1. Solve:

a) $10x^2 + x - 2 = 0$ **2**	b) $x^2 = 5$ **1**	c) $x^2 - 5x \leq -4$ **2**

2. Complete the square and hence solve: $x^2 - 6x + 3 = 0$ **3**

3. Neatly sketch the graph of $y = 3 + 2x - x^2$ clearly showing <u>all</u> features. **4**
   Hence, solve the inequality $3 + 2x - x^2 < 0$.

4. If α and β are the roots of $2x^2 + 4x + 1 = 0$, find the values of:

a) $(\alpha - 2)(\beta - 2)$ **2**	b) $\alpha^3 + \beta^3$ **2**	c) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ **2**

5. Find the value(s) of λ for which $3x^2 - 10x + 7 = \lambda$ has only one solution. **2**

6. Express $5x^2 - 3x + 4$ in the form $A(x + 1)^2 + B(x - 1) + C$. **3**

7. Solve $\sqrt[3]{x^2} - \sqrt[3]{x} - 6 = 0$. **2**

Quadratic Theory | Review Topic Test

1. Solve:

a) $10x^2 + x - 2 = 0$ **2**	b) $x^2 = 5$ **1**	c) $x^2 - 5x \leq -4$ **2**
$(5x-2)(2x+1) = 0$ $x = \frac{2}{5}, \frac{-1}{2}$	$x = \pm\sqrt{5}$	$x^2 - 5x + 4 \leq 0$ $(x-1)(x-4) \leq 0$ $1 \leq x \leq 4$

2. Complete the square and hence solve: $x^2 - 6x + 3 = 0$ **3**

$x^2 - 6x = -3$

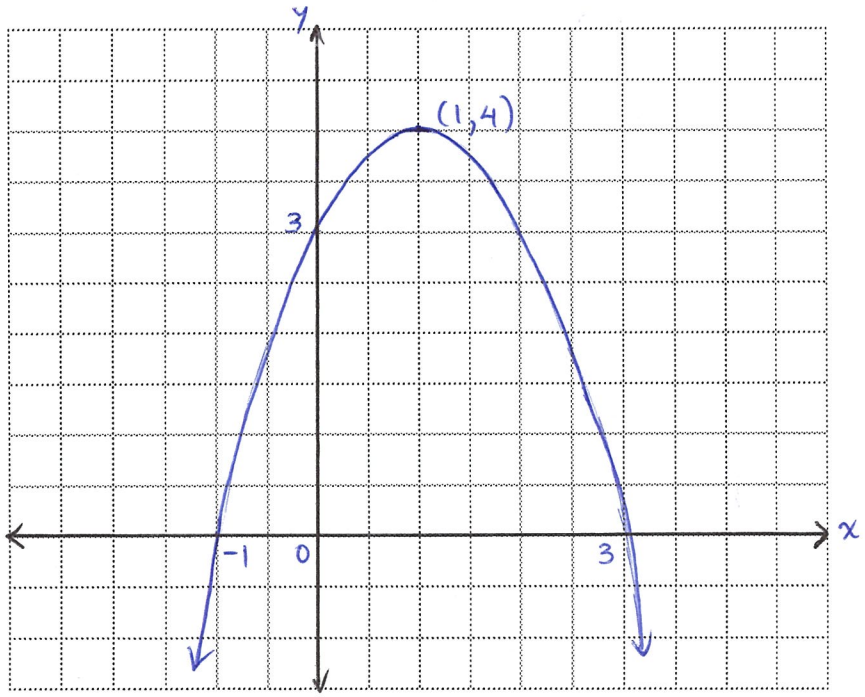
$x^2 - 6x + 9 = -3 + 9$

$(x-3)^2 = 6$

$x - 3 = \pm\sqrt{6}$

$x = 3 \pm \sqrt{6}$

3. Neatly sketch the graph of $y = 3 + 2x - x^2$ clearly showing all features. **4**
Hence, solve the inequality $3 + 2x - x^2 < 0$.



Inequality is satisfied when $x < -1$ or $x > 3$.

4. If α and β are the roots of $2x^2 + 4x + 1 = 0$, find the values of: $\alpha+\beta=-2,\ \alpha\beta=\frac{1}{2}$

a) $(\alpha-2)(\beta-2)$ **2**

$= \alpha\beta - 2\alpha - 2\beta + 4$

$= \alpha\beta - 2(\alpha+\beta) + 4$

$= \frac{1}{2} - 2(-2) + 4$

$= 8\frac{1}{2}$

b) $\alpha^3 + \beta^3$ **2**

$= (\alpha+\beta)(\alpha^2 - \alpha\beta + \beta^2)$

$= (\alpha+\beta)\left[(\alpha+\beta)^2 - 3\alpha\beta\right]$

$= -2 \times \left(4 - 1\frac{1}{2}\right)$

$= -2 \times 2\frac{1}{2}$

$= -5$

c) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ **2**

$= \frac{\alpha^2+\beta^2}{\alpha^2\beta^2}$

$= \frac{(\alpha+\beta)^2 - 2\alpha\beta}{(\alpha\beta)^2}$

$= \frac{4-1}{(\frac{1}{4})}$

$= 12$

5. Find the value(s) of λ for which $3x^2 - 10x + 7 = \lambda$ has only one solution. i.e. $\Delta = 0$ **2**

$3x^2 - 10x + 7 - \lambda = 0$

$\therefore \Delta = 100 - 4(3)(7-\lambda)$

$= 100 - 12(7-\lambda)$

$= 100 - 84 + 12\lambda$

$\Delta = 12\lambda + 16$

But $\Delta = 0$

$\therefore 12\lambda + 16 = 0$

$12\lambda = -16$

$\lambda = \frac{-4}{3}$

6. Express $5x^2 - 3x + 4$ in the form $A(x+1)^2 + B(x-1) + C$. **3**

$Ax^2 + 2Ax + A + Bx - B + C = 5x^2 - 3x + 4$

$Ax^2 + (2A+B)x + A - B + C = 5x^2 - 3x + 4$

$\therefore$ By comparison of co-efficients,

$A = 5$

$2(5) + B = -3$

$B = -13$

$5 + 13 + C = 4$

$C = -14$

$\therefore 5x^2 - 3x + 4$ is equal to $5(x+1)^2 - 13(x-1) - 14$.

7. Solve $\sqrt[3]{x^2} - \sqrt[3]{x} - 6 = 0$. **2**

Let $u = \sqrt[3]{x}$.

$\therefore u^2 - u - 6 = 0$

$(u-3)(u+2) = 0$

$\therefore u = -2$ or 3

$\sqrt[3]{x} = -2$ or 3

$\therefore x = -8$ or 27.