Express as a single power:

a) $\sqrt[5]{32}$ b) $\sqrt[3]{-64}$ c) $\left(\sqrt{144}\right)^{3}$ ← numerator

$32^{\frac{1}{5}}$ $(-64)^{\frac{1}{3}}$ den: $144^{\frac{3}{2}}$

Express as a Radical:

a) $8^{\frac{5}{3}}$ b) $49^{\frac{3}{2}}$ c) $(-125)^{\frac{2}{3}}$

$\left(\sqrt[3]{8}\right)^{5}$ $\left(\sqrt{49}\right)^{3}$ $\left(\sqrt[3]{-125}\right)^{2}$ $\frac{1}{2} = \sqrt{}$

$\sqrt[3]{8^{5}}$

Example 2   **Rewriting Powers in Radical and Exponent Form**

a) Write $40^{\frac{2}{3}}$ in radical form in 2 ways.
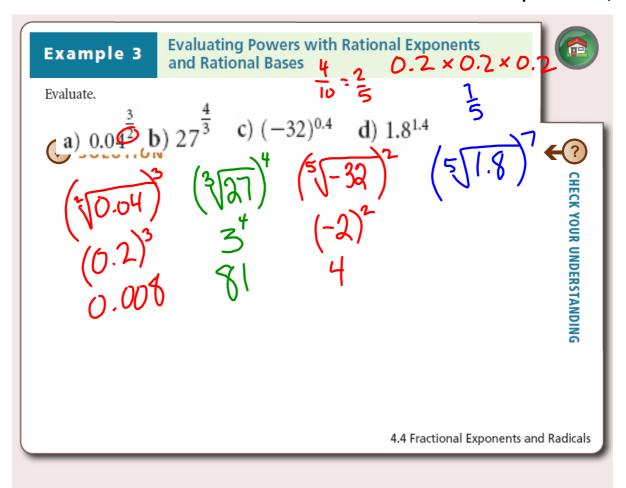b) Write $\sqrt{3^5}$ and $\left(\sqrt[3]{25}\right)^2$ in exponent form.
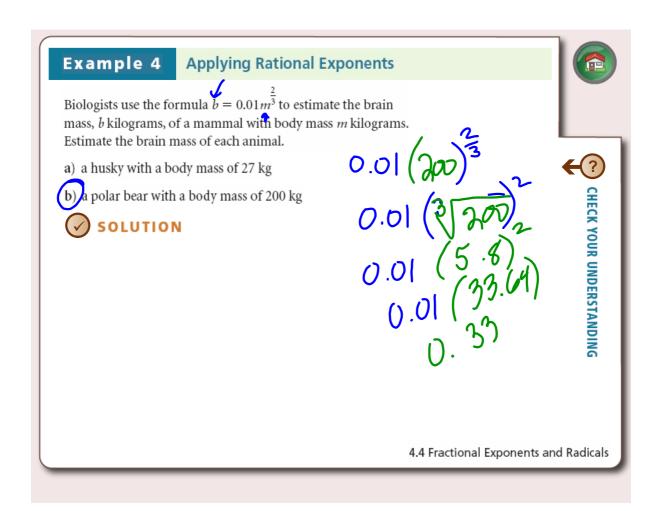
✓ **SOLUTION**

$40^{\frac{2}{3}}$

$\left(\sqrt[3]{40}\right)^{2}$

$\sqrt[3]{40^{2}}$

CHECK YOUR UNDERSTANDING

4.4 Fractional Exponents and Radicals

Example 3 — Evaluating Powers with Rational Exponents and Rational Bases

Evaluate.

$\dfrac{4}{10} = \dfrac{2}{5}$

$0.2 \times 0.2 \times 0.2$

$\dfrac{1}{5}$

a) $0.04^{\frac{3}{2}}$ b) $27^{\frac{4}{3}}$ c) $(-32)^{0.4}$ d) $1.8^{1.4}$

$\left(\sqrt[2]{0.04}\right)^3$ $\left(\sqrt[3]{27}\right)^4$ $\left(\sqrt[5]{-32}\right)^2$ $\left(\sqrt[5]{1.8}\right)^7$

$(0.2)^3$ 3^4 $(-2)^2$

0.008 81 4

4.4 Fractional Exponents and Radicals

Example 4 — Applying Rational Exponents

Biologists use the formula $b = 0.01m^{\frac{2}{3}}$ to estimate the brain mass, b kilograms, of a mammal with body mass m kilograms. Estimate the brain mass of each animal.

a) a husky with a body mass of 27 kg

b) a polar bear with a body mass of 200 kg

✓ SOLUTION

$0.01\left(200\right)^{\frac{2}{3}}$

$0.01\left(\sqrt[3]{200}\right)^2$

$0.01\left(5.8\right)$

$0.01\left(33.64\right)$

0.33

4.4 Fractional Exponents and Radicals

CHECK YOUR UNDERSTANDING

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End of lesson

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#8-16 Skip 13&14
Pg 233
#4-9

Class/Homework :)