

§13.6 (cont'd)

$$\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\textcircled{1} \sqrt{x-3} \sqrt{x+4}$$

$$= \sqrt{(x-3)(x+4)}$$

$$= \sqrt{x^2 - 3x + 4x - 12}$$

$$= \boxed{\sqrt{x^2 + x - 12}} \neq x \sqrt{x-12}$$

$$\textcircled{2} \sqrt{45x} \sqrt{3x}$$

$$= \sqrt{45 \cdot 3 \cdot x^2} = \sqrt{9 \cdot 5 \cdot 3x^2}$$

$$= \cancel{9} \cdot \cancel{3} \cdot \boxed{3x \sqrt{15}}$$

$$\textcircled{3} \sqrt{\frac{27}{48}}$$

$$= \sqrt{\frac{9}{16}} = \boxed{\frac{3}{4}}$$

$$\textcircled{4} \frac{\sqrt{72x^7}}{\sqrt{2x}}$$

$$= \sqrt{\frac{72x^7}{2x}}$$

$$= \sqrt{36x^6}$$

$$= \boxed{6x^3}$$

$$\textcircled{5} \sqrt{\frac{5}{12}}$$

$$= \sqrt{\frac{5}{12}} \cdot \sqrt{\frac{3}{3}}$$

$$= \frac{\sqrt{15}}{\sqrt{36}}$$

$$= \frac{\sqrt{15}}{6}$$

$$\textcircled{6} \sqrt{32} - \sqrt{18} \neq \sqrt{32-18}$$

$$= 4\sqrt{2} - 3\sqrt{2}$$

$$= \boxed{\sqrt{2}}$$

~~4~~

Add/subtract radical expressions

① same index

② same radicand

$$\textcircled{7} \sqrt{\frac{1}{3} \cdot \frac{\sqrt{3}}{\sqrt{3}}} + \sqrt{\frac{1}{12} \cdot \frac{\sqrt{3}}{\sqrt{3}}}$$

$$= \frac{\sqrt{3}}{3} + \frac{\sqrt{3}}{6}$$

$$= \frac{2\sqrt{3}}{6} + \frac{\sqrt{3}}{6}$$

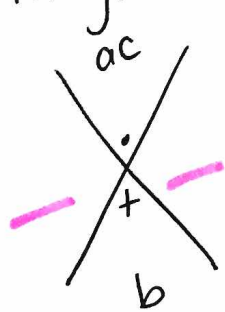
$$= \frac{3\sqrt{3}}{6}$$

$$= \boxed{\frac{\sqrt{3}}{2}}$$

§13.7 Factoring Quadratics

① collect/factor GCF, if any.

② "magic X"



$$ax^2 + bx + c$$

$$\underline{ax^2 + \quad x} + \underline{\quad x + c}$$

then factor by grouping

③ Difference of squares

$$a^2 - b^2 = (a+b)(a-b)$$

examples

① $x^6 - 9x^4$ $x^4(x^2 - 9)$

~~$(x^2 - 9)^2$~~ $\boxed{x^4(x+3)(x-3)}$

② $x^3 + 6x^2 + 9x$

$$x(x^2 + 6x + 9)$$

$$x(x+3)(x+3)$$

$$\boxed{x(x+3)^2}$$

③ $\underline{n^3 - 2n^2} + \underline{4n - 8}$

$$n^2(n-2) + 4(n-2)$$

$$\boxed{(n-2)(n^2+4)}$$

§13.8 Solving Quadratic Eqns.

① factoring / zero product property

$$x^2 - 11x + 24 = 0$$

$$(x-8)(x-3) = 0$$

$$x-8=0 \quad \text{or} \quad x-3=0$$

$$\boxed{x=8 \quad \text{or} \quad x=3}$$

② Quadratic Formula

$$ax^2 + bx + c = 0$$

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

③ Completing the square

$$x^2 - 4x + \frac{4}{1} = 12 + \frac{4}{1}$$

$$(x-2)(x-2) = 16$$

$$\sqrt{(x-2)^2} = \sqrt{16}$$

$$x-2 = \pm 4$$

$$x = 2 \pm 4$$

$$\boxed{x=6 \quad \text{or} \quad x=-2}$$