Geometry 10/12

Warm Up AIMS Web with Calc #2

0-9 Square Roots and Simplifying Radicals

I can evaluate square roots and simplify radical expressions

Radical Expression

an expression that contains a radical symbol such as a square root $\sqrt{\ }$

$\sqrt{25}$ $\sqrt{4x^3}$ $\sqrt[3]{64x^3y^9}$

Radicand

the number or expression under the radical symbol

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A radical expression is in simplest form if:

$\sqrt{25x}$

It contains no perfect square factors other than 1

It contains no fractions

$\sqrt{\frac{1}{4}}$

There are no radicals in the denominator of a fraction

$\frac{2}{\sqrt{16}}$

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Product Property

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

$\sqrt{5} \cdot \sqrt{5}$

$$\sqrt{125} = \sqrt{5} \cdot \sqrt{25}$$

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

$$\sqrt{8} = \sqrt{2} \cdot \sqrt{4}$$

$$= 2\sqrt{2}$$

Quotient Property

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\sqrt{\frac{49}{256}} = \frac{\sqrt{49}}{\sqrt{256}} = \frac{7}{16}$$

$$\sqrt{\frac{169}{25}} = \frac{\sqrt{169}}{\sqrt{25}} = \frac{13}{5}$$

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Rationalize the Denominator

the process of removing a radical expression from the denominator of a fraction

$$\sqrt{\frac{25}{17}} = \frac{\sqrt{25}}{\sqrt{17}} = \frac{5}{\sqrt{17}} \cdot \frac{\sqrt{17}}{\sqrt{17}} = \frac{5\sqrt{17}}{\sqrt{289}} = \frac{5\sqrt{17}}{17}$$

$\sqrt{17 \cdot 17}$

Conjugate

the binomal expression we multiply by to remove the radical expression from the denominator of a fraction.

$p\sqrt{q} + r\sqrt{t}$ and $p\sqrt{q} - r\sqrt{t}$

$$\frac{5}{1+\sqrt{5}} \cdot \frac{1-\sqrt{5}}{1-\sqrt{5}}$$

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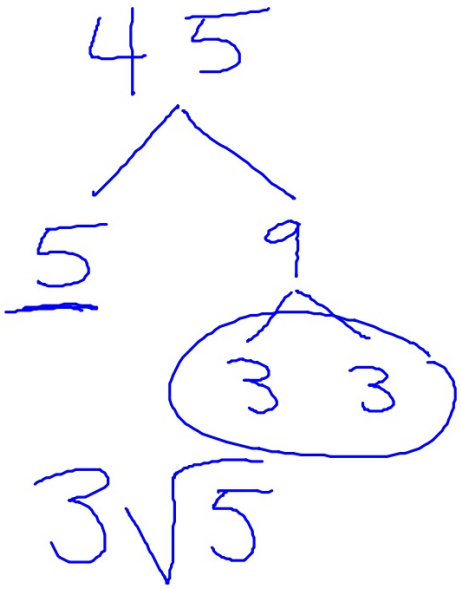
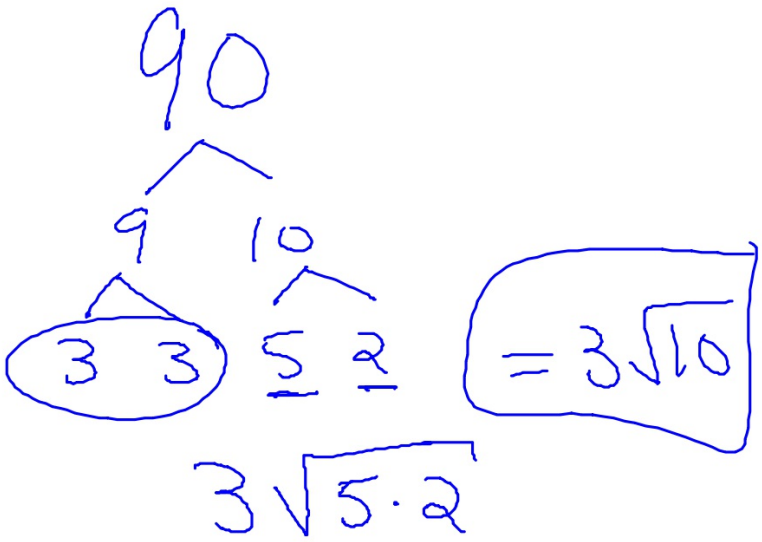
Ex. 1 Simplify

A. $\sqrt{45}$



B. $\sqrt{6} \cdot \sqrt{15}$

$= \sqrt{6 \cdot 15} = \sqrt{90}$



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Ex. 2 Simplify

A. $\sqrt{20x^3y^5z^6}$

$z^6 = (z\cdot z)(z\cdot z)(z\cdot z)$

$z\cdot z\cdot z = z^3$

$= \sqrt{20}\cdot\sqrt{x^3}\cdot\sqrt{y^5}\cdot\sqrt{z^6}$

$x^3 = (x\cdot x)x$

$x\sqrt{x}$

$y^5 = (y\cdot y)(y\cdot y)y$

$y\cdot y\sqrt{y}$

$y^2\sqrt{y}$

20

2 10

2 5

$2\sqrt{5}\cdot x\sqrt{x}\cdot y^2\sqrt{y}\cdot z^3$

$2xy^2z^3\sqrt{5xy}$

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Ex. 3 Simplify

A. $\sqrt{\frac{25}{16}}$

$= \frac{\sqrt{25}}{\sqrt{16}} = \frac{5}{4}$

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Ex. 4 Simplify

A. $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

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

$\frac{2}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

$2 \div \frac{2\sqrt{6}}{2 \div 6} = \frac{\sqrt{6}}{3}$

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Ex. 5 Simplify

A. $\dfrac{3}{5-\sqrt{2}} \cdot \dfrac{5+\sqrt{2}}{5+\sqrt{2}}$

$$\frac{15+3\sqrt{2}}{25-2} = \frac{15+3\sqrt{2}}{23}$$

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Hmwk Pg P20

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$$\frac{5}{6+\sqrt{3}} \cdot \frac{(6-\sqrt{3})}{6-\sqrt{3}} = \frac{30-5\sqrt{3}}{36-3}$$

$$= \frac{30-5\sqrt{3}}{33}$$