

AQA, Edexcel, OCR, MEI

A Level

A Level Mathematics

C4 Algebra

Name:

M M E

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Total Marks: /34

In order to obtain the solutions to these exercises you will be expected to recall the general binomial formula:

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \dots + \frac{n(n-1)\dots(n-k+1)}{1 \cdot 2 \dots k}x^k + \dots$$

1. Expand the following expressions. Include only the first three terms:

(a) $(1+x)^{-1}$. [2]

(b) $\frac{1}{1-2x}$. [3]

(c) $(2+x)^{\frac{1}{2}}$. [3]

(d) $(\frac{1}{3} + \frac{1}{3}x)^{-1}$. [2]

(e) $(32 + 16x)^{\frac{1}{2}}$. [2]

2. Express the following in partial fractions:

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

(b) $\frac{x}{(x+2)(x+3)}$. [2]

(c) $\frac{x}{(x+1)^2(x+2)}$. [3]

(d) $\frac{3x}{(x^2-2)(x+1)}$. [3]

(e) $\frac{x^3}{(x+2)(x+1)}$. [4] *Hint: you have a top heavy fraction here*

3. Consider the expression:

$$\frac{8}{(x-2)(x-1)}$$

(a) Write the expression in partial fractions. [2]

(b) Hence show that:

$$\frac{8}{(x-2)(x-1)} = 4 + 6x + 7x^2 + \dots$$

[6]