

## Assignment 1.

1. Solve the following inequalities .

(a)  $|4x - 1| \geq |x + 2|$  [4]

(b)  $|3x + 2| < x + 1$  [4]

2. Solve the equation  $x^2 - |x - 2| = 8$ . [6]

3. The polynomial  $2x^3 + 5x^2 + ax + b$ , where  $a$  and  $b$  are constants, is denoted by  $p(x)$ . It is given that  $x + 2$  is a factor of  $p(x)$ , and that when  $p(x)$  is divided by  $x - 1$  the remainder is 8.

(a) Find the values of  $a$  and  $b$ . [5]

(b) When  $a$  and  $b$  have these values, find the remainder when  $p(x)$  is divided by  $(x - 1)(x + 2)$ . [3]

4. It is given that  $x^2 + 3x + 7$  is a factor of the polynomial  $p(x) = x^4 + kx + 14$ , where  $k$  is a constant.

(a) Find the value of  $k$  and factorize  $p(x)$  completely.

[6]

(b) Hence solve the inequality  $p(x) \geq 0$ .

[2]

5. (†) Sketch the region in the  $x$ - $y$  plane that satisfies the inequality:  $|x - 1| - |y + 2| \leq 3$ .

[5]

**Total mark** of this assignment: 30 + 5.

The symbol (†) indicates a bonus question. Finish other questions before working on this one.