

Simplifying Radicals

Simplify.

1) $\sqrt{18}$

2) $\sqrt{256}$

3) $6\sqrt{108}$

4) $-\sqrt{32}$

5) $\sqrt{18x}$

6) $\sqrt{50k^2}$

7) $5\sqrt{252x^2y^2}$

8) $3\sqrt{125u^3v}$

9) $5\sqrt{125x^3y^2}$

10) $-3\sqrt{75a^3b^4}$

Geometry Notes: Simplifying Radicals

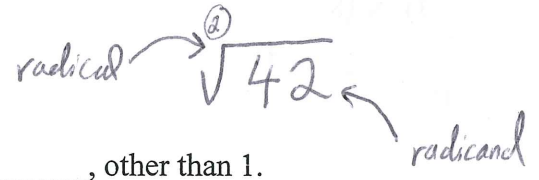
Date: Aug 20, 2015 (Thurs)

Key

Essential Question 1: How do you simplify a radical?

Essential Question 2: How do you add, subtract, or multiply radicals?

A square root of a number is a value such that the square of it with itself is the number. The symbol $\sqrt{\quad}$ is called a radical and it indicates the positive square root of a number. The number inside the symbol is called the radicand.



A radical expression is simplified when ...

- ... the radicand has no square factors, other than 1.
 Not OK: $\sqrt{24}$ OK: $2\sqrt{6}$
- ... no radicals are in the denominator of a fraction.
 Not OK: $\frac{1}{\sqrt{2}}$ OK: $\frac{\sqrt{2}}{2}$

Do NOT use a calculator and get a decimal for a square root.

To simplify square roots, we need to be able to recognize perfect squares.

Example 1: Find the following squares.

a. $1^2 = 1$	b. $2^2 = 4$	c. $3^2 = 9$
d. $4^2 = 16$	e. $5^2 = 25$	f. $6^2 = 36$
g. $7^2 = 49$	h. $8^2 = 64$	i. $9^2 = 81$
j. $10^2 = 100$	k. $11^2 = 121$	l. $12^2 = 144$ m. $13^2 = 169$

Example 2: Simplify the following perfect square radical expressions.

a. $\sqrt{81} = 9$ b. $\sqrt{49} = 7$ c. $\sqrt{169} = 13$

Example 3: Find the largest perfect square factor of the radicands to simplify.

a. $\sqrt{54} = 3\sqrt{6}$ b. $5\sqrt{24} = 10\sqrt{6}$ c. $\sqrt{98b^4c^3} = 7b^2c\sqrt{2c}$ d. $2x\sqrt{27x^3y^2} = 6x^2y\sqrt{3x}$

Example 4: Find the largest perfect square factor of the radicands to simplify.

i. $\sqrt{48} = 4\sqrt{3}$ b. $5\sqrt{68} = 10\sqrt{17}$ c. $\sqrt{50b^7c^8} = 5b^3c^4\sqrt{2b}$ d. $3y\sqrt{18x^5y^9} = 9x^2y^5\sqrt{2xy}$

* Find largest perfect square that can go into the radicand

Geometry

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Name _____

Simplifying Radicals

Date _____ Period _____

Simplify.

1) $\frac{\sqrt{18}}{3\sqrt{2}}$ $\sqrt{9 \cdot 2} = 3\sqrt{2}$

2) $\frac{\sqrt{256}}{16} = 16$

1	25	81
4	36	100
9	49	121
16	64	144
		169

3) $\frac{6\sqrt{108}}{36\sqrt{3}}$ $6 \cdot \sqrt{36 \cdot 3}$
 $\sqrt{36 \cdot 3} = 6\sqrt{3}$

4) $\frac{-\sqrt{32}}{-4\sqrt{2}} = -4\sqrt{2}$

5) $\frac{\sqrt{18x}}{3\sqrt{2x}}$ $\sqrt{9 \cdot 2x}$
 $\sqrt{9 \cdot 2x} = 3\sqrt{2x}$

6) $\frac{\sqrt{50k^2}}{5k\sqrt{2}}$ $\sqrt{25 \cdot 2k^2}$
 $5\sqrt{2k^2} = 5k\sqrt{2}$

7) $\frac{5\sqrt{252x^2y^2}}{30xy\sqrt{7}}$ $5 \sqrt{36 \cdot 7x^2y^2}$
 $5 \cdot 6 \cdot x \cdot y \sqrt{7} = 30xy\sqrt{7}$

8) $\frac{3\sqrt{125u^3v}}{15u\sqrt{5uv}}$ $3 \sqrt{25 \cdot 5u^3v}$ $\sqrt[3]{125}$
 $3 \cdot 5u \sqrt{5uv} = 15u\sqrt{5uv}$

9) $\frac{5\sqrt{125x^3y^2}}{25xy\sqrt{5x}}$ $30xy\sqrt{7}$

10) $\frac{-3\sqrt{75a^3b^4}}{-15b^2a\sqrt{3a}}$ $\sqrt[3]{125}$ $\sqrt[2]{16}$

$5 \cdot \sqrt{25 \cdot 5x^3y^2}$
 $5 \cdot 5 \sqrt{5x^3y^2}$
 $25xy\sqrt{5x}$

$-3 \sqrt{25 \cdot 3a^3b^4}$
 $-3 \cdot 5 \cdot a \cdot b^2 \sqrt{3a}$
 $-15ab^2\sqrt{3a}$