

1 Find the values of the constants  $A$  and  $B$  in each identity.

a  $x - 8 \equiv A(x - 2) + B(x + 4)$

b  $6x + 7 \equiv A(2x - 1) + B(x + 2)$

2 Find the values of the constants  $A$  and  $B$  in each identity.

a  $\frac{2}{(x+1)(x+3)} \equiv \frac{A}{x+1} + \frac{B}{x+3}$

b  $\frac{x-3}{x(x-1)} \equiv \frac{A}{x} + \frac{B}{x-1}$

c  $\frac{x+1}{(x-3)(x-5)} \equiv \frac{A}{x-3} + \frac{B}{x-5}$

d  $\frac{x+10}{(1+x)(2-x)} \equiv \frac{A}{1+x} + \frac{B}{2-x}$

e  $\frac{4x-1}{x^2+x-2} \equiv \frac{A}{x+2} + \frac{B}{x-1}$

f  $\frac{x-9}{x^2-4x+3} \equiv \frac{A}{x-1} + \frac{B}{x-3}$

3 Express in partial fractions

a  $\frac{8}{(x-1)(x+3)}$

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

c  $\frac{10x}{(x+4)(x-1)}$

d  $\frac{5x+7}{x^2+x}$

e  $\frac{x+2}{x^2-5x+4}$

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

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

h  $\frac{38-x}{12-x-x^2}$

i  $\frac{4x-5}{(2x+1)(x-3)}$

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

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

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

m  $\frac{2(x+5)}{8x^2+10x-3}$

n  $\frac{3x-7}{x^2-2x-3}$

o  $\frac{1-3x}{1-x-2x^2}$

4 Find the values of the constants  $A$ ,  $B$  and  $C$  in each identity.

a  $3x^2 + 17x - 32 \equiv A(x - 1)(x + 3) + B(x - 1)(x - 4) + C(x + 3)(x - 4)$

b  $14x + 2 \equiv A(x + 1)(x - 2) + B(x + 1)(3x - 1) + C(x - 2)(3x - 1)$

c  $x^2 + x + 12 \equiv A(x + 1)^2 + B(x + 1)(x + 5) + C(x + 5)$

d  $4(5x^2 + 4) \equiv A(2x + 1)^2 + B(2x + 1)(x - 3) + C(x - 3)$

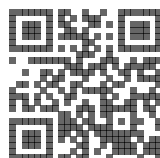
5 Find the values of the constants  $A$ ,  $B$  and  $C$  in each identity.

a  $\frac{8x+14}{(x-2)(x+1)(x+3)} \equiv \frac{A}{x-2} + \frac{B}{x+1} + \frac{C}{x+3}$

b  $\frac{2x^2-6x+20}{(x+1)(x+2)(x-6)} \equiv \frac{A}{x+1} + \frac{B}{x+2} + \frac{C}{x-6}$

c  $\frac{9x-14}{(x+4)(x-1)^2} \equiv \frac{A}{x+4} + \frac{B}{x-1} + \frac{C}{(x-1)^2}$

d  $\frac{3x^2-7x-4}{(x-3)(x-2)^2} \equiv \frac{A}{x-3} + \frac{B}{x-2} + \frac{C}{(x-2)^2}$



6 Express in partial fractions

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

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

c  $\frac{x^2 + 11x - 21}{(2x+1)(x-2)(x-3)}$

d  $\frac{10x+9}{(x-4)(x+3)^2}$

e  $\frac{x^2 + 4x + 5}{(x+1)(x+2)^2}$

f  $\frac{16-2x}{(x-3)(x^2-4)}$

g  $\frac{2-9x}{(x-3)(2x-1)^2}$

h  $\frac{3+24x-4x^2}{(x+1)(x-4)^2}$

i  $\frac{9x^2 - 2x - 12}{x^3 + x^2 - 6x}$

j  $\frac{5x^2 + 3x - 20}{x^3 + 4x^2}$

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

l  $\frac{26-x-x^2}{(x-1)(x+3)(x+5)}$

7 Find the values of the constants  $A$ ,  $B$  and  $C$  in each identity.

a  $\frac{x^2}{(x-2)(x-6)} \equiv A + \frac{B}{x-2} + \frac{C}{x-6}$

b  $\frac{x^2 + 2x + 9}{x^2 + 4x - 5} \equiv A + \frac{B}{x-1} + \frac{C}{x+5}$

8 a Find the quotient and remainder obtained in dividing  $(x^3 + 4x^2 - 2)$  by  $(x^2 + x - 2)$ .

b Hence, express  $\frac{x^3 + 4x^2 - 2}{x^2 + x - 2}$  in partial fractions.

9 Express in partial fractions

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

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

c  $\frac{2x^2 + 7x}{x^2 + 6x + 8}$

d  $\frac{3(x+1)(x-1)}{(x-4)(x+5)}$

e  $\frac{3x^3 + 7x^2 + 4}{x^2 + 4x + 3}$

f  $\frac{4x^2 - 7x + 5}{2x^2 - 7x + 3}$

g  $\frac{2x^2}{x^2 - 2x - 3}$

h  $\frac{x^3 - 6x^2 + 6x + 1}{x^2 - 6x + 5}$

i  $\frac{9x^3 - 27x - 2}{3x^2 - 4x - 4}$

10  $f(x) = \frac{x+5}{(x-1)(2x+1)}$ .

a Express  $f(x)$  in partial fractions.

b Find the exact  $x$ -coordinates of the stationary points of the curve  $y = f(x)$ .

11  $f(x) = \frac{x(4x+5)}{(x-1)(x+2)^2}$ .

a Find the values of the constants  $A$ ,  $B$  and  $C$  such that

$$f(x) = \frac{A}{x-1} + \frac{B}{x+2} + \frac{C}{(x+2)^2}.$$

b Show that the tangent to the curve  $y = f(x)$  at the point where  $x = -1$  has the equation

$$3x - 4y + 5 = 0.$$

