DISGUISED QUADRATIC EQUATIONS

1 Solve each of these equations for x.

a) $x^4 - 13x^2 + 36 = 0$ b) $x^4 - 2x^2 - 3 = 0$ c) $x^6 - 28x^3 + 27 = 0$

d) $x^6 + 5x^3 - 24 = 0$ e) $x - 5\sqrt{x} + 6 = 0$ f) $x - 6\sqrt{x} + 5 = 0$

g) $x^4 + x^2 = 12$ h) $x = 4\sqrt{x} - 3$ i) $x^8 + 16 = 17x^4$

j) $x^6 = 8 + 2x^3$ k) $8\sqrt{x} = 15 + x$ l) $65x^4 = 16 + 4x^8$

2 Solve each of these equations for x.

a) $x^2 + 1 = \dfrac{6}{x^2}$ b) $x^3 + 7 = \dfrac{8}{x^3}$ c) $x = 12\sqrt{x} - 35$

d) $x^3 - 6x + \dfrac{8}{x} = 0$ e) $\sqrt{x} + \dfrac{10}{\sqrt{x}} = 7$ f) $x^2 + 3 = \dfrac{18}{x^2}$

g) $x^4(x^4 - 20) + 64 = 0$ h) $15 = \sqrt{x}(8 - \sqrt{x})$ i) $\dfrac{5}{x^2} = x^2 + \dfrac{4}{x^6}$

j) $2(x^4 + 6) = 11x^2$ k) $2 + \dfrac{10}{x} = \dfrac{9}{\sqrt{x}}$ l) $x = \dfrac{2(3x^3 + 8)}{x^5}$

3 Solve $(x + 3)^2 - 5(x + 3) + 4 = 0$.

4 Solve $(3x - 1)^2 + 6(3x - 1) - 7 = 0$.

5 a) Solve $y^2 - 7y + 10 = 0$.

   b) Hence find the solutions to $(x^2 + 1)^2 - 7(x^2 + 1) + 10 = 0$.

6 a) Solve $y^2 - 5y - 14 = 0$.

   b) Hence find the solutions to $(x^3 - 1)^2 - 5(x^3 - 1) - 14 = 0$.

7 Solve $x(x + 1) + \dfrac{24}{x(x + 1)} = 14$.

*8 a) By using the substitution $p = x + \dfrac{1}{x}$, show that the equation

$$2x^4 + x^3 - 6x^2 + x + 2 = 0$$

reduces to $2p^2 + p - 10 = 0$.

   b) Hence solve $2x^4 + x^3 - 6x^2 + x + 2 = 0$.

9 Solve for x:

a) $4^x - 6(2^x) + 8 = 0$ b) $4^x - 2^x - 2 = 0$ c) $9^x - 12(3^x) + 27 = 0$

d) $9^x = 3^x + 6$ e) $25^x - 23(5^x) - 50 = 0$ f) $49^x - 1 = 2(7^x)$