Problem. Factor the following:

(a) $x^4 - 16$

(b) $2x^2 - 4x + 2$

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

Solution.

(a)

$$x^4 - 16$$
$$= (x^2)^2 - (4)^2$$
$$= (x^2 - 4)(x^2 + 4)$$
$$= (x - 2)(x + 2)(x^2 + 4)$$

(b)

$$2x^2 - 4x + 2$$
$$= 2(x^2 - 2x + 1)$$
$$= 2(x - 1)(x - 1)$$

(c)

$$x^3 - x^2 - 2x$$
$$= x(x^2 - x - 2)$$
$$= x(x - 2)(x + 1)$$