

## Warm-up

1) Simplify:  $(v^4 - 12v^2 + 8) - 2(v - 1)(v + 1)$

2) Simplify by reducing:  $\frac{p^2 + p}{p - p^3}$

3) Solve:  $(x + 4)(x^2 - 4x + 16) = 63$

$$1) \quad v^4 - 12v^2 + 8 - 2(v^2 - 1)$$

$$v^4 - 12v^2 + 8 - 2v^2 + 2$$

$$v^4 - 14v^2 + 10$$

$$2) \quad \frac{p^2 + p}{p - p^3} = \frac{p(p+1)}{p(1-p^2)} = \frac{p(p+1)}{p(1+p)(1-p)} = \frac{1}{1-p}$$

3)  $(x+4)(x^2 - 4x + 16) = 63$

$$x^3 - 4x^2 + 16x + 4x^2 - 16x + 64 = 63$$

$$x^3 + 64 = 63$$

$$\begin{array}{r} -64 \quad -64 \\ \sqrt{x^3} = \sqrt{-1} \end{array}$$

$$x = -1$$

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# Calc 4 Life

## Section R.7

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### Radicals:

If  $n$  is an even natural number and

$$a > 0, \text{ or } n$$

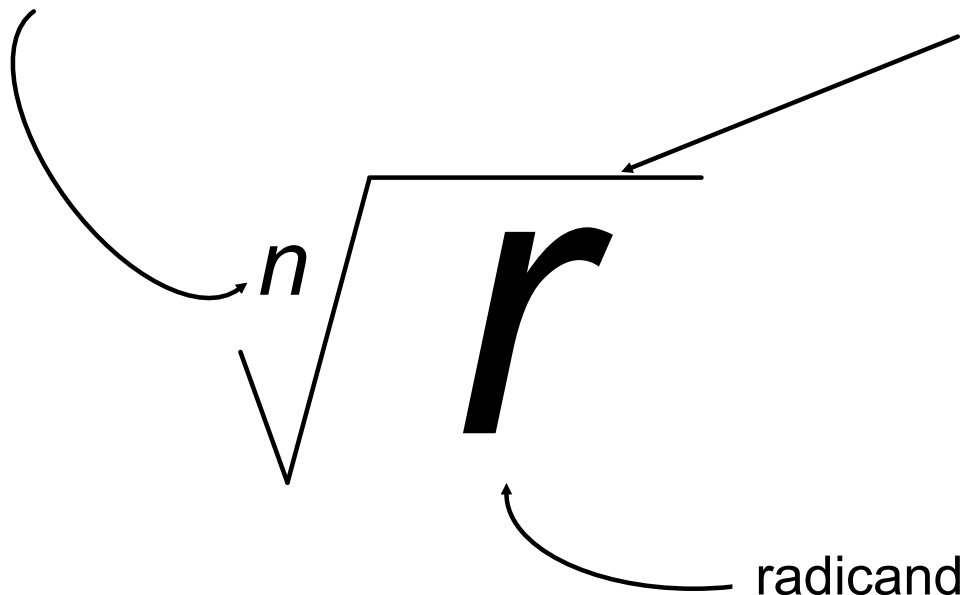
is an odd natural number, then

$$\sqrt[n]{a}$$

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index

radical  
symbol



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$$a) \sqrt[4]{16} = 2$$

$$b) \sqrt[5]{-32} = -2$$

$$c) \sqrt[3]{1000} = 10$$

$$d) \sqrt{\frac{36}{169}} = \frac{6}{13}$$

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### Properties of Radicals

$$1) (\sqrt[n]{a})^n = a \quad \left. \begin{array}{l} 2) \sqrt[n]{a^n} = a \end{array} \right\} a^{n/n} = a^1$$

$$3) \sqrt[n]{a} \sqrt[n]{b} = \sqrt[n]{ab}$$

$$4) \frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$$

$$5) \sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a}$$

$$\downarrow$$

$$(a^{1/n})^{1/m} = a^{1/mn}$$

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Simplifying  
Radicals

a)  $\sqrt{1000} = \sqrt{100} \sqrt{10} = 10\sqrt{10}$

b)  $\sqrt{128} = \sqrt{64} \sqrt{2} = 8\sqrt{2}$

c)  $\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = 4$

d)  $\sqrt[3]{54} = \sqrt[3]{27} \sqrt[3]{2} = 3\sqrt[3]{2}$

e)  $\sqrt{288m^5} \rightarrow \sqrt{144m^4} \sqrt{2m} = 12m^2 \sqrt{2m}$

f)  $2\sqrt{18} - 5\sqrt{98}$

g)  $\sqrt[3]{x^4} \cdot \sqrt[3]{x^5} \rightarrow 2 \cdot \sqrt[3]{9} \sqrt[3]{2} - 5 \cdot \sqrt[3]{49} \sqrt[3]{2}$

$x^{4/3} \cdot x^{5/2}$

$x^{4/3 + 5/2} = x^{8/6 + 15/6} = x^{23/6}$

$x^{23/6} = \sqrt[6]{x^{23}}$

$6\sqrt{2} - 35\sqrt{2} = -29\sqrt{2}$

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## Simplifying by Factoring

$\sqrt{m^2 - 4m + 4}$

$\sqrt{(m-2)(m-2)}$

$\sqrt{(m-2)^2}$

$|m-2|$

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### Rationalizing Denominators

$$\text{a) } \frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

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

$$\text{b) } \frac{2}{\sqrt[3]{x}} \cdot \frac{\sqrt[3]{x^2}}{\sqrt[3]{x^2}}$$

$$\frac{2\sqrt[3]{x^2}}{x}$$

$$\text{c) } \frac{4}{(\sqrt{2}-3)} \cdot \frac{(\sqrt{2}+3)}{(\sqrt{2}+3)}$$

$$\frac{4\sqrt{2}+12}{2-9} = \frac{4\sqrt{2}+12}{-7}$$

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### Rationalizing Numerators

$$\text{a) } \frac{(\sqrt{x}-3)(\sqrt{x}+3)}{(x-9)(\sqrt{x}+3)} = \frac{\cancel{x-9}}{(\cancel{x-9})(\sqrt{x}+3)}$$

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# Homework

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# 1 - 39 odd

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