

## Exercise 1D

Express as partial fractions:

$$1 \quad \frac{2x+5}{(x+2)(x+3)}$$

$$2 \quad \frac{2x+2}{(x-1)(x+3)}$$

$$3 \quad \frac{x+1}{(x+3)(x+4)}$$

$$4 \quad \frac{x+7}{x^2+5x+6}$$

$$5 \quad \frac{2x^2+12x-10}{(x-1)(2x-1)(x+3)}$$

$$6 \quad \frac{3x^2-x+6}{(x^2+4)(x-2)}$$

$$7 \quad \frac{x^2-2x+9}{(x^2+3)(x-3)}$$

$$8 \quad \frac{-2x^2+4x-4}{(x^2+5)(2x+3)}$$

$$9 \quad \frac{-6x^2+x-12}{(5+2x^2)(x+3)}$$

$$10 \quad \frac{-2x^2+13}{(2x+1)(x^2+2x+7)}$$

$$11 \quad \frac{2x-7}{(x-5)^2}$$

$$12 \quad \frac{x^2+4x+7}{(x+3)^3}$$

$$13 \quad \frac{-3x^2+10x+5}{(x+2)(x-1)^2}$$

$$14 \quad \frac{-5x^2+8x+9}{(x+2)(x-1)^2}$$

$$15 \quad \frac{10x+9}{(2x+1)(2x+3)^2}$$

$$16 \quad \frac{x}{x-1}$$

$$17 \quad \frac{x^2}{x-1}$$

$$18 \quad \frac{x^2+1}{x^2-1}$$

$$19 \quad \frac{x^2+2}{x(x-1)}$$

$$20 \quad \frac{x^3}{x^2-1}$$

$$21 \quad \frac{9 - 2x - 2x^2}{(1+x)(2-x)}$$

$$22 \quad \frac{4x^2 - 3x + 2}{2x^2 - x - 1}$$

$$23 \quad \frac{2x^3 + 10x^2 + 12x + 1}{(x+2)(x+3)}$$

$$24 \quad \frac{x^3 + x^2 - 2x + 4}{x^2 - 4}$$

$$25 \quad \frac{-x^4 - x^3 + 2x^2 - x - 2}{x^2(x+1)}$$

$$26 \quad \frac{13}{(2x-3)(3x+2)}$$

$$27 \quad \frac{4x^2 + 5x + 9}{(2x-1)(x+2)^2}$$

$$28 \quad \frac{x^3 + 4x^2 + 3x + 4}{(x^2 + 1)(x + 1)^2}$$

$$29 \quad \frac{4x^4 + 6x^3 + 4x^2 + x - 3}{x^2(2x+3)}$$

$$30 \quad \frac{4x+3}{(2x-1)(3x+1)}$$

$$31 \quad \frac{x^3 + 3x^2 - 2x - 5}{(x-1)^2(x^2+2)}$$

$$32 \quad \frac{3x^2 + 12x + 8}{(2x+3)(x^2-4)}$$

$$33 \quad \frac{x^3 - x^2 - 1}{x(x^2 + x + 1)}$$

$$34 \quad \frac{x^2 + 2x + 3}{x^2(x+1)}$$

$$35 \quad \frac{3}{x^3 + 1}$$

## Answers

### Exercise 1D

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

$$3 \frac{3}{x+4} - \frac{2}{x+3} \quad 4 \frac{5}{x+2} - \frac{4}{x+3}$$

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

$$6 \frac{x+1}{x^2+4} + \frac{2}{x-2} \quad 7 \frac{1}{x-3} - \frac{2}{x^2+3}$$

$$8 \frac{2}{x^2+5} - \frac{2}{2x+3} \quad 9 \frac{1}{5+2x^2} - \frac{3}{x+3}$$

$$10 \frac{2}{2x+1} - \frac{2x+1}{x^2+2x+7}$$

$$11 \frac{2}{x-5} + \frac{3}{(x-5)^2}$$

$$12 \frac{1}{x+3} - \frac{2}{(x+3)^2} + \frac{4}{(x+3)^2}$$

$$13 \frac{4}{(x-1)^2} - \frac{3}{x+2}$$

$$14 \frac{4}{(x-1)^2} - \frac{2}{x-1} - \frac{3}{x+2}$$

$$15 \frac{1}{2x+1} - \frac{1}{2x+3} + \frac{3}{(2x+3)^2}$$

$$16 1 + \frac{1}{x-1} \quad 17 x + 1 - \frac{1}{x-1}$$

$$18 1 + \frac{1}{x-1} - \frac{1}{x+1} \quad 19 1 - \frac{2}{x} + \frac{3}{x-1}$$

$$20 x + \frac{1}{2(x-1)} + \frac{1}{2(x+1)}$$

$$21 2 + \frac{3}{x+1} + \frac{1}{x-2}$$

$$22 2 - \frac{1}{1-x} - \frac{3}{1+2x}$$

$$23 2x + \frac{1}{x+2} - \frac{1}{x+3}$$

$$24 x + 1 - \frac{3}{x-2} - \frac{1}{x+2}$$

$$25 -x + \frac{1}{x} - \frac{2}{x^2} + \frac{1}{x+1}$$

$$26 \frac{2}{2x-3} - \frac{3}{3x+2}$$

$$27 \frac{2}{2x-1} + \frac{1}{x+2} - \frac{3}{(x+2)^2}$$

$$28 \frac{1}{x^2+1} + \frac{1}{x+1} + \frac{2}{(x+1)^2}$$

$$29 2x + \frac{2}{2x+3} - \frac{1}{x^2} + \frac{1}{x}$$

$$30 \frac{2}{2x-1} - \frac{1}{3x+1}$$

$$31 \frac{3}{x-1} - \frac{1}{(x-1)^2} + \frac{3-2x}{x^2+2}$$

$$32 \frac{11}{7(x-2)} - \frac{1}{x+2} + \frac{13}{7(2x+3)}$$

$$33 1 - \frac{1}{x} - \frac{x}{x^2+x+1}$$

$$34 \frac{3}{x^2} - \frac{1}{x} + \frac{2}{x+1}$$

$$35 \frac{1}{x+1} + \frac{-x+2}{x^2-x+1}$$