Algebra 1

irm-Up

(a) Solve $x^2 + 4x - 7 = 0$ by completing the square.

(b) Solve $x^2 + 4x - 7 = 0$ by the quadratic formula.

SIMPLEST FORM of a Radical expression

① No perfect square FACTORS IN THE RADICAND (OTHER THAN 1)

② No FRACTIONS in the RADICAND

③ No RADICALS allowed IN THE DENOMINATOR

   *MUST Rationalize the DENOMINATOR

Example 1. Using the Product Property of Radicals

Simplify.

(a) $\sqrt{32}$

$\sqrt{8 \cdot 4}$

$\sqrt{8} \cdot \sqrt{4}$

$2\sqrt{8}$

$2\sqrt{4 \cdot 2}$

$\boxed{4\sqrt{2}}$

$\sqrt{16}\sqrt{2}$

$4\sqrt{2}$

(b) $\sqrt{48} = \sqrt{16 \cdot 3}$

$\sqrt{16} \cdot \sqrt{3}$

$\boxed{4\sqrt{3}}$

(c) $\sqrt{24}$

$\sqrt{4} \cdot \sqrt{6}$

$\boxed{2\sqrt{6}}$

(d) $\sqrt{90}$

$\sqrt{9} \cdot \sqrt{10}$

$\boxed{3\sqrt{10}}$

Example 2. Use the Product Property of Radicals with Variables

(a) $\sqrt{25x^2}$

$\sqrt{25} \cdot \sqrt{x^2}$

$\boxed{5x}$

(b) $\sqrt{9x^3}$

$\sqrt{9} \cdot \sqrt{x^3}$

$\sqrt{9} \cdot \sqrt{x^2 x^1}$

$\sqrt{9} \cdot \sqrt{x^2} \sqrt{x}$

$\boxed{3x\sqrt{x}}$

(c) $\sqrt{27x}$

$\sqrt{27} \cdot \sqrt{x}$

$\sqrt{9} \cdot \sqrt{3} \cdot \sqrt{x}$

$\boxed{3\sqrt{3x}}$

(d) $\sqrt{20n^2}$

$\sqrt{20} \cdot \sqrt{n^2}$

$\sqrt{4} \cdot \sqrt{5} \cdot \sqrt{n^2}$

$\boxed{2n\sqrt{5}}$

Try It!

(a) $\sqrt{50}$

$\sqrt{25}\sqrt{2}$

$\boxed{5\sqrt{2}}$

(b) $\sqrt{12}$

$\sqrt{4}\sqrt{3}$

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

(c) $\sqrt{18b^3}$

$\sqrt{9}\sqrt{2}\sqrt{b^2}\sqrt{b}$

$\boxed{3b\sqrt{2b}}$

(d) $\sqrt{54y}$

$\sqrt{9}\sqrt{6}\sqrt{y}$

$\boxed{3\sqrt{6y}}$

Example 3. Multiply Radicals
Simplify.

(a) $\sqrt{6} \cdot \sqrt{6}$

$\sqrt{36}$

$\boxed{6}$

(b) $\sqrt{3} \cdot \sqrt{12}$

$\sqrt{36}$

$\boxed{6}$

(c) $3\sqrt{b} \cdot \sqrt{2b^3}$

$3\sqrt{2b^4}$

$3\sqrt{2}\sqrt{b^4}$

$\boxed{3b^2\sqrt{2}}$

(d) $2\sqrt{mn^2} \cdot \sqrt{5m^2}$

$2\sqrt{m^2 mn^2 5}$

$\boxed{2mn\sqrt{5m}}$

Example 4. Use the Quotient Property of Radicals
Simplify.

(a) $\sqrt{\dfrac{25}{49}}$

$\dfrac{\sqrt{25}}{\sqrt{49}} = \boxed{\dfrac{5}{7}}$

(b) $\sqrt{\dfrac{13}{100}}$

$\dfrac{\sqrt{13}}{\sqrt{100}} = \boxed{\dfrac{\sqrt{13}}{10}}$

(c) $\sqrt{\dfrac{7}{x^2}}$

$\dfrac{\sqrt{7}}{\sqrt{x^2}} = \boxed{\dfrac{\sqrt{7}}{x}}$

(d) $\sqrt{\dfrac{11}{d^4}}$

$\dfrac{\sqrt{11}}{\sqrt{d^4}} = \boxed{\dfrac{\sqrt{11}}{d^2}}$

Try It!
Simplify.

(a) $4\sqrt{5} \cdot \sqrt{10}$

$4\sqrt{50}$

$4\sqrt{25}\sqrt{2}$

$\boxed{20\sqrt{2}}$

(b) $\sqrt{6x} \cdot \sqrt{8x}$

$\sqrt{48x^2}$

$\sqrt{16x^2}\sqrt{3}$

$\boxed{4x\sqrt{3}}$

(c) $\sqrt{\dfrac{14}{9}}$

$\dfrac{\sqrt{14}}{\sqrt{9}}$

$\boxed{\dfrac{\sqrt{14}}{3}}$

(d) $\sqrt{\dfrac{x}{81}}$

$\dfrac{\sqrt{x}}{\sqrt{81}}$

$\boxed{\dfrac{\sqrt{x}}{9}}$

<u>Homework</u>

New: Pg. 723 #3-23

Review:
Solve using the Quadratic Formula.

1. $2x^2 + 7x - 3 = 0$

2. $5x^2 - 7x = -1$