Geometry Notes: Operations involving Radicals **Date: Aug 21, 2015 (Fri)**

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

The Product Property of Radicals states that ____.

Example 5: Simplify.

a. $4\sqrt{2} \times 5\sqrt{6}$ b. $\sqrt{18d^3} \times \sqrt{2d}$ c. $\sqrt{3}\left(8 + 2\sqrt{15}\right)$

d. $\sqrt{5x^3} \cdot \sqrt{15x^2}$

The Quotient Property of Radicals states that ____.

If there is a radical in the denominator, you must ____.

Example 6: Simplify.

a. $\sqrt{\frac{4}{9}}$ b. $\sqrt{\frac{16}{3}}$ c. $\frac{5}{\sqrt{18}}$

d. $\frac{2}{\sqrt{32}}$

If terms have the same radicand, then they can be simplified by addition or subtraction of their

_________________________.

Example 4: Simplify.

a. $4\sqrt{2} - \sqrt{2}$ b. $6\sqrt{12} + \sqrt{9}$

c. $5\sqrt{7} - 3\sqrt{2} + 2\sqrt{7}$ d. $4\sqrt{18} + 6\sqrt{12} - 7\sqrt{32}$

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Multiplying with Radicals

Date________________ Period____

Simplify.

1) $\sqrt{2} \cdot \sqrt{4}$

2) $\sqrt{12} \cdot \sqrt{3}$

3) $\sqrt{12} \cdot \sqrt{20}$

4) $\sqrt{6} \cdot \sqrt{2}$

5) $3\sqrt{20} \cdot 5\sqrt{5}$

6) $\sqrt{2} \cdot 4\sqrt{10}$

7) $4\sqrt{20a^3} \cdot \sqrt{10a^2}$

8) $-5\sqrt{6m^3} \cdot 3\sqrt{6m^3}$

9) $2\sqrt{2b^3} \cdot -2\sqrt{6b^2}$

10) $\sqrt{15}(\sqrt{5} - 5\sqrt{2})$

11) $5\sqrt{5}(3\sqrt{6} + \sqrt{2})$

12) $\sqrt{5}(3a^2 + \sqrt{10a})$

Geometry Notes: Operations involving Radicals $\boxed{\text{Key}}$ **Date: Aug 21, 2015 (Fri)**

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

*combine outside with outside
*combine inside with inside

The Product Property of Radicals states that $\sqrt{a}\cdot\sqrt{b}=\sqrt{ab}$.

Example 5: Simplify.

a. $4\sqrt{2}\times 5\sqrt{6}$

$20\sqrt{12}$

b. $\sqrt{18d^3}\times\sqrt{2d}$

$\sqrt{36d^4}$ $6d^2$

c. $1\sqrt{3}(8+2\sqrt{15})$

$8\sqrt{3}+2\sqrt{45}$

$8\sqrt{3}+2\sqrt{9\cdot 5}$

$\boxed{8\sqrt{3}+6\sqrt{5}}$

d. $\sqrt{5x^3}\cdot\sqrt{15x^2}$

$\sqrt{75x^5}$ $2\overline{)5}$ 2 R 1

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

The Quotient Property of Radicals states that ______________________________.

If there is a radical in the denominator, you must ______________________________.

Example 6: Simplify.

a. $\sqrt{\frac{4}{9}}$

b. $\sqrt{\frac{16}{3}}$

c. $\frac{5}{\sqrt{18}}$

d. $\frac{2}{\sqrt{32}}$

If terms have the same radicand, then they can be simplified by addition or subtraction of their ____________________.

Example 4: Simplify.

a. $4\sqrt{2}-\sqrt{2}$

b. $6\sqrt{12}+\sqrt{9}$

c. $5\sqrt{7}-3\sqrt{2}+2\sqrt{7}$

d. $4\sqrt{18}+6\sqrt{12}-7\sqrt{32}$

Geometry Name________________________________ ID: 1

Multiplying with Radicals

Date________________ Period____

Simplify.

1) $\sqrt{2} \cdot \sqrt{4}$

$2\sqrt{2}$

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

$\boxed{2\sqrt{2}}$

2) $\sqrt{12} \cdot \sqrt{3}$

6

$\sqrt{36} = \boxed{6}$

3) $\sqrt{12} \cdot \sqrt{20}$

$4\sqrt{15}$

$\sqrt{4 \cdot 3} \cdot \sqrt{4 \cdot 5}$

$2\sqrt{3} \cdot 2\sqrt{5}$

$\boxed{4\sqrt{15}}$

4) $\sqrt{6} \cdot \sqrt{2}$

$2\sqrt{3}$

$= \sqrt{12}$

$= \sqrt{4 \cdot 3}$

$2\sqrt{3}$

5) $3\sqrt{20} \cdot 5\sqrt{5}$

150

$3\sqrt{5 \cdot 4} \cdot 5\sqrt{5}$

2

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

$30\sqrt{25} = \boxed{150}$

6) $\sqrt{2} \cdot 4\sqrt{10}$

$8\sqrt{5}$

$4\sqrt{20}$

$4\sqrt{4 \cdot 5}$

2

$8\sqrt{5}$

7) $4\sqrt{20a^3} \cdot \sqrt{10a^2}$

$40a^2\sqrt{2a}$

2R1

$2\sqrt{5}$

$4\sqrt{200a^5}$

$4\sqrt{100 \cdot 2a^5}$

a 10

$\boxed{40a^2\sqrt{2a}}$

8) $-5\sqrt{6m^3} \cdot 3\sqrt{6m^3}$

$-90m^3$

$-15\sqrt{36m^6}$

$-15 \cdot 6m^3 = \boxed{-90m^3}$

9) $2\sqrt{2b^3} \cdot -2\sqrt{6b^2}$

$-8b^2\sqrt{3b}$

$-4\sqrt{12b^5}$

$-4\sqrt{4 \cdot 3b^5}$

2

$\boxed{-8b^2\sqrt{3b}}$

10) $\sqrt{15}(\sqrt{5} - 5\sqrt{2})$

$5\sqrt{3} - 5\sqrt{30}$

$\sqrt{75} - 5\sqrt{30}$

$\sqrt{25 \cdot 3} - 5\sqrt{30}$

$\boxed{5\sqrt{3} - 5\sqrt{30}}$

11) $5\sqrt{5}(3\sqrt{6} + \sqrt{2})$

$15\sqrt{30} + 5\sqrt{10}$

$15\sqrt{30} + 5\sqrt{10}$

12) $\sqrt{5}(3a^2 + \sqrt{10a})$

$3a^2\sqrt{5} + 5\sqrt{2a}$

$3\sqrt{5}a^2 + \sqrt{50a}$

$\sqrt{25a \cdot 2}$

$\boxed{3a^2\sqrt{5} + 5\sqrt{2a}}$