Mixed Factoring Worksheet

GCF

1. $3a + 6$ 1. $3(a+2)$

2. $4x - 20$ 2. $4(x-5)$

3. $2y^3 + 8xy$ 3. $2y(y^2 + 4x)$

4. $5x + 10y - 15$ 4. $5(x + 2y - 3)$

5. $42m - 7$ 5. $7(6m - 1)$

6. $18xy^2 + 6x^3 - 12x^2$ 6. $6x(3y^2 + x^2 - 2x)$

7. $7a + 21p + 14$ 7. $7(a + 3p + 2)$

8. $40x^8y^6 - 16x^9y^5$ 8. $8x^8y^5(5y - 2x)$

9. $x(y+3) + 5(y+3)$ 9. $(x+5)(y+3)$

10. $12x^3 + 16x^2 - 8x$ 10. $4x(3x^2 + 4x - 2)$

11. $2y^2 - 10y + 20$ 11. $2(y^2 - 5y + 10)$

12. $24x - 16$ 12. $8(3x - 2)$

13. $20xyz + 12x^2z - 40yz$ 13. $4z(5xy + 3x^2 - 10y)$

14. $a^5 + 3a^4 - 6a^3 + 9a^2$ 14. $a^2(a^3 + 3a^2 - 6a + 9)$

15. $y^7 - y^2$ 15. $y^2(y^5 - 1)$

16. $6t^2 + 24$ 16. $6(t^2 + 4)$

17. $-5x^3 + 10x^2$ 17. $-5x^2(x - 2)$

18. $-9a^2b + 18a^2b^2 - 3ab$ 18. $-3ab(3a - 6ab + 1)$

19. $25x^4z + 15x^3z + 5x^2z$ 19. $5x^2z(5x^2 + 3x + 1)$

20. $3y^2 + 5x$ 20. $prime$

GROUPING

1. $5x + 15 + xy + 3y$ 1. $(y+5)(x+3)$

2. $xy + y + 2x + 2$ 2. $(y+2)(x+1)$

3. $2y - 8 + xy - 4x$ 3. $(x+2)(y-4)$

4. $6x - 42 + xy - 7y$ $(y+6)(x-7)$

5. $3xy - 6x + 8y - 16$ 5. $(3x+8)(y-2)$

6. $xy - 2yz + 5x - 10z$ 6. $(y+5)(x-2z)$

7. $y^3 + 3y^2 + y + 3$ 7. $(y^2+1)(y+3)$

8. $x^3 + 4x + x^2 + 4$ 8. $(x+1)(x^2+4)$

9. $5xy + 15x + 6y + 18$ 9. $(5x+6)(y+3)$

10. $2x^3 + x^2 + 8x + 4$ 10. $(x^2+4)(2x+1)$

11. $4x^2 - 8xy - 3x + 6y$ 11. $(4x-3)(x-2y)$

12. $2x^3 - x^2 - 10x + 5$ 12. $(x^2-5)(2x-1)$

13. $y^2 - 3y + yz - 3z$ $(y-z)(y-3)$

14. $5x^2 - 20x^2y + 5z - 20yz$ 14. $5(x^2+z)(1-4y)$

15. $2x - xy + 18 - 9y$ 15. $-1(y-2)(x+9)$

16. $12x + 10 + 6xy + 5y$ 16. $(y+2)(6x+5)$

17. $7y - 7 + 5xy - 5x$ 17. $(5x+7)(y-1)$

