

A2 Partial Fractions

P3

1 Let $f(x) = \frac{x^2 + 7x - 6}{(x-1)(x-2)(x+1)}$.

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

[4]

9709/03/M/J/04

2 An appropriate form for expressing $\frac{3x}{(x+1)(x-2)}$ in partial fractions is

$$\frac{A}{x+1} + \frac{B}{x-2},$$

where A and B are constants.

(a) Without evaluating any constants, state appropriate forms for expressing the following in partial fractions:

(i) $\frac{4x}{(x+4)(x^2+3)}$, [1]

(ii) $\frac{2x+1}{(x-2)(x+2)^2}$. [2]

9709/03/O/N/04

3 (i) Express $\frac{3x^2+x}{(x+2)(x^2+1)}$ in partial fractions. [5]

© UCLES 2005

9709/03/O/N/05

9 (i) Express $\frac{10}{(2-x)(1+x^2)}$ in partial fractions. [5]

© UCLES 2006

9709/03/M/J/06

5 Let $f(x) = \frac{7x+4}{(2x+1)(x+1)^2}$.

(i) Express $f(x)$ in partial fractions. [5]

2

© UCLES 2006

9709/03/O/N/06

6 (i) Express $\frac{2-x+8x^2}{(1-x)(1+2x)(2+x)}$ in partial fractions. [5]

© UCLES 2007

9709/03/O/N/07

7 Let $f(x) \equiv \frac{x^2 + 3x + 3}{(x+1)(x+3)}$.

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

[5]

© UCLES 2008

9709/03/M/J/08

8 (i) Express $\frac{100}{x^2(10-x)}$ in partial fractions. [4]

© UCLES 2009

9709/03/M/J/09

9 (i) Express $\frac{5x+3}{(x+1)^2(3x+2)}$ in partial fractions. [5]

© UCLES 2009

9709/31/O/N/09

10 (i) Express $\frac{1+x}{(1-x)(2+x^2)}$ in partial fractions. [5]

© UCLES 2009

9709/32/O/N/09

11 (i) Express $\frac{2}{(x+1)(x+3)}$ in partial fractions. [2]

(ii) Using your answer to part (i), show that

$$\left(\frac{2}{(x+1)(x+3)}\right)^2 \equiv \frac{1}{(x+1)^2} - \frac{1}{x+1} + \frac{1}{x+3} + \frac{1}{(x+3)^2}. \quad [2]$$

© UCLES 2010

9709/31/M/J/10

12 (i) Find the values of the constants A , B , C and D such that

$$\frac{2x^3 - 1}{x^2(2x-1)} \equiv A + \frac{B}{x} + \frac{C}{x^2} + \frac{D}{2x-1}. \quad [5]$$

© UCLES 2010

9709/32/M/J/10

13 Let $f(x) = \frac{3x}{(1+x)(1+2x^2)}$.

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

[5]

© UCLES 2010

9709/31/O/N/10

14 (i) Express $\frac{5x - x^2}{(1+x)(2+x^2)}$ in partial fractions. [5]

© UCLES 2011

9709/32/M/J/11

15 Let $f(x) = \frac{12 + 8x - x^2}{(2-x)(4+x^2)}$.

(i) Express $f(x)$ in the form $\frac{A}{2-x} + \frac{Bx+C}{4+x^2}$. [4]

© UCLES 2011

9709/31/O/N/11

16 Let $f(x) = \frac{4x^2 - 7x - 1}{(x+1)(2x-3)}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2012

9709/33/M/J/12

17 (i) Express $\frac{9 - 7x + 8x^2}{(3-x)(1+x^2)}$ in partial fractions. [5]

© UCLES 2012

9709/33/O/N/12

18 Express $\frac{7x^2 - 3x + 2}{x(x^2 + 1)}$ in partial fractions. [5]

© UCLES 2013

9709/31/M/J/13

19 (i) Express $\frac{1}{x^2(2x+1)}$ in the form $\frac{A}{x^2} + \frac{B}{x} + \frac{C}{2x+1}$. [4]

© UCLES 2013

9709/32/M/J/13

20 Let $f(x) = \frac{2x^2 - 7x - 1}{(x-2)(x^2 + 3)}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2013

9709/31/O/N/13

21 (i) Express $\frac{7x^2 + 8}{(1+x)^2(2-3x)}$ in partial fractions. [5]

© UCLES 2013

9709/33/O/N/13

22 (i) Express $\frac{4 + 12x + x^2}{(3-x)(1+2x)^2}$ in partial fractions. [5]

