

MAS051 — Example Sheet 2

To be handed in: Friday, October 4, 2001

Remember to give your Tutorial Group, along with your name, on the assignment.

Only the *asterisked* (starred) questions are to be handed in. You should attempt all the questions, however; they are intended to help you learn the material, and you can only do this by working through problems. You should only use a calculator to check your answers (if at all).

(1) Simplify, giving your answer as the power of a natural number:

(a) $2^6 \div 2^3$ (b) $3^7 \times 3^{13}$ (c)* $2^{-1} \times 2^4$ (d) $\frac{1}{2^{-1}}$

(e)* $2^{\frac{1}{2}} \div 2^{-\frac{7}{2}}$ (f) $(\frac{1}{4})^{-\frac{1}{2}}$ (g) $(2^{12} - 3^{10})^0$ (h) $(2^2)^3$

(2) Express each of the following in the form a^n (i.e. find n):

(a) $a^5 a^7$ (b) $(a^2)^4$ (c) $a^4 a^{-2}$ (d) $\frac{a^3}{a^{-5}}$

(e) $a^4 \frac{1}{a^2} a^3$ (f) $\frac{\sqrt{a}}{\sqrt[3]{a}}$ (g) $\sqrt[5]{a^2}$ (h)* $(\sqrt{a})^4$

(3) Expand the following and simplify if possible:

(a)* $(x - 2y)(2x - y)$ (b) $(3x - 2y)^2$ (c) $(x + y + z)^2$

(d) $(2 + \sqrt{3})(2 - \sqrt{3})$ (e) $(3 - \sqrt{5})(2 + \sqrt{7})$ (f)* $(1 + \sqrt{2})^2$

(4) Simplify the following expressions.

(a)* $\frac{1}{x-1} - \frac{1}{x+1}$ (b) $\frac{x}{y+1} - \frac{y}{x+1}$ (c) $\frac{2x(x^2+1)-2x(x^2-1)}{(x^2+1)^2}$

(d) $\frac{x^2-3x}{x^3}$ (e)* $\frac{(3-4 \times 7)x}{x^2-x}$

(5) Solve the following equations for x :

(a)* $x + 2 = 2x + 3$ (b) $(x + 1)(x + 2) = (x - 1)(x - 2)$ (c) $\frac{1}{x+1} = \frac{2}{1-x}$

(d)* $\frac{1}{x+1} - \frac{1}{x+2} = \frac{1}{x^2+3}$ (e) $\frac{x^2+1}{x^2+x-1} = 1$

(6) Solve the following simultaneous equations for x and y :

(a) $x + y = 1$
 $x - y = 1$ (b)* $x + 2y = 1$
 $2x - y = 2$ (c)* $2x + y = 4$
 $3x - 2y = -1$ (d) $2x + y = 3$
 $3x - 2y = 8$

(e) $2x - 3y = -11$
 $3x + 2y = 3$ (f) $3x + 2y = 12$
 $5x - 3y = 1$