EXERCISE 7.8 PAGE NO: 7.30

Resolve each of the following quadratic trinomials into factors:

1. $2x^2 + 5x + 3$

Solution:

We have,

$2x^2 + 5x + 3$

The coefficient of x^2 is 2

The coefficient of x is 5

Constant term is 3

We shall split up the center term i.e., 5 into two parts such that their sum p+q is 5 and product pq = 2 × 3 is 6

So, we express the middle term 5x as 2x + 3x

$2x^2 + 5x + 3 = 2x^2 + 2x + 3x + 3$

$= 2x (x + 1) + 3 (x + 1)$

$= (2x + 3) (x + 1)$

2. $2x^2 - 3x - 2$

Solution:

We have,

$2x^2 - 3x – 2$

The coefficient of x^2 is 2

The coefficient of x is -3

Constant term is -2

So, we express the middle term -3x as -4x + x

$2x^2 - 3x – 2 = 2x^2 - 4x + x – 2$

$= 2x (x – 2) + 1 (x – 2)$

$= (x – 2) (2x + 1)$

3. $3x^2 + 10x + 3$

Solution:

We have,

$3x^2 + 10x + 3$

The coefficient of x^2 is 3

The coefficient of x is 10

Constant term is 3

So, we express the middle term 10x as 9x + x

$3x^2 + 10x + 3 = 3x^2 + 9x + x + 3$

$= 3x (x + 3) + 1 (x + 3)$

= (3x + 1) (x + 3)

4. $7x – 6 – 2x^2$

Solution:

We have,

$7x – 6 – 2x^2$

$– 2x^2 + 7x – 6$

$2x^2 - 7x + 6$

The coefficient of x^2 is 2

The coefficient of x is -7

Constant term is 6

So, we express the middle term -7x as -4x - 3x

$2x^2 - 7x + 6 = 2x^2 - 4x - 3x + 6$

$= 2x (x – 2) - 3 (x – 2)$

$= (x – 2) (2x – 3)$

5. $7x^2 - 19x - 6$

Solution:

We have,

$7x^2 - 19x – 6$

The coefficient of x^2 is 7

The coefficient of x is -19

Constant term is -6

So, we express the middle term -19x as 2x – 21x

$7x^2 - 19x – 6 = 7x^2 + 2x - 21x – 6$

$= x (7x + 2) - 3 (7x + 2)$

$= (7x + 2) (x – 3)$

6. $28 – 31x – 5x^2$

Solution:

We have,

$28 – 31x – 5x^2$

$– 5x^2 -31x + 28$

$5x^2 + 31x - 28$

The coefficient of x^2 is 5

The coefficient of x is 31

Constant term is -28

So, we express the middle term 31x as -4x + 35x

$5x^2 + 31x - 28 = 5x^2 - 4x + 35x - 28$

= x (5x – 4) + 7 (5x – 4)
= (x + 7) (5x - 4)

7. $3 + 23y – 8y^2$
Solution:
We have,
$3 + 23y – 8y^2$
$– 8y^2 + 23y + 3$
$8y^2 - 23y - 3$
The coefficient of y^2 is 8
The coefficient of y is -23
Constant term is -3
So, we express the middle term -23y as -24y + y
$8y^2 - 23y - 3 = 8y^2 - 24y + y - 3$
= 8y (y – 3) + 1 (y – 3)
= (8y + 1) (y – 3)

8. $11x^2 – 54x + 63$
Solution:
We have,
$11x^2 – 54x + 63$
The coefficient of x^2 is 11
The coefficient of x is -54
Constant term is 63
So, we express the middle term -54x as -33x – 21x
$11x^2 – 54x + 63 = 11x^2 - 33x - 21x – 63$
= 11x (x – 3) - 21 (x – 3)
= (11x – 21) (x – 3)

9. $7x – 6x^2 + 20$
Solution:
We have,
$7x – 6x^2 + 20$
$– 6x^2 + 7x + 20$
$6x^2 - 7x - 20$
The coefficient of x^2 is 6
The coefficient of x is -7
Constant term is -20
So, we express the middle term -7x as -15x + 8x

$6x^2 - 7x - 20 = 6x^2 - 15x + 8x - 20$
$= 3x (2x – 5) + 4 (2x – 5)$
$= (3x + 4) (2x - 5)$

10. $3x^2 + 22x + 35$
Solution:
We have,
$3x^2 + 22x + 35$
The coefficient of x^2 is 3
The coefficient of x is 22
Constant term is 35
So, we express the middle term 22x as 15x + 7x
$3x^2 + 22x + 35 = 3x^2 + 15x + 7x + 35$
$= 3x (x + 5) + 7 (x + 5)$
$= (3x + 7) (x+ 5)$

