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Perform the indicated operation on the following polynomials.

1. add $6a - 3b + 6$; $-6a + 2b - 10$

2. subtract $x + xy - 2y$ from $5x - xy + 5y$

3. add $3xy - x^2y + xy^2$; $-xy^2 - 5xy - 6x + 4x^2y$

4. subtract $x^3y^2 - xy^3 + 5y^2 + 10$ from $3x^3y^2 + 2xy^3 - x - 3y^2$

Simplify the following.

5. $\{-4x - [5x - 2 - (3x + 3) - 6] + 10\} + 2$

6. $[x + y - (5 - 3y + 5x)] - (2x - 3y + 1)$

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Find the product of the following polynomials.

7. $4b(8bc)$

8. $5mo(12mn)$

9. $2x(8x + y)$

10. $4x(1 + 7y)$

11. $2a(3a + 2b - 4)$

12. $6bc(2a + b - 2c)$

Factor the following polynomials.

13. $15x + 30$

14. $8x + 16y - 24$

15. $12a - 9b + 3$

16. $60x - 20xy$

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17. $36a^2 - 24ab - 72a$

18. $30vuz - 60u^2z - 100uz$

Find the product of the following binomials.

19. $(x + 5)(x + 2)$

20. $(x + 3)(2x + 4)$

21. $(x + y)(3x + 4y)$

22. $(6y + 5)(y - 9)$

23. $(x - y)(12x + y)$

24. $(3 - 9y)(3 + 14y)$

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Find the product of the following Special product.

25. $(x+4)(x-4)$

26. $(x+2)(x-2)$

27. $(2x+3y)(2x-3y)$

28. $(y+2)^2$

29. $(6x-y)(6x+y)$

30. $(3+7y)^2$

Factor the Following Polynomials.

31. $x^2+10x+21$

32. $y^2-11y+28$

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33. $2x^2 + 26x + 72$

34. $4y^2 + 12y - 40$

Find the Following Special product.

35. $x^2 - 36$

36. $y^2 - 49$

37. $x^2 + 12x + 36$

38. $9y^2 - 60y + 100$

Factor the following by grouping.

39. $b^2 + 2b + 5b + 10$

40. $y^2 - 3ny + 2ay - 6an$

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ANSWER

Perform the indicated operation on the following polynomials.

1. add $6a - 3b + 6;\ -6a + 2b - 10$

Answer:

$$\begin{array}{r} 6a - 3b + 6 \\ +\ \underline{-6a + 2b - 10} \\ -b - 4 \end{array}$$

2. subtract $x + xy - 2y$ from $5x - xy + 5y$

Answer:

$$\begin{array}{r} 5x - xy + 5y \\ (-)\quad \underline{x + xy - 2y} \\ 5x - xy + 5y \\ (+)\quad \underline{-x - xy + 2y} \\ 4x - 2xy + 7y \end{array}$$

3. add $3xy - x^2y + xy^2;\ -xy^2 - 5xy - 6x + 4x^2y$

Answer:

$$\begin{array}{r} 3xy - x^2y + xy^2 \\ +\ \underline{-5xy + 4x^2y - xy^2 - 6x} \\ -2xy + 3x^2y \quad - 6x \\ 3x^2y - 2xy - 6x \end{array}$$

4. subtract $x^3y^2 - xy^3 + 5y^2 + 10$ from $3x^3y^2 + 2xy^3 - x - 3y^2$

Answer:

$$\begin{array}{r} 3x^3y^2 + 2xy^3 - 3y^2 - x \\ (-)\quad \underline{x^3y^2 - xy^3 + 5y^2 \quad + 10} \\ 3x^3y^2 + 2xy^3 - 3y^2 - x \\ (+)\quad \underline{-x^3y^2 + xy^3 - 5y^2 \quad - 10} \\ 2x^3y^2 + 3xy^3 - 8y^2 - x - 10 \end{array}$$

Simplify the following.

5. $\{-4x - [5x - 2 - (3x + 3) - 6] + 10\} + 2$

$= \{-4x - [5x - 2 - 3x - 3 - 6] + 10\} + 2$

$= \{-4x - [2x - 11] + 10\} + 2$

$= \{-4x - 2x + 11 + 10\} + 2$

$= \{-6x + 21\} + 2$

$= -6x + 21 + 2$

$= -6x + 23$

6. $[x + y - (5 - 3y + 5x)] - (2x - 3y + 1)$

$= [x + y - 5 + 3y - 5x] - 2x + 3y - 1$

$= [-4x + 4y - 5] - 2x + 3y - 1$

$= -4x + 4y - 5 - 2x + 3y - 1$

$= -6x + 7y - 6$

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Find the product of the following polynomials.

