

The Weekly Rigor

No. 195

“A mathematician is a machine for turning coffee into theorems.”

March 17, 2018

20 Problems in Factoring by Splitting the Middle Term

PROBLEMS

For each of the following expressions, factor by the method “splitting the middle term.”

1. $3x^2 - x - 2$

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

3. $3x^2 - 2x - 5$

4. $6x^2 - 11x + 4$

5. $8x^2 + 33x + 4$

6. $9x^2 - 9x + 2$

7. $9x^2 + 5x - 4$

8. $5x^2 - 16x + 3$

9. $3x^2 + 10x + 8$

10. $3x^2 + 14x + 8$

11. $3x^2 - 10x + 8$

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

13. $14x^2 + 9x + 1$

14. $2x^2 + x - 6$

15. $2x^2 + 5x - 3$

16. $x^2 + 4x - 12$

17. $x^2 - 10x + 24$

18. $x^2 - 23x + 42$

19. $9x^2 - 6x + 1$

20. $25x^2 + 10x + 1$

ANSWERS

1. $(3x + 2)(x - 1)$	2. $(2x - 1)(x + 3)$
3. $(3x - 5)(x + 1)$	4. $(2x - 1)(3x - 4)$
5. $(8x + 1)(x + 4)$	6. $(3x - 2)(3x - 1)$
7. $(9x - 4)(x + 1)$	8. $(5x - 1)(x - 3)$
9. $(x + 2)(3x + 4)$	10. $(x + 4)(3x + 2)$
11. $(x - 2)(3x - 4)$	12. $(x + 1)(5x - 2)$
13. $(2x + 1)(7x + 1)$	14. $(x + 2)(2x - 3)$
15. $(x + 3)(2x - 1)$	16. $(x - 2)(x + 6)$
17. $(x - 6)(x - 4)$	18. $(x - 21)(x - 2)$
19. $(3x - 1)^2$	20. $(5x + 1)^2$

SELECTED SOLUTIONS

1.

-6	
-1	6
1	-6
-2	3
2	-3

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

13.

14	
1	14
-1	-14
2	7
-2	-7

$$14x^2 + 9x + 1 = 14x^2 + 7x + 2x + 1 = 7x(2x + 1) + (2x + 1) = (2x + 1)(7x + 1).$$

19.

9	
1	9
-1	-9
3	3
-3	-3

$$9x^2 - 6x + 1 = 9x^2 - 3x - 3x + 1 = 3x(3x - 1) - (3x - 1) = (3x - 1)(3x - 1) = (3x - 1)^2.$$

“Only he who never plays, never loses.”