18. $6x^2y - 21x^2 - 4y + 14$ 18. $(3x^2-2)(2y-7)$

19. $30 + 5y^2 - 6x - xy^2$ 19. $-1(x-5)(y^2+6)$

20. $4ax - 4ab - 2bx + 2b^2$ 20. $2(2a-b)(x-b)$

BINOMIALS

1. $x^2 - 4$ 1. $(x-2)(x+2)$

2. $y^2 - 36$ 2. $(y-6)(y+6)$

3. $100 - p^2$ 3. $(10-p)(10+p)$

4. $4x^2 - 1$ 4. $(2x-1)(2x+1)$

5. $9t^2 - 1$ 5. $(3t-1)(3t+1)$

6. $a^2 + 25$ 6. prime

7. $49x^2 - 16$ 7. $(7x-4)(7x+4)$

8. $4y^2 - 25$ 8. $(2x-5)(2x+5)$

$(4x^2-9)$ 9. $12x^2 - 27$ 9. $3(2x+3)(2x-3)$

$9(z^2-4)$ 10. $9z^2 - 36$ 10. $9(z+2)(z-2)$

11. $a^3 + 27$ 11. $(a+3)(a^2-3a+9)$

12. $8y^3 + 1$ 12. $(2y+1)(4y^2-2y+1)$

13. $y^3 + 125$ 13. $(y+5)(y^2-5y+25)$

14. $b^3 + 8$ 14. $(b+2)(b^2-2b+4)$

15. $x^3 + 64$ 15. $(x+4)(x^2-4x+16)$

16. $y^3 - 1$ 16. $(y-1)(y^2+y+1)$

17. $27a^3 - 8$ 17. $(3a-2)(9a^2+6a+4)$

18. $c^3 - 125$ 18. $(c-5)(c^2+5c+25)$

19. $8x^3 - 27$ 19. $(2x-3)(4x^2+6x+9)$

20. $64y^3 - 1$ 20. $(4y-1)(16y^2+4y+1)$

TRINOMIALS

1. $x^2 + 7x + 6$ 1. $(x+6)(x+1)$

2. $x^2 + 6x + 8$ 2. $(x+4)(x+2)$

3. $x^2 + 13x + 30$ 3. $(x+10)(x+3)$

4. $x^2 + 10x + 25$ 4. $(x+5)^2$

5. $x^2 - 8x + 15$ 5. $(x-5)(x-3)$

6. $x^2 - 6x + 9$ 6. $(x-3)^2$

7. $x^2 - 10x + 9$ 7. $(x-9)(x-1)$

8. $x^2 - 3x - 18$ 8. $(x-6)(x+3)$

9. $x^2 - x - 30$ 9. $(x-6)(x+5)$

10. $x^2 - x - 2$ 10. $(x-2)(x+1)$

11. $x^2 + x - 42$ 11. $(x-6)(x+7)$

12. $y^2 + 4y - 12$ 12. $(y+6)(y-2)$

13. $2a^2 - 9a - 5$ 13. $(2a+1)(a-5)$

14. $3c^2 + 8c + 4$ 14. $(3c+2)(c+2)$

15. $2x^2 + 7x + 5$ 15. $(2x+5)(x+1)$

16. $6y^2 - 11y - 10$ 16. $(3y+2)(2y-5)$

17. $4a^2 - 8a - 21$ 17. $(2a+3)(2a-7)$

18. $3x^2 + x - 2$ 18. $(3x-2)(x+1)$

19. $3x^2 - 5x + 1$ 19. prime

