

## Binomial Expansion Revision Tutorial Questions

**Q1.**

(a) Find the first 3 terms, in ascending powers of  $x$ , of the binomial expansion of

$$(2 - 3x)^6$$

giving each term in its simplest form.

(4)

(b) Hence, or otherwise, find the first 3 terms, in ascending powers of  $x$ , of the expansion of

$$\left(1 + \frac{x}{2}\right)(2 - 3x)^6$$

(3)

**(Total 7 marks)**

**Q2.**

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

Find the binomial expansion of  $f(x)$ , in ascending powers of  $x$ , as far as the term in  $x^3$ .

Give each coefficient as a simplified fraction.

(5)

**(Total for question = 5 marks)**

**Q3.**

(a) Find the binomial expansion of

$$\frac{1}{\sqrt{9 - 10x}}, \quad |x| < \frac{9}{10}$$

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

$$\frac{3 + x}{\sqrt{9 - 10x}}, \quad |x| < \frac{9}{10}$$

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)**

**Q4.**

(a) Find the first 4 terms of the binomial expansion, in ascending powers of  $x$ , of

$$\left(1 + \frac{x}{4}\right)^8$$

giving each term in its simplest form.

(4)

(b) Use your expansion to estimate the value of  $(1.025)^8$ , giving your answer to 4 decimal places.

(3)

**(Total 7 marks)**

**Q5.**

(a) Use the binomial expansion to show that

$$\sqrt{\left(\frac{1+x}{1-x}\right)} \approx 1 + x + \frac{1}{2}x^2, \quad |x| < 1$$

(6)

(b) Substitute  $x = \frac{1}{26}$  into

$$\sqrt{\left(\frac{1+x}{1-x}\right)} = 1 + x + \frac{1}{2}x^2$$

to obtain an approximation to  $\sqrt{3}$

Give your answer in the form  $\frac{a}{b}$  where  $a$  and  $b$  are integers.

(3)

**(Total 9 marks)**

**Q6.**

$$\frac{2x^2 + 5x - 10}{(x-1)(x+2)} \equiv A + \frac{B}{x-1} + \frac{C}{x+2}$$

(a) Find the values of the constants  $A$ ,  $B$  and  $C$ .

(4)

$$\frac{2x^2 + 5x - 10}{(x-1)(x+2)}$$

(b) Hence, or otherwise, expand in ascending powers of  $x$ , as far as the term in  $x^2$ . Give each coefficient as a simplified fraction.

(7)

**(Total 11 marks)**