = (2x)^2 + 2.(2x).3 + 3^2$

$= 4x^2 + 9 + 12x$

Question.8. *x* and *x +1* are the two continuous natural numbers then [Marks :(4)]

a) Write the next two natural numbers

b) Find the product of first and the fourth number

c) Find the product of the second and third number

d) Find the relation between these product

Ans. a) x + 2 , x + 3

b). x (x + 3) = x^2 + 3x

c). (x + 1) (x + 2) = x^2 + x + 2x + 2

= x^2 + 3x + 2

d). (x + 1) (x + 2) = x (x + 3) + 2

Question.9. a) . (x + y) (u + v) = xu + xv + yu + ….. Write the missing term in this question[Marks :(3)]

b). Find the expansion of (2x + 3) (2y + 4)

Ans. *(x + y) (u + v) = xu + xv + yu + ..yv.*

(2x + 3) (2y + 4) = 2x . 2y + 2x . 4 + 3 x 2y + 3 x4

= 4xy + 8x + 6y + 12

Question.10. a) Write the expansion of *(x + 1) (y + 1)*[Marks :(3)]

b). Find 51 x 41

Ans. *(x + 1) (y + 1) = xy + x+ y+ 1*

51 x 41 =(50 + 1) (40 + 1)

= 2000 + 50 + 40 + 1

= 2091

Question.11. Complete the following equation[Marks :(4)]

a) 28 (100 + 2) = 2800 + ……

b) k (x + y) = …… + ……

c). Using this idea find 18 x 105

Ans. (a) 28 (100 + 2) = 2800 + ...56.....

b) k (x + y) = ...kx ..... + ...ky.....

18 x 105 = 18 (100 + 5)

= 1800 + 90

= 1890

Question.12. [Marks :(4)]

a). Write the expansion of $(x+y)^2$ and $(x-y)^2$

b). Find $(x+y)^2 + (x-y)^2$

c) Write $2(6^2 + 4^2)$ as the sum of two perfect square

Ans.

a).$(x+y)^2 = x^2 + y^2 + 2xy.$ (1)

$(x-y)^2 = x^2 + y^2 - 2xy.$ (1)

b) $(x+y)^2 + (x-y)^2 = 2(x^2 + y^2)$ (1)

c). $2(6^2 + 4^2) = 10^2 + 2^2$ (1)

Question.13. a). x(a+b) = xb + ……. Which is the missing term in the equation ?[Marks : (3)]

b). Using this idea find 38 x 102

Ans. *x b*

38 x 102 = 38 (100 +2)

= 3800+ 76

= 3876

Question.14. a).Find the square of 3 n , 3 n + 1 and 3 n + 2[Marks :(4)]

b). Write the reminder on dividing the perfect square by 3

Ans.

a). $(3n)^2 = 9n^2$ (1)

$(3n+1)^2 = 9n^2 + 6n + 1$ (1)

$(3n+2)^2 = 9n^2 + 12n + 4$ (1)

b). reminders are 0 and 1 (1)