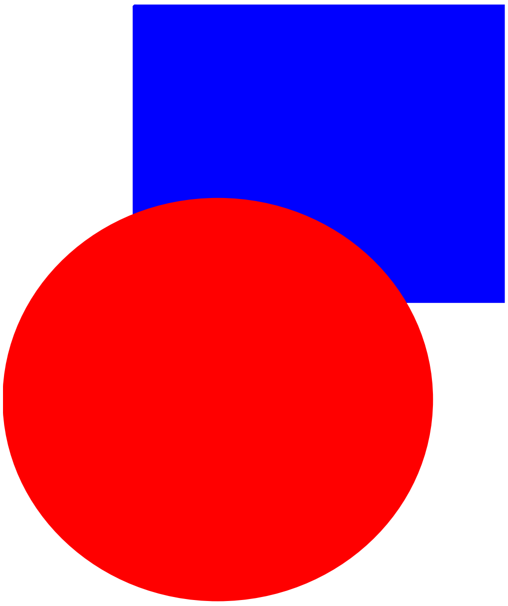
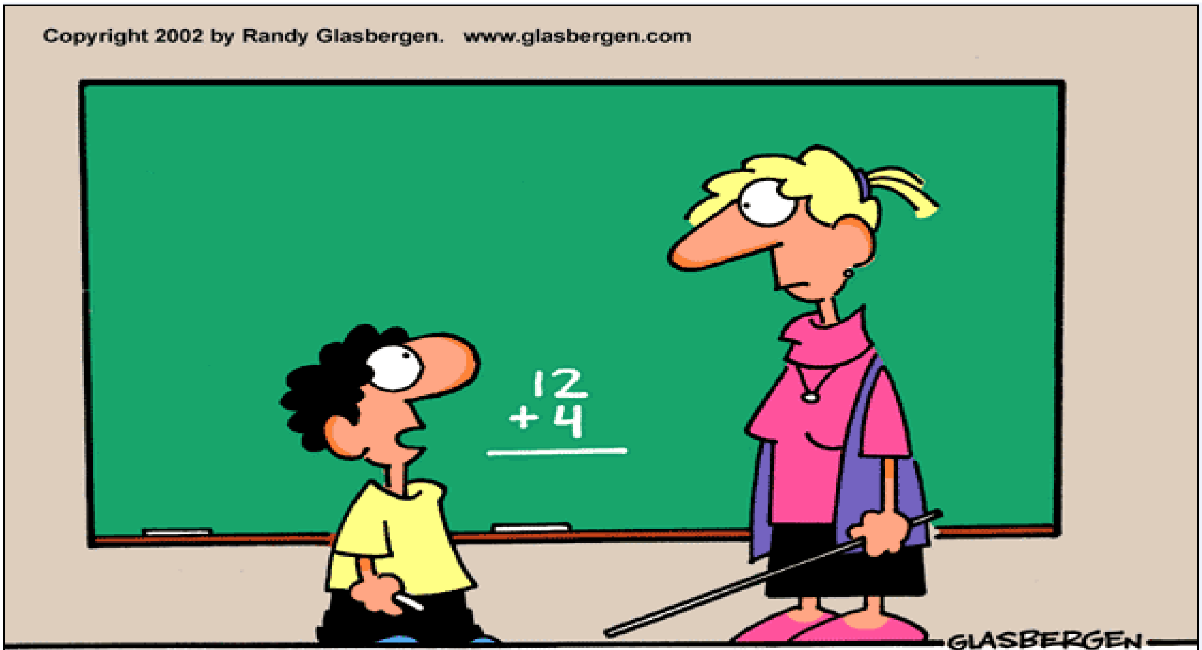
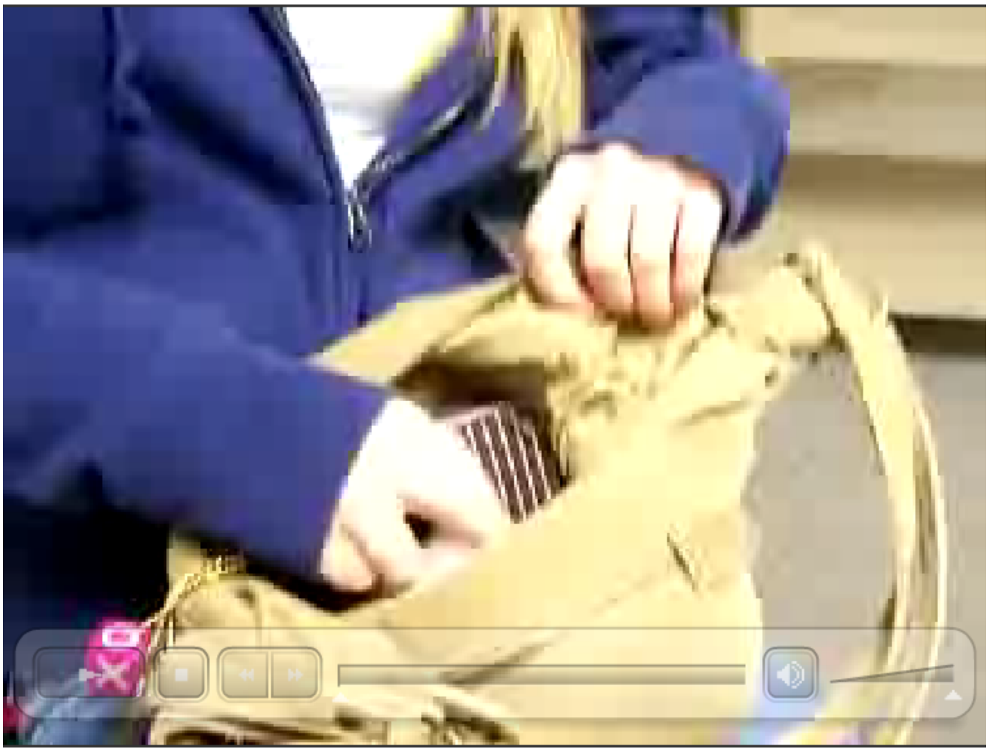


