VIDYA BHAWAN BALIKA VIDYA PITH

शक्तिउत्थानआश्रमलखीसरायबिहार

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1. Use suitable identities to find the following products:

(i) (x+4)(x +10)

Solution:

Using the identity, $(x+a)(x+b) = x^2+(a+b)x+ab$

[Here, a = 4 and b = 10]

We get,

$(x+4)(x+10) = x^2+(4+10)x+(4\times10)$

$= x^2+14x+40$

(ii) (x+8)(x −10)

Solution:

Using the identity, $(x+a)(x+b) = x^2+(a+b)x+ab$

[Here, a = 8 and b = −10]

We get,

$(x+8)(x-10) = x^2+(8+(-10))x+(8\times(-10))$

$= x^2+(8-10)x-80$

$= x^2-2x-80$

(iii) (3x+4)(3x−5)

Solution:

Using the identity, $(x+a)(x+b) = x^2+(a+b)x+ab$

[Here, x = 3x, a = 4 and b = −5]

We get,

$(3x+4)(3x-5) = (3x)^2+[4+(-5)]3x+4\times(-5)$

$= 9x^2+3x(4-5)-20$

$= 9x^2-3x-20$

(iv) $(y^2+3/2)(y^2-3/2)$

Solution:

Using the identity, $(x+y)(x-y) = x^2-y^2$

[Here, $x = y^2$ and $y = 3/2$]

We get,

$(y^2+3/2)(y^2-3/2) = (y^2)^2-(3/2)^2$

$= y^4-9/4$

2. Evaluate the following products without multiplying directly:

(i) 103×107

Solution:

$103\times107 = (100+3)\times(100+7)$

Using identity, $[(x+a)(x+b) = x^2+(a+b)x+ab$

Here, x = 100

a = 3

b = 7

We get, $103\times107 = (100+3)\times(100+7)$

$= (100)^2+(3+7)100+(3\times7))$

= 10000+1000+21

= 11021

(ii) 95×96

Solution:

$95\times96 = (100-5)\times(100-4)$

Using identity, $[(x-a)(x-b) = x^2-(a+b)x+ab$

Here, x = 100

a = -5

b = -4

We get, $95\times96 = (100-5)\times(100-4)$

$= (100)^2+100(-5+(-4))+(-5\times-4)$

$= 10000-900+20$

$= 9120$