A level Mathematics Summer Practice

1)   a) Simplify as far as possible $(3x - 1) - 2(x - 5)$ (2)

       b) Expand $(x - 3)(x^2 + 5x - 2)$ (2)

2)   Factorise the following expressions

       a) $x^2 + 8x$ (1)

       b) $x^2 + 8x + 15$ (2)

       c) $x^2 - 3x - 10$ (2)

       d) $x^2 - 4y^2$ (1)

       e) $6x^2 + 7x + 2$ (2)

3)   Solve

       a) $4x + 2 = 2x + 12$ (2)

       b) $6(x - 1) - 6(1 - 3x) = 36$ (3)

       c) $3(3x - 2) - 2(x + 4) = 2x + 1$ (3)

4)   Solve

       a)   Factorise and hence solve $x^2 + 5x + 4 = 0$ (2)

       b)   Solve by completing the square $x^2 + 4x - 13 = 0$ (2)

       c)   Use the quadratic formula to solve $x^2 + 5x - 7 = 0$ giving your answers in surd form   (3)

       d) $2x^2 - 4x + 1 = 0$ (3)

5)   Solve the simultaneous equations

       a) $5x + 3y = 21$ and $2x + y = 8$ (4)

       b) $x + xy + 2y^2 = 1$ and $y + x = 3$ (4)

6)   Expand and simplify

       a) $\sqrt{5}\,(\sqrt{3} + 1)$ (1)

       b) $(4\sqrt{5} - 1)(3\sqrt{5} - 7)$ (2)

7)   Rationalise the denominator

       a) $\dfrac{5}{\sqrt{7}}$ b) $\dfrac{3}{2\sqrt{5} + 3}$ c) $\dfrac{2\sqrt{7}}{\sqrt{7} + 1}$

       (5)

8)   Evaluate showing your working

       a) 4^3 b) $4^3 - 4^2$

       c) $8^{2/3}$ d) $64^{-1/3}$ (4)