Find the **vertex** for the following quadratics by using the Completing the Square technique, leave answers in fraction form where applicable, NO DECIMALS. (6 marks)

(a) $y = x^2 + 8x$

(b) $y = 2x^2 - 10x + 7$

(c) $y = -3x^2 - 18x$

(d) $y = 2x^2 - 5x - 9$

Solve the following using either a factoring or algebraic approach, or the quadratic formula. All answers should be whole number, fractions or simplest radical form (NO DECIMALS). (10 marks)

(a) $0 = x^2 + 5x$

(b) $0 = x^2 - 12x + 9$

(c) $11 = -2x^2 - 16x$

(d) $-9(2x - 1)(3x + 8) = 0$

(e) $5 = 3x^2 - 10x - 6$

(f) $110 = -2x^2 + 32x$

For quadratics in the form, $ax^2 + bx + c = 0$, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$