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11-6 - Simplifying Radicals.....#

EQ: How do we simplify radicals that include fractions?

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11-6 - Simplifying Radicals

EQ: How do we simplify radicals that include fractions?

**RADICAND**  
- the expression under the radical sign

Name the radicands for each expression

a)  $\sqrt{12x}$       b)  $\sqrt{5x+1} - 4x$

$12$                        $5x+1$

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Review: Simplify each radical expression

1.  $-\sqrt{20}$       2.  $\sqrt{x-5}$

$-\sqrt{4 \cdot 5}$        $x-5$

$-2\sqrt{5}$

3.  $12\sqrt{24m^7n^4}$

$12 \cdot \sqrt{4 \cdot 6 \cdot m^6 \cdot m \cdot n^4}$

$6 \cdot 2$

$24m^3n^2\sqrt{6m}$

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Simplifying radicals with fractions

- \*Check for perfect squares
- \*Simplify fraction if possible (coefficients and variables)
- \*Take the square root of the numerator and denominator separately.

a)  $\sqrt{\frac{32}{2}} = \sqrt{16} = 4$

b)  $\sqrt{\frac{11}{36}} = \frac{\sqrt{11}}{\sqrt{36}} = \frac{\sqrt{11}}{6}$

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Simplify each radical expression

1.  $\frac{\sqrt{7}}{\sqrt{100}} = \frac{\sqrt{7}}{\sqrt{100}} = \frac{\sqrt{7}}{10}$        $\frac{\sqrt{20}}{7} = \frac{2\sqrt{5}}{7}$

2.  $\frac{\sqrt{180}}{\sqrt{49}} = \frac{\sqrt{36 \cdot 5}}{7} = \frac{6\sqrt{5}}{7}$

3.  $\frac{\sqrt{24}}{\sqrt{6}} = \sqrt{\frac{24}{6}} = \sqrt{4} = 2$        $\frac{\sqrt{24} \cdot \sqrt{6}}{\sqrt{6} \cdot \sqrt{6}} = \frac{\sqrt{144}}{6} = \frac{12}{6} = 2$

4.  $\frac{\sqrt{12a}}{\sqrt{3}} = \sqrt{\frac{12a}{3}} = \sqrt{4a} = 2\sqrt{a}$

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Simplify each radical expression

5.  $\frac{\sqrt{8x^{15}}}{\sqrt{36x^4}} = \frac{\sqrt{2x^{12}}}{\sqrt{9}} = \frac{\sqrt{2} \cdot \sqrt{x^{12}}}{3} = \frac{x^6\sqrt{2}}{3}$

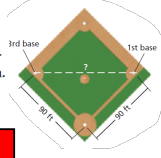
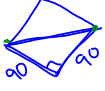
6.  $\frac{\sqrt{x^5}}{\sqrt{4x}} = \frac{\sqrt{x^2}}{\sqrt{4}} \cdot \frac{\sqrt{x^2}}{\sqrt{x}} = \frac{x}{2}$

7.  $\frac{\sqrt{mn}}{\sqrt{4c^6}} = \frac{\sqrt{mn}}{2c^3}$

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**APPLICATION**

A baseball diamond is a square with sides of 90 feet. How far is a throw from third base to first base? Give the answer as a radical expression in simplest form. Then estimate the length to the nearest tenth of a foot.

**[Redacted]**

$$a^2 + b^2 = c^2$$

$$90^2 + 90^2 = c^2$$

$$8100 + 8100 = c^2$$

$$\sqrt{16200} = \sqrt{c^2}$$

$$c = \sqrt{162(100)}$$

$$10\sqrt{162}$$

$$10\sqrt{(81)2}$$

$$10 \cdot 9\sqrt{2} \quad \boxed{90\sqrt{2} \text{ ft.}}$$

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Assignment

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6.  $3x\sqrt{\frac{x^7}{121}}$

3.  $\sqrt{\frac{25x^9}{49x^3}}$

9.  $\sqrt{\frac{27n}{100n^{17}}}$

5.  $6n\sqrt{\frac{5n^7}{45}}$

3.  $12\sqrt{24m^7n^4}$

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