Write your name here

Surname	Other names

Pearson Edexcel GCE

Centre Number	Candidate Number

A level Mathematics

Practice Paper
Pure Mathematics - Binomial expansion

You must have:
Mathematical Formulae and Statistical Tables (Pink)

Total Marks

Instructions

- Use black ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all the questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided – there may be more space than you need.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 6 questions in this question paper. The total mark for this paper is 50.
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.
- Calculators must not be used for questions marked with a * sign.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

1. (*a*) Find the binomial expansion of

$$\frac{1}{\sqrt{(9-10x)}}, \qquad |x| < \frac{9}{10}$$

in ascending powers of x up to and including the term in x^2.
Give each coefficient as a simplified fraction.

(5)

(*b*) Hence, or otherwise, find the expansion of

$$\frac{3+x}{\sqrt{(9-10x)}}, \qquad |x| < \frac{9}{10}$$

in ascending powers of x, up to and including the term in x^2.
Give each coefficient as a simplified fraction.

(3)

(Total 8 marks)

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2. Given that the binomial expansion of $(1 + kx)^{-4}$, $|kx| < 1$, is

$$1 - 6x + Ax^2 + \ldots$$

(*a*) find the value of the constant k,

(2)

(*b*) find the value of the constant A, giving your answer in its simplest form.

(3)

(Total 5 marks)

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3. $$f(x) = \frac{1}{\sqrt{(9+4x^2)}}, \qquad |x| < \frac{3}{2}.$$

Find the first three non-zero terms of the binomial expansion of f(x) in ascending powers of x.
Give each coefficient as a simplified fraction.

(Total 6 marks)

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4. $f(x) = \dfrac{6}{\sqrt{(9-4x)}}, \qquad |x| < \dfrac{9}{4}.$

(*a*) Find the binomial expansion of f(x) in ascending powers of x, up to and including the term in x^3. Give each coefficient in its simplest form.

(6)

Use your answer to part (*a*) to find the binomial expansion in ascending powers of x, up to and including the term in x^3, of

(*b*) $g(x) = \dfrac{6}{\sqrt{(9+4x)}}, \qquad |x| < \dfrac{9}{4},$

(1)

(*c*) $h(x) = \dfrac{6}{\sqrt{(9-8x)}}, \qquad |x| < \dfrac{9}{8}.$

(2)

(Total 9 marks)

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5. (*a*) Expand

$$\frac{1}{(2-5x)^2}, \qquad |x| < \frac{2}{5},$$

in ascending powers of x, up to and including the term in x^2, giving each term as a simplified fraction.

(5)

Given that the binomial expansion of $\dfrac{2+kx}{(2-5x)^2}, \ |x| < \dfrac{2}{5},$ is

$$\frac{1}{2} + \frac{7}{4}x + Ax^2 + \ldots,$$

(*b*) find the value of the constant k,

(2)

(*c*) find the value of the constant A.

(2)

(Total 9 marks)

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6. (*a*) Use the binomial theorem to expand

$$(2 - 3x)^{-2}, \quad |x| < \frac{2}{3},$$

in ascending powers of x, up to and including the term in x^3. Give each coefficient as a simplified fraction.

(5)

$$f(x) = \frac{a + bx}{(2 - 3x)^2}, \quad |x| < \frac{2}{3}, \quad \text{where } a \text{ and } b \text{ are constants.}$$

In the binomial expansion of f(x), in ascending powers of x, the coefficient of x is 0 and the coefficient of x^2 is $\frac{9}{16}$.

Find

(*b*) the value of a and the value of b,

(5)

(*c*) the coefficient of x^3 , giving your answer as a simplified fraction.

(3)

(Total 13 marks)

TOTAL FOR PAPER: 50 MARKS