7. $4b(8bc) = 32b^2c$

8. $5mo(12mn) = 60m^2no$

9. $2x(8x + y) = 16x^2 + 2xy$

10. $4x(1 + 7y) = 4x + 28xy$

11. $2a(3a + 2b - 4) = 6a^2 + 4ab - 8a$

12. $6bc(2a + b - 2c) = 12abc + 6b^2c - 12bc^2$

$6b^2c - 12bc^2 + 12abc$

Factor the following polynomials.

13. $15x + 30$

$(15\times1)x + (15\times2)$

GCF: 15

Answer: $15(x + 2)$

14. $8x + 16y - 24$

$(8\times1)x + (8\times2)y - (8\times3)$

GCF:8

Answer: $8(x + 2y - 3)$

15. $12a - 9b + 3$

$(3\times4)a - (3\times3)b + (3\times1)$

GCF: 3

Answer: $3(4a - 3b + 1)$

16. $60x - 20xy$

$(20\times3)x - (20\times1)xy$

GCF: 20x

Answer: $20x(3 - y)$

17. $36a^2 - 24ab - 72a$

$(12\times3)a^2 - (12\times2)ab - (12\times6)a$

GCF:12a

Answer: $12a(3a - 2b - 6)$

18. $30vuz - 60u^2z - 100uz$

$(10\times3)vuz - (10\times6)u^2z - (10\times10)uz$

GCF: 10uz

Answer: $10uz(3v - 6u - 10)$

Find the product of the following binomials.

19. $(x + 5)(x + 2)$

Answer:

$x^2 + 5x + 2x + 10$

$x^2 + 7x + 10$

20. $(x + 3)(2x + 4)$

Answer:

$x^2 + 6x + 4x + 12$

$x^2 + 10x + 12$

21. $(x + y)(3x + 4y)$

Answer:

$3x^2 + 3xy + 4xy + 4y^2$

$3x^2 + 7xy + 4y^2$

$3x^2 + 4y^2 + 7xy$

22. $(6y + 5)(y - 9)$

Answer:

$6y^2 - 54y + 5y - 45$

$6y^2 - 49y - 45$

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23. $(x-y)(12x+y)$
Answer:
$12x^2-12xy+xy-y^2$
$12x^2-11xy-y^2$
$12x^2-y^2-11xy$

24. $(3-9y)(3+14y)$
Answer:
$9+42y-27y-126y^2$
$9+15y-126y^2$
$-126y^2+15y+9$

Find the product of the following Special product.

25. $(x+4)(x-4)$
Answer:
$(x)^2-(4)^2$
x^2-16

26. $(x+2)(x-2)$
Answer:
$(x)^2-(2)^2$
x^2-4

27. $(2x+3y)(2x-3y)$
Answer:
$(2x)^2-(3y)^2$
$4x^2-9y^2$

28. $(y+2)^2$
Answer:
$(y)^2+2(y)(2)+(2)^2$
y^2+4y+4

29. $(6x-y)(6x+y)$
Answer:
$(6x)^2-(y)^2$
$36x^2-y^2$

30. $(3+7y)^2$
Answer:
$(3)^2+2(3)(7y)+(7y)^2$
$9+42y+49y^2$
$49y^2+42y+9$

Factor the Following Polynomials.

31. $x^2+10x+21$
Answer:
$x^2=(x)(x)$
$21=(7)(3)$
$10x=7x+3x$
$(x+7)(x+3)$

32. $y^2-11y+28$
Answer:
$y^2=(y)(y)$
$28=(-7)(-4)$
$-11y=-7y-4y$
$(y-7)(y-4)$

33. $2x^2+26x+72$
Answer:
$2x^2=(2x)(x)$
$72=(8)(9)$
$26x=8x+18x$
$(2x+8)(x+9)$

34. $4y^2+12y-40$
Answer:
$4y^2=(2y)(2y)$
$-40=(-4)(10)$
$12y=-8y+20y$
$(2y-4)(2y+10)$

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Find the Following Special product.

35. $x^2 - 36$

Answer:

$x^2 = (x)(x)$

$36 = (6)(6)$

$(x + 6)(x - 6)$

36. $y^2 - 49$

Answer:

$y^2 = (y)(y)$

$49 = (7)(7)$

$(y + 7)(y - 7)$

37. $x^2 + 12x + 36$

Answer:

$x^2 = (x)(x)$

$36 = (6)(6)$

$12x = 6x + 6x$

$(x + 6)^2$

38. $9y^2 - 60y + 100$

Answer:

$9y^2 = (3y)(3y)$

$100 = (10)(10)$

$-60y = -30y - 30y$

$(3y - 10)^2$

Factor the following by grouping.

39. $b^2 + 2b + 5b + 10$

$= (b^2 + 2b) + (5b + 10)$

$= b(b + 2) + 5(b + 2)$

$= (b + 5)(b + 2)$

40. $y^2 - 3ny + 2ay - 6an$

$= (y^2 - 3ny) + (2ay - 6an)$

$= y(y - 3n) + 2a(y - 3n)$

$= (y + 2a)(y - 3n)$