The Weekly Rigor

20 Problems in Factoring by Finding the Greatest Common Factor

PROBLEMS

For each of the following expressions, factor out the greatest common factor.

1. $18x + 27$.

2. $16x - 24$.

3. $3x^2 + 6x$.

4. $4x^2 - 8x$.

5. $9x^4 - 18x^3 + 27x^2$.

6. $6x^4 - 18x^3 + 12x^2$.

7. $x(x + 5) + 3(x + 5)$.

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

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

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

11. $18x^2 - 27xy$

12. $15x^3y^2 + 20x^4y$

13. $12m^2n^2 - 48mn^3$

14. $5abc - 5ac^2 + 15ab^2c$

15. $6x^2 + 4xy - 8x^3$

16. $9x^2y^2 - 6x^2y + 12x^2yz$

17. $6a^4b + 21a^2b - 18a^3b^3$

18. $3a^2b - abc - abd$

19. $6a^4b^5 + 36a^3b^2 - 42a^3b^3$

20. $15a^2b^4 + 20a^3b^5 - 25a^5b^2$

ANSWERS

1. $9(2x + 3)$	2. $8(2x - 3)$
3. $3x(x + 2)$	4. $4x(x - 2)$
5. $9x^2(x^2 - 2x + 3)$	6. $6x^2(x^2 - 3x + 2)$
7. $(x + 5)(x + 3)$	8. $(2x + 1)(x + 4)$
9. $(x - 3)(x^2 + 12)$	10. $(2x + 5)(x^2 + 17)$
11. $9x(2x - 3y)$	12. $5x^3y(3y + 4x)$
13. $12mn^2(m - 4n)$	14. $5ac(b - c + 3b^2)$
15. $2x(3x + 2y - 4x^2)$	16. $3x^2y(3y - 2 + 4z)$
17. $3a^2b(2a^2 + 7 - 6ab^2)$	18. $ab(3a - c - d)$
19. $6a^3b^2(ab^3 + 6 - 7b)$	20. $5a^2b^2(3b^2 + 4ab^3 - 5a^3)$

SELECTED SOLUTIONS

1. $18x + 27 = 9 \cdot 2x + 9 \cdot 3 = 9(2x + 3)$.

3. $3x^2 + 6x = 3 \cdot x \cdot x + 3 \cdot 2 \cdot x = 3x(x + 2)$.

5. $9x^4 - 18x^3 + 27x^2 = 9 \cdot x^2 \cdot x^2 - 9 \cdot 2 \cdot x^2 \cdot x + 9 \cdot 3 \cdot x^2 = 9x^2(x^2 - 2x + 3)$.

7. $x(x + 5) + 3(x + 5) = x \cdot (x + 5) + 3 \cdot (x + 5) = (x + 5)(x + 3)$.

9. $x^2(x - 3) + 12(x - 3) = x^2 \cdot (x - 3) + 12 \cdot (x - 3) = (x - 3)(x^2 + 12)$.

11. $18x^2 - 27xy = 9 \cdot 2 \cdot x \cdot x - 9 \cdot 3 \cdot x \cdot y = 9x(2x - 3y)$.

13. $12m^2n^2 - 48mn^3 = 12 \cdot m \cdot m \cdot n^2 - 12 \cdot 4 \cdot m \cdot n^2 \cdot n = 12mn^2(m - 4n)$.

15. $6x^2 + 4xy - 8x^3 = 2 \cdot 3 \cdot x \cdot x + 2 \cdot 2 \cdot x \cdot y - 2 \cdot 4 \cdot x \cdot x^2 = 2x(3x + 2y - 4x^2)$.

17. $6a^4b + 21a^2b - 18a^3b^3 = 3 \cdot 2 \cdot a^2 \cdot a^2 \cdot b + 3 \cdot 7 \cdot a^2 \cdot b - 3 \cdot 6 \cdot a^2 \cdot a \cdot b \cdot b^2 = $
$= 3a^2b(2a^2 + 7 - 6ab^2)$.

19. $6a^4b^5 + 36a^3b^2 - 42a^3b^3 = 6 \cdot a^3 \cdot a \cdot b^2 \cdot b^3 + 6 \cdot 6 \cdot a^3 \cdot b^2 - 6 \cdot 7 \cdot a^3 \cdot b^2 \cdot b = $
$= 6a^3b^2(ab^3 + 6 - 7b)$.