© UCLES 2014

9709/31/M/J/14

23 Let $f(x) = \frac{6 + 6x}{(2-x)(2+x^2)}$.

(i) Express $f(x)$ in the form $\frac{A}{2-x} + \frac{Bx+C}{2+x^2}$. [4]

© UCLES 2014

9709/33/M/J/14

24 Let $f(x) = \frac{x^2 - 8x + 9}{(1-x)(2-x)^2}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2014

9709/31/O/N/14

25 Let $f(x) = \frac{5x^2 + x + 6}{(3-2x)(x^2 + 4)}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2015

9709/32/M/J/15

26 Let $f(x) = \frac{11x + 7}{(2x-1)(x+2)^2}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2015

9709/33/M/J/15

27 Let $f(x) = \frac{4x^2 + 12}{(x+1)(x-3)^2}$.

(i) Express $f(x)$ in partial fractions. [5]

© UCLES 2016

9709/31/M/J/16

28 Let $f(x) = \frac{4x^2 + 7x + 4}{(2x + 1)(x + 2)}.$

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

[5]

© UCLES 2016

9709/32/M/J/16

29 Let $f(x) = \frac{10x - 2x^2}{(x + 3)(x - 1)^2}.$

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

[5]

© UCLES 2016

9709/33/M/J/16

30 Let $f(x) = \frac{3x^2 + x + 6}{(x + 2)(x^2 + 4)}.$

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

[5]

© UCLES 2016

9709/33/O/N/16

31 (i) Express $\frac{1}{x(2x + 3)}$ in partial fractions.

[2]

© UCLES 2017

9709/31/M/J/17

32 Let $f(x) = \frac{5x^2 - 7x + 4}{(3x + 2)(x^2 + 5)}.$

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

[5]

© UCLES 2017

9709/32/M/J/17

33 Let $f(x) = \frac{3x^2 - 4}{x^2(3x + 2)}.$

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

[5]

CLES 2017

9709/33/M/J/17

34 Let $f(x) = \frac{4x^2 + 9x - 8}{(x+2)(2x-1)}$.

- (i) Express $f(x)$ in the form $A + \frac{B}{x+2} + \frac{C}{2x-1}$. [4]

© UCLES 2017

9709/31/O/N/17

35 Let $f(x) = \frac{8x^2 + 9x + 8}{(1-x)(2x+3)^2}$.

- (i) Express $f(x)$ in partial fractions. [5]

© UCLES 2017

9709/32/O/N/17

36 Let $f(x) = \frac{12x^2 + 4x - 1}{(x-1)(3x+2)}$.

- (i) Express $f(x)$ in partial fractions. [5]

© UCLES 2018

9709/31/M/J/18

37 Let $f(x) = \frac{x - 4x^2}{(3-x)(2+x^2)}$.

- (i) Express $f(x)$ in the form $\frac{A}{3-x} + \frac{Bx+C}{2+x^2}$. [4]

© UCLES 2018

9709/32/M/J/18

38 (i) Express $\frac{1}{4-y^2}$ in partial fractions. [2]

© UCLES 2018

9709/33/M/J/18

39 Let $f(x) = \frac{6x^2 + 8x + 9}{(2-x)(3+2x)^2}$.

- (i) Express $f(x)$ in partial fractions. [5]

© UCLES 2018

9709/31/O/N/18

40 Let $f(x) = \frac{7x^2 - 15x + 8}{(1 - 2x)(2 - x)^2}$.

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

[5]

© UCLES 2018

9709/32/O/N/18

41 Let $f(x) = \frac{16 - 17x}{(2 + x)(3 - x)^2}$.

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

[5]

© UCLES 2019

9709/31/M/J/19

42 Let $f(x) = \frac{10x + 9}{(2x + 1)(2x + 3)^2}$.

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

[5]

© UCLES 2019

9709/32/M/J/19

43 Let $f(x) = \frac{2x(5 - x)}{(3 + x)(1 - x)^2}$.

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

[5]

© UCLES 2019

9709/33/M/J/19

44 Let $f(x) = \frac{x^2 + x + 6}{x^2(x + 2)}$.

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

[5]

© UCLES 2019

9709/31/O/N/19

45 Let $f(x) = \frac{2x^2 + x + 8}{(2x - 1)(x^2 + 2)}$.

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

[5]

© UCLES 2019

9709/32/O/N/19