

P.3.6 Rationalizing Denominators & Conjugates

Date _____ Period _____

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1) NOTES: _____ involves rewriting a radical expression as an equivalent expression in which the _____ no longer contains any radicals.

If the denominator consists of the square root of a natural number that is not a perfect square, _____ the numerator and the denominator by the _____ number that produces the square root of a perfect square in the denominator.

Simplify.

2) $\frac{5}{\sqrt{5}}$

3) $-\frac{6}{\sqrt{2}}$

4) $\frac{6}{\sqrt{3}}$

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

6) $\frac{2}{\sqrt{7}}$

7) $\frac{7}{\sqrt{6}}$

8) $\frac{4}{\sqrt{5}}$

9) $\frac{4}{\sqrt{6}}$

10) $\frac{7}{\sqrt{5}}$

11) $-\frac{4}{\sqrt{7}}$

12) NOTES: Radical expressions that involve the sum and difference of the _____ are called conjugates. Conjugates are used to rationalize denominators because the product of such a pair contains no _____.

Multiplying Conjugates:

$$(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) = (\sqrt{a})^2 - (\sqrt{b})^2 = a - b$$

Simplify.

13) $(\sqrt{5} + 1)(\sqrt{5} - 1)$

14) $(\sqrt{2} + 5)(\sqrt{2} - 5)$

15) $(\sqrt{2} + 3)(\sqrt{2} - 3)$

16) $(\sqrt{5} + 4)(\sqrt{5} - 4)$

17) $(\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5})$

18) $(\sqrt{2} + \sqrt{7})(\sqrt{2} - \sqrt{7})$

19) NOTES: To rationalize a denominator containing two terms with one or more square roots,
_____ the numerator and the denominator by the _____ of the denominator.

Simplify.

20) $\frac{2}{5 - \sqrt{2}}$

21) $\frac{5}{3 + 4\sqrt{3}}$

22) $\frac{2}{3 - \sqrt{5}}$

23) $\frac{5}{4 - \sqrt{2}}$

24) $\frac{3}{\sqrt{2} + \sqrt{5}}$

25) $\frac{4}{-2 - \sqrt{2}}$

26) $\frac{3}{3 - 2\sqrt{3}}$

27) $\frac{5}{-4 + \sqrt{5}}$

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- 1) NOTES: _____ involves rewriting a radical expression as an equivalent expression in which the _____ no longer contains any radicals.

If the denominator consists of the square root of a natural number that is not a perfect square, _____ the numerator and the denominator by the _____ number that produces the square root of a perfect square in the denominator.

Rationalizing the denominator; multiply; smallest

Simplify.

$$2) \frac{5}{\sqrt{5}}$$

$$\sqrt{5}$$

$$3) -\frac{6}{\sqrt{2}}$$

$$-3\sqrt{2}$$

$$4) \frac{6}{\sqrt{3}}$$

$$2\sqrt{3}$$

$$5) \frac{2}{\sqrt{3}} \frac{2\sqrt{3}}{3}$$

$$6) \frac{2}{\sqrt{7}} \frac{2\sqrt{7}}{7}$$

$$7) \frac{7}{\sqrt{6}} \frac{7\sqrt{6}}{6}$$

$$8) \frac{4}{\sqrt{5}} \frac{4\sqrt{5}}{5}$$

$$9) \frac{4}{\sqrt{6}} \frac{2\sqrt{6}}{3}$$

$$10) \frac{7}{\sqrt{5}}$$

$$\frac{7\sqrt{5}}{5}$$

$$11) -\frac{4}{\sqrt{7}} -\frac{4\sqrt{7}}{7}$$

- 12) NOTES: Radical expressions that involve the sum and difference of the _____ are called conjugates. Conjugates are used to rationalize denominators because the product of such a pair contains no _____.

same two terms; radicals

Multiplying Conjugates:

$$(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b}) = (\sqrt{a})^2 - (\sqrt{b})^2 = a - b$$

Simplify.

$$13) (\sqrt{5} + 1)(\sqrt{5} - 1)$$

$$4$$

$$14) (\sqrt{2} + 5)(\sqrt{2} - 5)$$

$$-23$$

15) $(\sqrt{2} + 3)(\sqrt{2} - 3)$

 -7

16) $(\sqrt{5} + 4)(\sqrt{5} - 4)$

 -11

17) $(\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5})$

 -2

18) $(\sqrt{2} + \sqrt{7})(\sqrt{2} - \sqrt{7})$

 -5

19) NOTES: To rationalize a denominator containing two terms with one or more square roots,
 _____ the numerator and the denominator by the _____ of the denominator.

multiply; conjugate**Simplify.**

20) $\frac{2}{5 - \sqrt{2}}$

$\frac{10 + 2\sqrt{2}}{23}$

21) $\frac{5}{3 + 4\sqrt{3}} \frac{-15 + 20\sqrt{3}}{39}$

22) $\frac{2}{3 - \sqrt{5}}$

$\frac{3 + \sqrt{5}}{2}$

23) $\frac{5}{4 - \sqrt{2}} \frac{20 + 5\sqrt{2}}{14}$

24) $\frac{3}{\sqrt{2} + \sqrt{5}}$

$-\sqrt{2} + \sqrt{5}$

25) $\frac{4}{-2 - \sqrt{2}}$

$-4 + 2\sqrt{2}$

26) $\frac{3}{3 - 2\sqrt{3}}$

$-3 - 2\sqrt{3}$

27) $\frac{5}{-4 + \sqrt{5}} \frac{-20 - 5\sqrt{5}}{11}$