

Name _____

Date _____

Factor By Grouping

Factor the expression.

1. $4x(x+5) - 3(x+5)$ $(x+5)(4x-3)$

2. $12(a-3) - 2a(a-3)$ $(a-3)(12-2a)$

3. $w^2(w+8) - 5(w+8)$ $(w+8)(w^2-5)$

4. $2b^2(b+6) + 3(b+6)$ $(b+6)(2b^2+3)$

5. $y(15+x) - (x+15)$ $(x+15)(y-1)$

6. $3x(4+y) - 6(4+y)$ $(y+4)(3x-6)$

Factor the polynomial by grouping.

7. $x^3 + x^2 + 5x + 5$
 $x^2(x+1) + 5(x+1)$
 $(x+1)(x^2+5)$

8. $y^3 - 14y^2 + y - 14$
 $y^2(y-14) + 1(y-14)$
 $(y^2+1)(y-14)$

9. $m^3 - 6m^2 + 2m - 12$
 $m^2(m-6) + 2(m-6)$
 $(m^2+2)(m-6)$

10. $p^3 + 9p^2 + 4p + 36$
 $p^2(p+9) + 4(p+9)$
 $(p^2+4)(p+9)$

11. $p^3 + 9p^2 + 4p + 36$
 $p^2(p+9) + 4(p+9)$
 $(p+9)(p^2+4)$

12. $t^3 + 12t^2 - 2t - 24$
 $t^2(t+12) - 2(t+12)$
 $(t+12)(t^2-2)$

13. $3n^3 - 3n^2 + n - 1$
 $3n^2(n-1) + 1(n-1)$
 $(3n^2+1)(n-1)$

$$14. \frac{2ax + 6xc + ba + 3bc}{2x(a+3c) + b(a+3c)}$$

$$(2x+b)(a+3c)$$

$$16. \frac{3m^2 - 5m^2p + 3p^2 - 5p^3}{m^2(3-5p) + p^2(3-5p)}$$

$$(m^2 + p^2)(3-5p)$$

$$* 18. \frac{5a^2 - 4ab + 12b^3 - 15ab^2}{a(5a-4b) - 3b^2(-4b+5a)}$$

$$(a-3b^2)(5a-4b)$$

$$* 20. \frac{12ax + 20bx + 32cx}{4x(3a+5b+8c)}$$

$$* 22. \frac{3my - ab + am - 3by}{3my - 3by - ab + am}$$

$$3y(m-b) + a(-b+m)$$

$$(3y+a)(m-b)$$

$$* 24. \frac{6a^2 - 6ab + 3bc - 3ca}{6a(a-b) - 3c(-b+a)}$$

$$(6a-3c)(a-b)$$

$$* 26. \frac{2ax + bx - 6ay - 3by - bz - 2az}{x(2a+b) - 3y(2a+b) - z(b+2a)}$$

$$(2a+b)(x-3y-z)$$

$$* 15. \frac{2my + 7x + 7m + 2xy}{2my + 2xy + 7x + 7m}$$

$$2y(m+x) + 7(x+m)$$

$$(2y+7)(m+x)$$

$$17. \frac{3x^3y - 9xy^2 + 36xy}{3xy(x^2 - 3y + 12)}$$

$$19. \frac{2x^3 - 5xy^2 - 2x^2y + 5y^3}{x(2x^2 - 5y^2) - y(2x^2 - 5y^2)}$$

$$(x-y)(2x^2 - 5y^2)$$

$$21. \frac{4ax - 14bx + 35by - 10ay}{2x(2a-7b) - 5y(7b+2a)}$$

$$(2x-5y)(2a-7b)$$

$$23. \frac{28a^2b^2c^2 + 21a^2bc^2 - 14abc}{7abc(4abc + 3ac - 2)}$$

$$25. \frac{12mx - 8m + 6rx - 4r}{4m(3x-2) + 2r(3x-2)}$$

$$(3x-2)(4m+2r)$$

$$* 27. \frac{7ax + 7bx + 3at + 3bt - 4a - 4b}{7x(a+b) + 3t(a+b) - 4(a+b)}$$

$$(a+b)(7x+3t-4)$$