

## MA10103: Foundation Mathematics I

### PROBLEM SHEET 2

On Friday 12th October, there is a **drop-in class** in 8West 2.8. If you have questions and/or want to practise (further) examples, simply come to this session (note that it is not compulsory).

Web page: <http://www.maths.bath.ac.uk/~bs259/ma10103/>

Email address: [bs259@bath.ac.uk](mailto:bs259@bath.ac.uk)

Please, do all questions and hand in solutions to the starred questions at the lecture on *Monday 15th October*.

1. Factorise the following, using integers, if you can.

$$6x^2+x-12; \quad 4x^2-11x+6; \quad 4x^2+3x-1; \quad 3x^2-17x+10; \quad 4x^2-12x+9; \quad 3-5x-2x^2;$$
$$25x^2-16; \quad 3-2x-x^2; \quad 5x^2-61x+12; \quad 9x^2+30x+25.$$

2\*. Simplify the following expressions as much as you can (which may be not at all).

$$\frac{x-2}{4x-8}; \quad \frac{2x+4}{3x-6}; \quad \frac{2a+8}{3a+12}; \quad \frac{3p-3q}{5p-5q}; \quad \frac{x^2+xy}{xy+y^2};$$
$$\frac{x-3p}{2x+p}; \quad \frac{a-4}{a-2}; \quad \frac{x^2y+xy^2}{y^2+\frac{2}{5}xy}.$$

3. Express the following in partial fractions:

$$\frac{x-2}{(x+1)(x-1)}; \quad \frac{2x-1}{(x-1)(x-7)}; \quad \frac{4}{(x+3)(x-2)}; \quad \frac{7x}{(2x-1)(x+4)}; \quad \frac{2}{x(x-2)};$$
$$\frac{2x-1}{(x-2)(x-1)}; \quad \frac{3}{(x-3)(x+3)}; \quad \frac{6x+7}{3x(x+1)}; \quad \frac{9}{x(2x+1)}; \quad \frac{x+1}{(3x+2)(x-1)}.$$

4\*. Write the following in partial fractions:

$$\frac{4}{x^2-7x-8}; \quad \frac{4x}{4x^2-9}; \quad \frac{3x+2}{2x^2-4x}; \quad \frac{3}{x^2-1}.$$

*Please turn over!*

5. Rewrite the following expressions in a simpler, or at least in a different, form:

$$\sqrt{12}; \quad \sqrt{32}; \quad \sqrt{27}; \quad \sqrt{35}; \quad \sqrt{200}; \quad \sqrt{72}; \quad \sqrt{162}; \quad \sqrt{288}; \quad \sqrt{75}; \quad \sqrt{48}$$

6. Simplify the following:

$$\begin{aligned} &\sqrt{3}(2 - \sqrt{3}); \quad \sqrt{5}(2 + \sqrt{75}); \quad (\sqrt{3} + 1)(\sqrt{2} - 1); \\ &(\sqrt{5} - 1)(\sqrt{5} + 1); \quad (\sqrt{5} - 3)(2\sqrt{5} - 4); \quad (\sqrt{6} - 2)^2. \end{aligned}$$

7. Rationalise the denominator in the following fractions:

$$\frac{\sqrt{7}}{6 + \sqrt{7}}; \quad \frac{2}{5 - \sqrt{3}}; \quad \frac{3 - \sqrt{2}}{4 - \sqrt{2}}; \quad \frac{1}{\sqrt{5} - \sqrt{3}}.$$