Exercise 23

Radicals and Exponents Evaluate each expression.

$$\text{(a)} \ 3\sqrt[3]{16} \qquad\qquad \text{(b)} \ \frac{\sqrt{18}}{\sqrt{81}} \qquad\qquad \text{(c)} \ \sqrt{\frac{27}{4}}$$

Solution

<u>**Part (a)**</u>

Since the root is 3, it takes three 2s to move out of it.

$$3\sqrt[3]{16} = 3\sqrt[3]{2 \times 2 \times 2 \times 2}$$

$$= 3(2)\sqrt[3]{2}$$

$$= 6\sqrt[3]{2}$$

<u>**Part (b)**</u>

The root is 2, so it takes two of the same number to move out of it.

$$\frac{\sqrt{18}}{\sqrt{81}} = \frac{\sqrt{2 \times 3 \times 3}}{\sqrt{9 \times 9}}$$

$$= \frac{3\sqrt{2}}{9}$$

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

<u>**Part (c)**</u>

The root is 2, so it takes two of the same number to move out of it.

$$\sqrt{\frac{27}{4}} = \frac{\sqrt{27}}{\sqrt{4}}$$

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

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