

Exercise A.6.45 and 63 Solve each equation:

A.6.45  $x^3 + 2x^2 - 4x - 8 = 0$     A.6.63  $|x^2 - 2x| = 3$ .

A.6.45 solution

We solve by grouping:

$$x^3 + 2x^2 - 4x - 8 = x^2(x+2) - 4(x+2) = 0$$

$$\text{or } (x^2 - 4)(x+2) = 0 \text{ or } (x-2)(x+2)(x+2) = 0$$

$$\text{or } (x-2)(x+2)^2 = 0. \text{ So by the Zero}$$

Product Property, either  $x-2=0$  or  $x+2=0$ .

That is, either  $x=2$  or  $x=-2$  and

the solution set is  $\{-2, 2\}$ .  $\square$

A.6.63 solution

$$\text{If } |x^2 - 2x| = 3 \text{ then either } x^2 - 2x = 3$$

$$\text{or } x^2 - 2x = -3. \text{ That is, either } x^2 - 2x - 3 = 0$$

$$\text{or } x^2 - 2x + 3 = 0. \text{ Now } x^2 - 2x - 3 = 0$$

$$\text{implies } (x-3)(x+1) = 0 \text{ or either } x=3 \text{ or } x=-1.$$

Next,  $x^2 - 2x + 3 = 0$  has no real solution

since the discriminant for this quadratic

$$\text{equation is } b^2 - 4ac = (-2)^2 - 4(1)(3) =$$

$$= 4 - 12 = -8 < 0 \text{ (see Note A.6.C).}$$

So either  $x=-1$  or  $x=3$  and the

solution set is  $\{-1, 3\}$ .  $\square$