Section 7.1: cont'd

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9:28 AM

quotient rule:

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

→ provided that $b \neq 0$ and that all roots are real numbers

simplify:

$$\frac{\sqrt{50}}{\sqrt{2}} = \sqrt{\frac{50}{2}} = \sqrt{25} = 5$$

$$\text{or} = \frac{\sqrt{2 \cdot 25}}{\sqrt{2}} = \frac{5\cancel{\sqrt{2}}}{\cancel{\sqrt{2}}} = 5$$

$$\sqrt[3]{\frac{-27y^{36}}{1000}} = \frac{-3}{10}\sqrt[3]{(y^{12})^3} = \frac{-3y^{12}}{10}$$

$$\sqrt[4]{\frac{x^5 y^4}{z^{12}}} = \sqrt[4]{\frac{x^4 \cdot x \; y^4}{(z^3)^4}} = \frac{xy}{z^3}\sqrt[4]{x}$$

domain of a radical ~~function~~:

we learn about functions

in Math 173

$\cancel{f(x)=}\ \underbrace{\sqrt{2-x}}$

ignore

there are values of x that make the expression under the radical negative

→ result is "not a real number"

domain - set of all x that lead to real numbers for $\sqrt{2-x}$

how to find?

$$2-x \geq 0$$

$$-x \geq -2$$

$$x \leq 2$$

domain:

set-builder notation:

$$\{x \mid x \leq 2\}$$

interval notation: $(-\infty, 2]$

note: only have to worry if taking an <u>even</u> root because taking odd roots of negative numbers gives you reals

examples:

find the domain of $\sqrt[4]{4x-12}$

$$4x-12 \geq 0$$
$$4x \geq 12$$
$$x \geq 3$$

domain: $\{x \mid x \geq 3\}$

$[3, \infty)$

find the domain of $\sqrt[3]{\underbrace{5-4x}}$

all real values of x are okay

domain: $\mathbb{R}$

$(-\infty, \infty)$

only if you insist! $\longrightarrow$ $\{x \mid x \in \mathbb{R}\}$