

### Factor the difference of two squares

We know from our multiplication rules that  $(a + b)(a - b) = a^2 - b^2$ . Applying this rule backwards we get a factoring rule for the difference of two squares,

$$\mathbf{a^2 - b^2 = (a + b)(a - b)}$$

If we can identify the problem as being the difference of two squares, we can apply above rule.

Example:

$$\begin{aligned} \text{Factor } x^2 - 4 \\ x^2 - 2^2 \quad a = x \text{ and } b = 2 \\ (x + 2)(x - 2) \end{aligned}$$

Example:

$$\begin{aligned} \text{Factor } 4t^2 - 9s^2 \\ (2t)^2 - (3s)^2 \quad a = 2t \text{ and } b = 3s \\ (2t + 3s)(2t - 3s) \end{aligned}$$

Example:

$$\begin{aligned} \text{Factor } u^4 - 16 \\ (u^2)^2 - 4^2 \quad a = u^2 \text{ and } b = 4 \\ (u^2 + 4)(u^2 - 4) \\ (u^2 + 4)(u^2 - 2^2) \quad a = u \text{ and } b = 2 \\ (u^2 + 4)(u + 2)(u - 2) \end{aligned}$$