Quadratics – Test A (45 mins)

Fundamentals ✓Challenge Expert

Subtopics: Solving quadratic equations, completing the square, functions, quadratic graphs, discriminants, modelling

1. Rearrange the following equations into the form $x^2+bx+c=0$, then solve by **factorisation**:

   a) $x^2-2x=35$ b) $(x+2)^2=-x$

   c) $x(x+1)=6$ d) $(x+3)(x+4)=x+4$ **[12]**

2. Solve the following equations using the **quadratic formula**, leaving your answers in simplified surd form when necessary:

   a) $2x^2-3x-1=0$ b) $5x^2=2x+3$ c) $(2x+3)^2=8$ **[7]**

3. Solve by **completing the square**, leaving your answers in simplified surd form when necessary:

   a) $x^2-4x+4=0$ b) $x^2+6x+3=0$ c) $x^2+5x-1=0$ **[6]**

4. Write x^2+2x-5 in the form $p(x+q)^2+r$ where p, q and r are integers. **[2]**

5. Write $2x^2-4x+8$ in the form $p(x+q)^2+r$ where p, q and r are integers. **[2]**

6. The functions f and g are given by $f(x)=3x-15$ and $g(x)=x^2+11x+1$

   a) Find the values of $f(2)$ and $g(5)$ **[2]**

   b) Find the value of x where $f(x)=g(x)$ **[3]**

7. Calculate the value of the **discriminant** for the following functions, then state whether the function has two real roots, no real roots or one repeated root:

   a) $f(x)=5x^2+12x+8$ b) $g(x)=(-x+6)(2x+3)$

   c) $h(x)=3x^2-6x+2$ d) $j(x)=(2x+8)(3x-4)$ **[10]**

8. Solve $2x=\sqrt{4x+3}$, where $x\geq -\frac{3}{4}$, by first squaring both sides and then using the **quadratic formula**. **[3]**

9. Find the values of k for which $f(x)=x^2+kx+4$ has **one** repeated root. **[3]**

10. Find the value of A for which $2x^2-5x+A=0$ has exactly **one** solution. **[3]**

TOTAL 53 MARKS