

You can use this page as a cover sheet for your coursework.

Name: \_\_\_\_\_

Initials: \_\_\_\_\_

Student Number: \_\_\_\_\_

Tutor: \_\_\_\_\_

- Coursework must have your NAME and INITIALS, STUDENT NUMBER, and name of your Personal Tutor in Elect. Engineering clearly marked on the front. Work without a Student Number may not be marked.
- Use a staple or treasury tag to join sheets, NOT a paper clip.
- Marked work is returned to you via your Tutor in Elect. Engineering.
- Some questions are harder than others. Don't worry if you can't do everything. Hand in whatever you can do. Your coursework counts towards the final mark of the

module.

- Coursework can be *either*: posted in **YELLOW** box in **GROUND** floor of **Mathematics Building** or: handed in at the end of a lecture.
- For Summary Sheets, Lecture Notes and Course Information sheet use the Course web page.
- Rules for late and excused coursework are in the Course Information Sheet.
- Remember: The material you hand in must be your own work. Copying doesn't help you learn!

### Coursework Questions

1. Simplify the following expressions:

(a)  $(x + 1)^3 - 3x(x + 1)$

(b)  $y(2y + 3) + 2y^2(y + 1)(y - 1)$

(c)  $\frac{14x^3(3 - 2x)}{x^2(x - 1)(4x - 6)}$

(6 marks)

2. Evaluate the following expression:

$$(6q)^{-1/2} + 16^{1/4} \left( w - \frac{132}{11w} \right)$$

by substituting  $q = 6$ ,  $w = 12$ . Leave answer exact, as a fraction if necessary. DO NOT USE A CALCULATOR!

(4 marks)

3. Rationalize the following expressions:

(a)  $\frac{8}{\sqrt{2}}$

(b)  $\frac{16\sqrt{9}}{\sqrt{12}\sqrt[3]{8}}$

(c)  $\frac{3}{\sqrt{2}}(1 + \sqrt{2})$

(d)  $\frac{1 + \sqrt{2}}{1 - \sqrt{2}}$

(8 marks)

4. Simplify the following expressions:

(a)  $(x^3z^4)(x^{-2}z^2)$

(b)  $\left(\frac{a^3}{b^{-4}}\right)\left(\frac{a^{-4}}{b^2c}\right)$

(4 marks)

5. Factorize the following expressions:

(a)  $x^2 + 5x + 6$

(b)  $x^2 + x - 2$

(c)  $x^2 - 9$

(d)  $x^3 - x^2 - 4x + 4$

(8 marks)

6. Solve, using the standard formula, the quadratic equations:

(a)  $p^2 + 5p + 3 = 0$

(b)  $2x^2 + 5x - 7 = 0$

Keep your answers in exact form.

(4 marks)

7. Express in partial fractions the following:

(a)  $\frac{2x + 1}{x^2 + 5x + 6}$

(b)  $\frac{6 - 15x}{(x - 1)(x + 2)(x - 4)}$

(6 marks)

Total Marks: [ 40 ]