Indices/Surds/Quadratics – Hard - www.m4ths.com

(1) Write each of the following as powers of x.

(a) $\sqrt{x}$ (b) $\sqrt[3]{x}$ (c) $\sqrt[4]{x}$ (d) $\sqrt[8]{x^5}$

(e) $\frac{1}{x}$ (f) $\frac{1}{x^5}$ (g) $\frac{1}{\sqrt{x}}$ (h) $\frac{x^7}{x}$

(i) $x\sqrt{x}$ (j) $x\sqrt[4]{x^7}$ (k) $\frac{1}{x\sqrt{x}}$ (l) $\left(\sqrt[6]{x^5}\right)^{0.5}$

(2) Solve equation giving your answers as fractions where appropriate. We don't like decimals.

(a) $25^{x-1} = 5^{3x+4}$ (b) $27^{2x+3} = 9^{1-x}$

(c) $16^{2x} = \frac{1}{8^{3-x}}$ (d) $216^{x-2} = \frac{1}{36^{3-x}}$

(3) Given that there are no solutions to the equation $7^{Ax+4} = 49^{4+Bx}$, express A in terms of B. (nice question)

(4) Solve each equation below giving your answers in exact form:

(a) $\sqrt{3}x - 4 = \sqrt{6} + x$ (b) $1 - \sqrt{6}x = 2x - \sqrt{2}$

(5) Solve each equation below:

(a) $x - 2\sqrt{x} - 8 = 0$ (b) $x - x^{0.5} - 6 = 0$

(c) $\sqrt{x} - \frac{12}{\sqrt{x}} = 1$ (d) $x^6 + 7x^3 = 8$

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