# The Weekly Rigor

No. 207 "A mathematician is a machine for turning coffee into theorems." June 9, 2018


## 12 Problems in Partial Fractions

(Part 1)

PROBLEMS

Resolve the following rational expressions into their partial-fraction decompositions.

1. $\frac{1}{x^2-1}$

2. $\frac{7}{x^2-4}$

3. $\frac{x+7}{x^2-x-6}$

4. $\frac{1}{x^2+x}$

5. $\frac{1}{4x^2-9}$

6. $\frac{3}{x^2-3x}$

7. $\frac{1}{2x^2+x}$

8. $\frac{5}{x^2+x-6}$

9. $\frac{3}{x^2+x-2}$

10. $\frac{x+2}{x^2+4x+3}$

11. $\frac{x+2}{x^2-4x}$

12. $\frac{4x+26}{x^2+4x-5}$

ANSWERS

| | |
|---|---|
| 1. $\frac{\frac{-1}{2}}{x+1}+\frac{\frac{1}{2}}{x-1}$ | 2. $\frac{\frac{-7}{4}}{x+2}+\frac{\frac{7}{4}}{x-2}$ |
| 3. $\frac{2}{x-3}+\frac{-1}{x+2}$ | 4. $\frac{1}{x}+\frac{-1}{x+1}$ |
| 5. $\frac{\frac{-1}{6}}{2x+3}+\frac{\frac{1}{6}}{2x-3}$ | 6. $\frac{-1}{x}+\frac{1}{x-3}$ |
| 7. $\frac{1}{x}+\frac{-2}{2x+1}$ | 8. $\frac{1}{x-2}+\frac{-1}{x+3}$ |
| 9. $\frac{1}{x-1}+\frac{-1}{x+2}$ | 10. $\frac{\frac{1}{2}}{x+3}+\frac{\frac{1}{2}}{x+1}$ |
| 11. $\frac{\frac{-1}{2}}{x}+\frac{\frac{3}{2}}{x-4}$ | 12. $\frac{5}{x-1}+\frac{-1}{x+5}$ |