Radicals



"Do I get partial credit for simply having the courage to get out of bed and face the world again today?"



Properties of Radicals

Let a and b be real numbers, variables, or algebraic expressions such that the indicated roots are real numbers, and let m and n be positive integers.

	Property	*Example*
1.	$\sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$	$\sqrt[3]{8^2} = \left(\sqrt[3]{8}\right)^2 = (2)^2 = 4$
2.	$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$	$\sqrt{5} \cdot \sqrt{7} = \sqrt{5 \cdot 7} = \sqrt{35}$
3.	$\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\dfrac{a}{b}}, \quad b \neq 0$	$\dfrac{\sqrt[4]{27}}{\sqrt[4]{9}} = \sqrt[4]{\dfrac{27}{9}} = \sqrt[4]{3}$
4.	$\sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$	$\sqrt[3]{\sqrt[2]{10}} = \sqrt[6]{10}$
5.	$\left(\sqrt[n]{a}\right)^n = a$	$\left(\sqrt{3}\right)^2 = 3$
6.	For n even, $\sqrt[n]{a^n} = \lvert a \rvert$.	$\sqrt{(-12)^2} = \lvert -12 \rvert = 12$
	For n odd, $\sqrt[n]{a^n} = a$.	$\sqrt[3]{(-12)^3} = -12$

$$\sqrt[2]{\underline{16}^3} = \left(\sqrt[2]{\underline{16}}\right)^3 = 64$$

$$\sqrt{75} = \sqrt{\underline{25}}\,\sqrt{3} = 5\sqrt{3}$$

$$\sqrt{\underline{3}} + \sqrt{\underline{2}} \neq$$

index

$\sqrt{25}$

$$\frac{x}{x+2}$$

$$\sqrt[3]{25} = x \cdot x \cdot x$$

$$\sqrt{40} = \sqrt{4}\sqrt{10}$$

$$2\sqrt{10}$$

$$\sqrt[3]{32} = 2\sqrt[3]{4}$$

$\sqrt[3]{8}$ $\sqrt[3]{4}$

$$\sqrt[3]{108x^2y^6z^5}$$

$27 \quad 4 \quad \cancel{y}^3 \; \cancel{y}^3 \quad z^3 \; z^2$

$$3y^2z\sqrt[3]{4x^2z^2}$$

po· wer

$$a^{m/n} = \sqrt[n]{a^m}$$

root

rational exponents

$4^{1/2} = \sqrt[2]{4^1} = 2$

$25^{1/2} = 5$

$32^{2/5} = \sqrt[5]{32}^{2} = 2^{2} = 4$

$$81^{-3/4} = \frac{1}{81^{3/4}} = \frac{1}{\left(\sqrt[4]{81}\right)^{3}} = \frac{1}{27}$$

$$\left(\frac{27}{343}\right)^{-\frac{2}{3}} = \frac{343^{2/3}}{27^{2/3}} = \left(\sqrt[3]{343/3}\right)^{2} = \frac{49}{9}$$

$$2\sqrt{48} - 3\sqrt{27}$$

16 3   9 3

$$8\sqrt{3} - 9\sqrt{3} = -\sqrt{3}$$

Rationalizing the denominator:

$$\frac{6}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{6\sqrt{5}}{5}$$

$$\frac{10}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}} = \frac{10\sqrt[3]{4}}{2}$$

$$\frac{4}{5+\sqrt{13}} \cdot \frac{5-\sqrt{13}}{5-\sqrt{13}} = \frac{20-4\sqrt{13}}{12}$$

$$25 - 13$$

$$= \frac{5-\sqrt{13}}{3}$$

Rationalizing the numerator:

$$\frac{(\sqrt{5} - \sqrt{7})}{2} \cdot \frac{(\sqrt{5} + \sqrt{7})}{\sqrt{5} + \sqrt{7}}$$

$$= \frac{5 - 7}{2(\sqrt{5}+\sqrt{7})} = \frac{-2}{2(\sqrt{5}+\sqrt{7})} = \frac{-1}{\sqrt{5}+\sqrt{7}}$$

HW: pg. 22 #51-56, 61-68,79-82

Know your properties for the tescht_.flv