The Weekly Rigor

No. 284 "A mathematician is a machine for turning coffee into theorems." November 30, 2019

60 Problems in Factoring by a Mixture of Methods

(Part 1)

PROBLEMS

For each of the following expressions, factor completely by the following appropriate methods: greatest common factor, grouping, splitting the middle term, difference of squares, sum of cubes, and difference of cubes.

1. $x^3 + 125y^3$

2. $8x^5y^2 + 12xy^3$

3. $8 - (x + y)^3$

4. $t^2 + 1$

5. $2x^2 + 15x + 18$

6. $12t^3 - 8t^2 - 24t + 20$

7. $m^3 + m$

8. $3y^3 - 2y^2 - 6y + 4$

9. $x^6 + y^6$

10. $\theta^2 - 25$

11. $x^3 + 3x^2 - 4x - 12$

12. $\alpha(\alpha + 7) + 3(\alpha + 7)$

13. $x^3 + 4^3$

14. $3x^2 + 5x + 4$

15. $3x^2 - 75$

16. $121m^2 - n^2$

17. $(3x - 6)^3 - 27$

18. $4\alpha^2 - 9\beta^2$

19. $12x^3 - 4x^2 - 8x$

20. $5x^3 - 20x + 3x^2 - 12$

21. $(x + 3)^3 - (x + 5)^3$

22. $5t^2 + 23t + 12$

23. $(x + y)^3 + 8$

24. $12x^6 - 12x^5 + 24x^4 - 24x^3$

25. $64x^3 - 27y^3$

26. $x^3 + x^2$

27. $10mn + 50m + 6n^3 + 30n^2$

28. $x^6 - 64$

29. $64x^3 + y^3$

30. $x^3 - x$