

## Pure Maths. 3

Binomial Theorem.  
(Rational functions and Partial fractions)

Exercise.

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The Binomial expansion and  
(Partial fractions) Rational function.

Q1. Expand  $\sqrt[4]{(1-4x)}$  in ascending powers of  $x$ , upto and including the terms in  $x^3$ , simplifying the coefficients. --- [4]

M-18/32/Q2

Q2. Let  $f(x) = \frac{12x^2 + 4x + 1}{(x-1)(3x+2)}$

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

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , upto and including the terms in  $x^2$ , --- [5]

S-18/31/Q9

Q3. 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]

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , upto and including the term in  $x^3$ . --- [5]

S-18/32/Q9

Q4. Expand  $\frac{4}{\sqrt{4-3x}}$  in ascending powers of  $x$ , upto and including  $x^2$ , simplifying the coefficients. --- [4]

S-18/33/Q1

Q5. Let  $f(x) = \frac{7x^2 - 15x + 8}{(1-2x)(2-x)^2}$

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

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , upto and including the term in  $x^2$ . --- [5]

N-18/32/Q8

Q6. Let  $f(x) = \frac{x(6-x)}{(2+x)(4+x^2)}$

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

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , upto and including the term in  $x^2$ . --- [5]

M-17/32/Q9

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Binomial Theorem & Rational function  
(Partial fractions)

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Q7. Expand  $\frac{1}{3(1+6x)}$  in ascending powers of  $x$ , up to and including the term in  $x^3$ , simplifying the coefficients. ---[4]  
S-17/31/Q2

Q8. Let  $f(x) = \frac{5x^2 - 7x + 4}{(3x+2)(x^2+5)}$

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

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ . S-17/32/Q8 ---[5]

Q9. Expand  $(3+2x)^{-3}$  in ascending powers of  $x$  up to and including the term in  $x^2$ , simplifying the coefficients. ---[4]  
S-17/33/Q2

Q10. Let  $f(x) = \frac{8x^2 + 9x + 8}{(1-x)(2x+3)^2}$

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

(ii) Hence obtain the expansion of  $f(x)$  in ascending powers of  $x$ , up to and including the term in  $x^2$ . W-17/32/Q8 ---[5]

## Answers

$$Q1. \quad 1 - x - \frac{3}{2}x^2 - \frac{7}{2}x^3$$

$$Q2. (i) \quad 4 + \frac{3}{x-1} + \frac{-1}{3x+2}$$

$$(ii) \quad \frac{1}{2} - \frac{9}{4}x - \frac{33}{8}x^2 \dots$$

$$Q3. (i) \quad A = -3, B = 1, C = 2$$

$$(ii) \quad \frac{1}{6}x - \frac{11}{18}x^2 - \frac{31}{108}x^3$$

$$Q4. \text{ Rearrange } 2 \left[ 1 - \frac{3}{4}x \right]^{-\frac{1}{2}}$$

$$= 2 + \frac{3}{4}x + \frac{27}{64}x^2$$

$$Q5. (i) \quad \frac{1}{1-2x} + \frac{3}{2-x} + \frac{-2}{(2-x)^2}$$

$$(ii) \quad 2 + \frac{9}{4}x + 4x^2$$

$$Q6. (i) \quad \frac{-2}{2+x} + \frac{x+4}{4+x^2}$$

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

$$Q7. \quad 1 - 2x + 8x^2 - \frac{112}{3}x^3 \checkmark$$

$$Q8. (i) \quad \frac{2}{3x+2} + \frac{x-3}{x^2+5}$$

$$(ii) \quad \frac{2}{5} - \frac{13}{10}x + \frac{237}{100}x^2$$

$$Q9. \quad \frac{1}{27} - \frac{2}{27}x + \frac{8}{81}x^2$$

$$Q10. (i) \quad \frac{1}{1-x} + \frac{-2}{2x+3} + \frac{5}{(2x+3)^2}$$

$$(ii) \quad \frac{8}{9} + \frac{19}{27}x + \frac{13}{9}x^2$$

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