11. $12x^2 - 17xy + 6y^2$
Solution:
We have,
$12x^2 - 17xy + 6y^2$
The coefficient of x^2 is 12
The coefficient of x is -17y
Constant term is $6y^2$
So, we express the middle term -17xy as -9xy - 8xy
$12x^2 -17xy+ 6y^2 = 12x^2 - 9xy - 8xy + 6y^2$
$= 3x (4x – 3y) – 2y (4x – 3y)$
$= (3x – 2y) (4x – 3y)$

12. $6x^2 - 5xy - 6y^2$
Solution:
We have,
$6x^2 - 5xy - 6y^2$
The coefficient of x^2 is 6
The coefficient of x is -5y
Constant term is $-6y^2$
So, we express the middle term -5xy as 4xy - 9xy
$6x^2 -5xy- 6y^2 = 6x^2 + 4xy - 9xy - 6y^2$
$= 2x (3x + 2y) -3y (3x + 2y)$
$= (2x – 3y) (3x + 2y)$

13. $6x^2 - 13xy + 2y^2$

Solution:

We have,

$6x^2 - 13xy + 2y^2$

The coefficient of x^2 is 6

The coefficient of x is -13y

Constant term is $2y^2$

So, we express the middle term -13xy as -12xy – xy

$6x^2 - 13xy + 2y^2 = 6x^2 - 12xy - xy + 2y^2$

$= 6x (x – 2y) – y (x – 2y)$

$= (6x – y) (x - 2y)$

14. $14x^2 + 11xy - 15y^2$

Solution:

We have,

$14x^2 + 11xy - 15y^2$

The coefficient of x^2 is 14

The coefficient of x is 11y

Constant term is $-15y^2$

So, we express the middle term 11xy as 21xy – 10xy

$14x^2 + 11xy - 15y^2 = 14x^2 + 21xy - 10xy - 15y^2$

$= 2x (7x – 5y) + 3y (7x – 5y)$

$= (2x + 3y) (7x - 5y)$

15. $6a^2 + 17ab – 3b^2$

Solution:

We have,

$6a^2 + 17ab – 3b^2$

The coefficient of a^2 is 6

The coefficient of a is 17b

Constant term is $-3b^2$

So, we express the middle term 17ab as 18ab – ab

$6a^2 + 17ab – 3b^2 = 6a^2 + 18ab - ab – 3b^2$

$= 6a (a + 3b) – b (a + 3b)$

$= (6a – b) (a + 3b)$

16. $36a^2 + 12abc – 15b^2c^2$

Solution:

We have,
$36a^2 + 12abc – 15b^2c^2$
The coefficient of a^2 is 36
The coefficient of a is 12bc
Constant term is $-15b^2c^2$
So, we express the middle term 12abc as 30abc – 18abc
$36a^2 –12abc– 15b^2c^2 = 36a^2 + 30abc – 18abc – 15b^2c^2$
$= 6a (6a + 5bc) – 3bc (6a + 5bc)$
$= (6a + 5bc) (6a – 3bc)$
$= (6a + 5bc) 3(2a - bc)$

17. $15x^2 – 16xyz – 15y^2z^2$
Solution:
We have,
$15x^2 – 16xyz – 15y^2z^2$
The coefficient of x^2 is 15
The coefficient of x is -16yz
Constant term is $-15y^2z^2$
So, we express the middle term -16xyz as -25xyz + 9xyz
$15x^2 -16xyz- 15y^2z^2 = 15x^2 - 25yz + 9yz - 15y^2z^2$
$= 5x (3x – 5yz) + 3yz (3x – 5yz)$
$= (5x + 3yz) (3x - 5yz)$

18. $(x – 2y)^2 – 5 (x – 2y) + 6$
Solution:
We have,
$(x – 2y)^2 – 5 (x – 2y) + 6$
The coefficient of $(x-2y)^2$ is 1
The coefficient of (x-2y) is -5
Constant term is 6
So, we express the middle term -5(x – 2y) as -2(x – 2y) -3(x – 2y)
$(x – 2y)^2 – 5 (x – 2y) + 6 = (x – 2y)^2 – 2 (x – 2y) – 3 (x – 2y) + 6$
$= (x – 2y - 2) (x - 2y - 3)$

19. $(2a – b)^2 + 2 (2a – b) – 8$
Solution:
We have,
$(2a – b)^2 + 2 (2a – b) – 8$
The coefficient of $(2a-b)^2$ is 1

The coefficient of (2a-b) is 2
Constant term is -8
So, we express the middle term 2(2a – b) as 4 (2a –b) – 2 (2a – b)

$(2a – b)^2 + 2 (2a – b) – 8 = (2a – b)^2 + 4 (2a – b) – 2 (2a – b) - 8$

$= (2a – b) (2a – b + 4) – 2 (2a – b + 4)$

$= (2a – b + 4) (2a – b – 2)$