

Partial Fraction Worksheet

Express each of these fractions as the sum of two or more fractions with simpler denominators.

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

9. $\frac{6}{x^4 - 5x^2 + 4}$

2. $\frac{x^2 + 3x + 3}{x(x + 2)^2}$

10. $\frac{1}{x^3 + x^2 + x + 1}$

3. $\frac{4}{(x - 1)(x^2 + 1)}$

11. $\frac{\cos x}{\sin x(\sin x - 1)}$

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

12. $\frac{\sec^2 x}{\tan^2 x + \tan x}$

5. $\frac{1}{x^2 - 3x + 2}$

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

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

14. $\frac{e^x}{e^{2x} + e^x}$

7. $\frac{x^3 + x^2 + x}{x^2 + 2x + 1}$

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

8. $\frac{x^2 + 1}{x^3 + x^2 - 4x - 4}$

Answers (not guaranteed to be correct)

1. $\frac{-2}{x+2} + \frac{3}{x+3}$

2. $\frac{3}{4x} + \frac{1}{4(x+2)} - \frac{1}{2(x+2)^2}$

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

4. $\frac{-1}{2(x+1)} + \frac{1}{2(x-1)}$

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

6. $-2 + \frac{5}{2(2-x)} + \frac{5}{2(2+x)}$

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

8. $\frac{-2}{3(x+1)} + \frac{5}{4(x+2)} + \frac{5}{12(x-2)}$

9. $\frac{1}{x+1} - \frac{1}{x-1} - \frac{1}{2(x+2)} + \frac{1}{2(x-2)}$

10. $\frac{1}{2(x+1)} - \frac{x-1}{2(x^2+1)}$

11. $\frac{-\cos x}{\sin x} + \frac{\cos x}{\sin x - 1}$

12. $1 + \frac{1}{\tan x} - \frac{2}{\tan x + 1}$

13. $\frac{1}{2} \left(\frac{1}{e^x + 1} + \frac{1}{e^x - 1} \right)$

14. Doesn't factor, but it does simplify to: $\frac{1}{e^x + 1}$

15. $\frac{1}{2} \left(\frac{1}{e^x - 1} - \frac{1}{e^x + 1} \right)$