20. $8y^2 - 22y + 5$ 20. $(4y-1)(2y-5)$

Grouping

1. $(5x + 15)(xy + 3y)$
   $5(x+3) \quad y(x+3)$
   $(y+5)(x+3)$

2. $(xy + y)(+2x + 2)$
   $y(x+1) \quad 2(x+1)$
   $(y+2)(x+1)$

3. $(2y-8)(+xy - 4x)$
   $2(y-4) \quad x(y-4)$
   $(x+2)(y-4)$

4. $(6x-42)(+xy - 7y)$
   $6(x-7) \quad y(x-7)$
   $(y+6)(x-7)$

5. $(3xy-6x)(+8y - 16)$
   $3x(y-2) \quad 8(y-2)$
   $(3x+8)(y-2)$

6. $(xy - 2yz)(+5x - 10z)$
   $y(x-2z) \quad 5(x-2z)$
   $(y+5)(x-2z)$

7. $(y^3 + 3y^2 + y + 3)$
   $y^2(y+3) + (y+3)$
   $(y^2+1)(y+3)$

8. $(x^3 + 4x + x^2 + 4)$
   $x(x^2+4) + 1(x^2+4)$
   $(x+1)(x^2+4)$

9. $(5xy + 15x)(+ 6y + 18)$
   $5x(y+3) \quad 6(y+3)$
   $(5x+6)(y+3)$

10. $(2x^3 + x^2)(+8x + 4)$
    $x^2(2x+1) \quad 4(2x+1)$
    $(x^2+4)(2x+1)$

11. $(4x^2 - 8xy)(- 3x + 6y)$
    $4x(x-2y) - 3(x-2y)$
    $(4x-3)(x-2y)$

12. $(2x^3 - x^2)(- 10x + 5)$
    $x^2(2x-1) - 5(2x-1)$
    $(x^2-5)(2x-1)$

13. $(y^2 - 3y)(+ yz - 3z)$
    $y(y-3) \quad z(y-3)$
    $(y-z)(y-3)$

14. $(5x^2 - 20x^2y)(+ 5z - 20yz)$
    $5x^2(1-4y) \quad 5z(1-4y)$
    $5(x^2+z)(1-4y)$

15. $(2x - xy)(+ 18 - 9y)$

$x(2-y) \quad 9(2-y)$

$(x+9)(2-y) \Rightarrow -1(y-2)(x+9)$

16. $(12x + 10)(+6xy + 5y)$

$2(6x+5) \quad y(6x+5)$

$(y+2)(6x+5)$

17. $(7y - 7)(5xy - 5x)$

$7(y-1) \quad 5x(y-1)$

$(5x+7)(y-1)$

18. $(6x^2y - 21x^2)(-4y +14)$

$3x^2(2y-7) - 2(2y-7)$

$(3x^2-2)(2y-7)$

19. $(30 + 5y^2)(-6x - xy^2)$
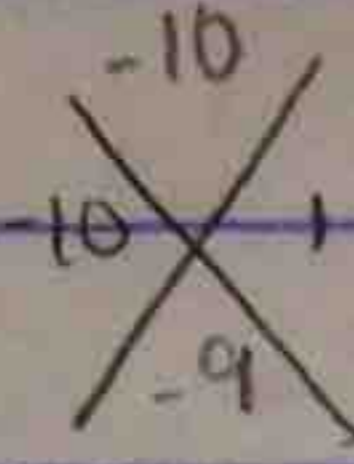
$5(6 + y^2) - x(6 + y^2)$

$-1(x-5)(y^2 + 6)$

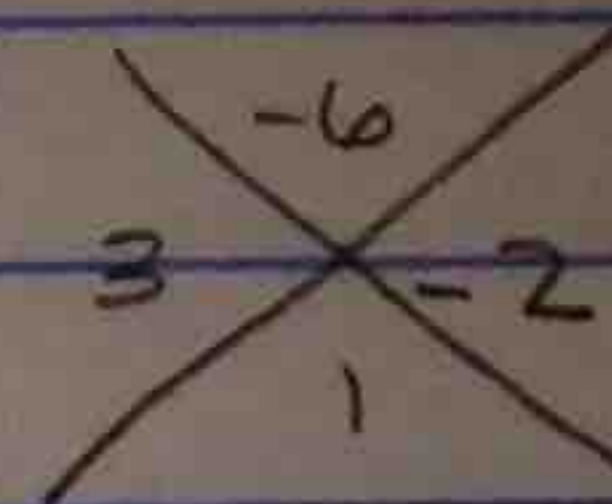20. $(4ax - 4ab)(- 2bx + 2b^2)$
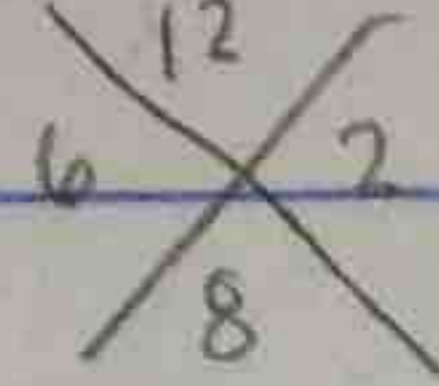
$4a(x-b) - 2b(x-b)$

