1. Factorise by taking out the common factors: $2(2x - 5y)(3x + 4y) - 6(2x - 5y)(x - y)$

Solution :
Taking $(2x - 5y)$ common from both terms
$= (2x - 5y)[2(3x + 4y) - 6(x - y)]$
$=(2x - 5y)(6x + 8y - 6x + 6y)$
$=(2x - 5y)(8y + 6y)$
$=(2x - 5y)(14y)$
$=(2x - 5y)14y$

2. Factorise by grouping method: $a^3 + a - 3a^2 - 3$

Solution :
$= a^3 + a - 3a^2 - 3$
$= a(a^2 + 1) - 3(a^2 + 1)$
$= (a^2 + 1)(a - 3)$

3. Factorise: $(x^2 - 3x)(x^2 - 3x - 1) - 20$

Solution :
$= (x^2 - 3x)(x^2 - 3x - 1) - 20$
$= (x^2 - 3x)[(x^2 - 3x) - 1] - 20$
$= a[a - 1] - 20$ ....(Taking $x^2 - 3x = a$)
$= a^2 - a - 20$
$= a^2 - 5a + 4a - 20$
$= a(a - 5) + 4(a - 5)$
$= (a - 5)(a + 4)$
$= (x^2 - 3x - 5)(x^2 - 3x + 4)$

4. Give possible expressions for the length and the breadth of the rectangle whose area is $12x^2 - 35x + 25$

Solution :
$= 12x^2 - 35x + 25$
$= 12x^2 - 20x - 15x + 25$
$= 4x(3x - 5) - 5(3x - 5)$
$= (3x - 5)(4x - 5)$
Thus, Length $= (3x - 5)$ and breadth $= (4x - 5)$ OR Length $= (4x - 5)$ and breadth $= (3x - 5)$

5. Factorise $(x - y)^3 - 8x^3$

Solution: $(x - y)^3 - 8x^3$
$= (x - y)^3 - (2x)^3$
$= (x - y - 2x)[(x - y)^2 + 2x(x - y) + (2x)^2]$
[Using identity $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$]
$= (-x - y)[x^2 + y^2 - 2xy + 2x^2 - 2xy + 4x^2]$
$= -(x + y)[7x^2 - 4xy + y^2]$

6. Factorise $x^2 + \frac{1}{x^2} - 11$

Solution : $x^2 + \frac{1}{x^2} - 11$
$= x^2 + \frac{1}{x^2} - 2 - 9$

$= (x^2 + \frac{1}{x^2} - 2) - 9$
$= \left(x - \frac{1}{x}\right)^2 - 3^2$
$= \left(x - \frac{1}{x} + 3\right)\left(x - \frac{1}{x} - 3\right)$

7. Factorise a(3a-2)-1
   Solution:
   $a(3a-2)-1=3a^2-2a-1$
   $=3a^2-3a+a-1$
   $=3a(a-1)+1(a-1)$
   $=(3a+1)(a-1)$
8. Factorise $a^2b^2+8ab-9$
   Solution:
   $A^2b^2+8ab-9=a^2b+9ab-ab-9$
   $=ab(ab+9)-1(ab+9)$
   $=(ab+9)(ab-1)$
9. Factorise 3-a(4+7a)
   Solution:
   $3-a(4+7a)=3-4a-7a^2$
   $=3-7a+3a-7a^2$
   $=1(3-7a)+a(3-7a)$
   $=(3-7a)(a+1)$
10. Factorise $(2a+b)^2-6a-3b-4$
    solution:
    $(2a+b)^2-6a-3b-4=(2a+b)^2-3(2a+b)-4$
    Assume that $2a+b=x$
    Therefore,
    $(2a+b)^2-6a-3a-4=x^2-3x-4$
    $=x^2-4x+x-4$
    $=1(x-4)+x(x-4)$
    $=(x+1)(x-4)$
    $=(2a+b+1)(2a+b-4)$
    (Resubstitute the value of x)

11. Factorise:

$(x^2 - 3x)(x^2 - 3x - 1) - 20$

Solution:

$(x^2 - 3x)(x^2 - 3x - 1) - 20$
$= (x^2 - 3x)[(x^2 - 3x) - 1] - 20$
$= a[a - 1] - 20$ ....(Taking $x^2 - 3x = a$)
$= a^2 - a - 20$
$= a^2 - 5a + 4a - 20$
$= a(a - 5) + 4(a - 5)$
$= (a - 5)(a + 4)$
$= (x^2 - 3x - 5)(x^2 - 3x + 4)$

12. Give possible expressions for the length and the breadth of the rectangle whose area is

$12x^2 - 35x + 25$

Solution:

$12x^2 - 35x + 25$

$= 12x^2 - 20x - 15x + 25$

$= 4x(3x - 5) - 5(3x - 5)$

$= (3x - 5)(4x - 5)$

Thus,

Length = (3x - 5) and breadth = (4x - 5)

OR

Length = (4x - 5) and breadth = (3x - 5)

13. Factorise:

1. $A^3 - 27$

solution:

$a^3-27=(a)^3-(3)^3$

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

$=(a-3)[a^2+3a+9]$

14. Factorise $(x - y)3 - 8x3$

Solution:

$(x - y)^3 - 8x^3 = (x - y)^3 - (2x)^3$

$= (x - y - 2x)[(x - y)^2 + 2x(x - y) + (2x)^2]$

[Using identity $(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$]

$= (-x - y)[x^2 + y^2 - 2xy + 2x^2 - 2xy + 4x^2]$

$=-(x + y)\ [7x^2 - 4xy + y^2]$