Quadratic Equations

If $ab = 0$ then either $a = 0$ or $b = 0$

e.g. (i) $x^2 + 9x + 18 = 0$

$$(x + 6)(x + 3) = 0$$

$$x = -6 \quad \text{or} \quad x = -3$$

(ii) $x(2x + 1) = 0$

$$x = 0 \quad \text{or} \quad x = -\frac{1}{2}$$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

e.g.(*i*) $2x^2 + 5x - 4 = 0$

$$x = \frac{-5 \pm \sqrt{25 + 32}}{4}$$

$$x = \frac{-5 \pm \sqrt{57}}{4} \quad \longleftarrow \text{exact}$$

$$x = -3.14 \quad \text{or} \quad x = 0.64 \quad \longleftarrow \text{approximate}$$

Exercise 1F; 1af, 2ai, 3bko, 4jnr, 5bgl, 6b, 7ac, 8c, 9bc, 10a, 11a, 12bcfg, 13c, 14b

(*ii*) make x the subject in

$$y = x^2 + 4x - 3$$

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

$$x = \frac{-4 \pm \sqrt{16 + 4(3 + y)}}{2}$$

$$x = \frac{-4 \pm 2\sqrt{4 + (3 + y)}}{2}$$

$$x = \frac{-4 \pm 2\sqrt{7 + y}}{2}$$

$$x = -2 \pm \sqrt{7 + y}$$