$(4a-2b)(x-b)$

$2(2a-b)(x-b)$

Trinomials # 13-20

13. $2a^2 - 9a - 5$

$(2a^2 - 10a) + 1a - 5)$

$2a(a-5) \, 1(a-5)$

$(2a+1)(a-5)$

X-diagram: -10 top, -10 and 1 sides, -9 bottom

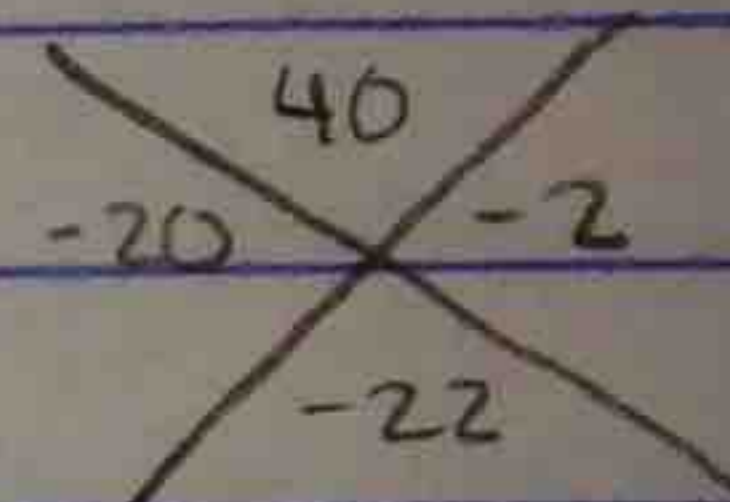**14.** $3c^2 + 8c + 4$

$3c^2 + 6c + 2c + 4)$

$3c(c+2) \, 2(c+2)$

$(3c+2)(c+2)$

X-diagram: 12 top, 6 and 2 sides, 8 bottom

15. $2x^2 + 7x + 5$

$(2x^2 + 2x) + 5x + 5)$

$2x(x+1) \, 5(x+1)$

$(2x+5)(x+1)$

X-diagram: 10 top, 5 and 2 sides, 7 bottom

16. $6y^2 - 11y - 10$

$(6y^2 - 15y) + 4y - 10)$

$3y(2y-5) \, 2(2y-5)$

$(3y+2)(2y-5)$

X-diagram: -60 top, -15 and 4 sides, -11 bottom

17. $4a^2 - 8a - 21$

$(4a^2 - 14a) + 6a - 21)$

$2a(2a-7) \, 3(2a-7)$

$(2a+3)(2a-7)$

X-diagram: -84 top, -14 and 6 sides, -8 bottom

18. $3x^2 + x - 2$

$(3x^2 + 3x) - 2x - 2)$

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

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

X-diagram: -6 top, 3 and -2 sides, 1 bottom
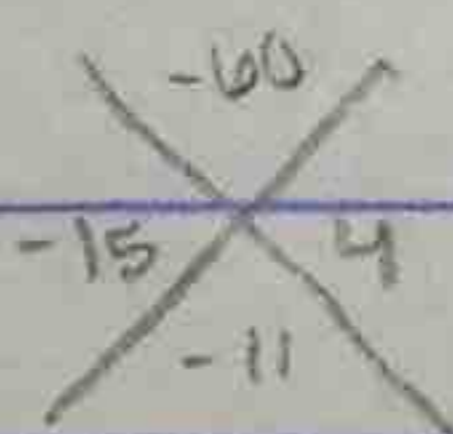
19. prime
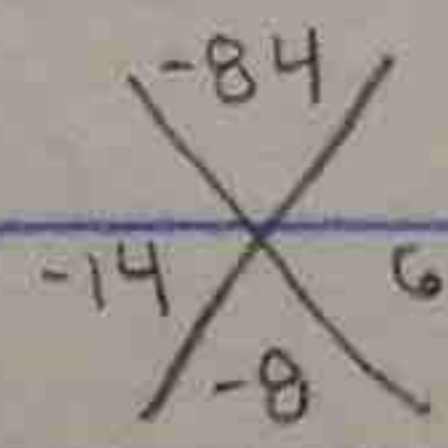
20. $8y^2 - 22y + 5$

$(8y^2 - 20y) - 2y + 5)$

$4y(2y-5) - 1(2y-5)$

$(4y-1)(2y-5)$

X-diagram: 40 top, -20 and -2 sides, -22 bottom