

Math Sheet

Name _____ Score _____ / 8 Teacher _____ Date _____

Divide Radical Expressions

Simplify and rationalize each denominator.

1.
$$\frac{1}{5\sqrt{7}}$$

2.
$$\frac{6}{6 - 1\sqrt{5}\cdot x}$$

Domain: variables are positive $x > 0$ $6 - 1\sqrt{5}\cdot x \neq 0$

3.
$$\frac{1 + 5\sqrt{6}}{1 + 4\sqrt{6}}$$

Domain: real variables $1 + 4\sqrt{6} \neq 0$

4.
$$\frac{4}{\sqrt{5}\cdot x}$$

Domain: variables are positive $x > 0$

5.
$$\frac{1}{1 + 2\sqrt{5}}$$

Domain: real variables $1 + 2\sqrt{5} \neq 0$

6.
$$\frac{2 + \sqrt{7}\cdot x}{2 - 1\sqrt{7}\cdot x}$$

Domain: variables are positive $x > 0$ $2 - 1\sqrt{7}\cdot x \neq 0$

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Simplify and rationalize each denominator.

7.
$$\frac{1}{3\sqrt{6}}$$

8.
$$\frac{4 + \sqrt{7 \cdot x}}{6 \cdot \sqrt{7 \cdot x}}$$

Domain: variables are positive $x > 0$

Divide Radical Expressions

Answer Key

Simplify and rationalize each denominator.

1. $\frac{1}{5\sqrt{7}}$

Work:

$$\frac{1}{5\sqrt{7}} = \frac{1\sqrt{7}}{5\sqrt{7}\sqrt{7}}$$

$$\frac{1\sqrt{7}}{5\sqrt{7}\sqrt{7}} = \frac{1\sqrt{7}}{35}$$

$$\frac{1\sqrt{7}}{35} = \frac{1}{35}\sqrt{7}$$

2. $\frac{6}{6 - 1\sqrt{5}\cdot x}$

Domain: variables are positive $x > 0$ $6 - 1\sqrt{5}\cdot x \neq 0$

Work:

$$\frac{6}{6 - 1\sqrt{5}\cdot x} = \frac{6(6 + \sqrt{5}\cdot x)}{(6 - 1\sqrt{5}\cdot x)(6 + \sqrt{5}\cdot x)}$$

$$\frac{6(6 + \sqrt{5}\cdot x)}{(6 - 1\sqrt{5}\cdot x)(6 + \sqrt{5}\cdot x)} = \frac{36 + 6\sqrt{5}\cdot x}{36 - 5\cdot x}$$

$$\frac{36 + 6\sqrt{5}\cdot x}{36 - 5\cdot x} = \frac{36 + 6\sqrt{5}\cdot x}{36 - 5\cdot x}$$

3. $\frac{1 + 5\sqrt{6}}{1 + 4\sqrt{6}}$

Domain: real variables $1 + 4\sqrt{6} \neq 0$

Work:

$$\frac{1 + 5\sqrt{6}}{1 + 4\sqrt{6}} = \frac{(1 + 5\sqrt{6})(1 - 4\sqrt{6})}{(1 + 4\sqrt{6})(1 - 4\sqrt{6})}$$

$$\frac{(1 + 5\sqrt{6})(1 - 4\sqrt{6})}{(1 + 4\sqrt{6})(1 - 4\sqrt{6})} = \frac{-119 + \sqrt{6}}{-95}$$

$$\frac{-119 + \sqrt{6}}{-95} = \frac{119 - 1\sqrt{6}}{95}$$

4. $\frac{4}{\sqrt{5}\cdot x}$

Domain: variables are positive $x > 0$

Work:

$$\frac{4}{\sqrt{5}\cdot x} = \frac{4\sqrt{5}\cdot x}{\sqrt{5}\cdot x\sqrt{5}\cdot x}$$

$$\frac{4\sqrt{5}\cdot x}{\sqrt{5}\cdot x\sqrt{5}\cdot x} = \frac{4\sqrt{5}\cdot x}{5\cdot x}$$

$$\frac{4\sqrt{5}\cdot x}{5\cdot x} = \frac{4\sqrt{5}\cdot x}{5\cdot x}$$

5. $\frac{1}{1 + 2\sqrt{5}}$

Domain: real variables $1 + 2\sqrt{5} \neq 0$

Work:

$$\frac{1}{1 + 2\sqrt{5}} = \frac{1(1 - 2\sqrt{5})}{(1 + 2\sqrt{5})(1 - 2\sqrt{5})}$$

$$\frac{1(1 - 2\sqrt{5})}{(1 + 2\sqrt{5})(1 - 2\sqrt{5})} = \frac{1 - 2\sqrt{5}}{-19}$$

$$\frac{1 - 2\sqrt{5}}{-19} = \frac{-1 + 2\sqrt{5}}{19}$$

6. $\frac{2 + \sqrt{7}\cdot x}{2 - 1\sqrt{7}\cdot x}$

Domain: variables are positive $x > 0$ $2 - 1\sqrt{7}\cdot x \neq 0$

Work:

$$\frac{2 + \sqrt{7}\cdot x}{2 - 1\sqrt{7}\cdot x} = \frac{(2 + \sqrt{7}\cdot x)(2 + \sqrt{7}\cdot x)}{(2 - 1\sqrt{7}\cdot x)(2 + \sqrt{7}\cdot x)}$$

$$\frac{(2 + \sqrt{7}\cdot x)(2 + \sqrt{7}\cdot x)}{(2 - 1\sqrt{7}\cdot x)(2 + \sqrt{7}\cdot x)} = \frac{4 + 7\cdot x + 4\sqrt{7}\cdot x}{4 - 7\cdot x}$$

$$\frac{4 + 7\cdot x + 4\sqrt{7}\cdot x}{4 - 7\cdot x} = \frac{4 + 7\cdot x + 4\sqrt{7}\cdot x}{4 - 7\cdot x}$$

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Answer Key

Simplify and rationalize each denominator.

7. $\frac{1}{3\sqrt{6}}$

Work:

$$\frac{1}{3\sqrt{6}} = \frac{1\sqrt{6}}{3\sqrt{6}\sqrt{6}}$$

$$\frac{1\sqrt{6}}{3\sqrt{6}\sqrt{6}} = \frac{1\sqrt{6}}{18}$$

$$\frac{1\sqrt{6}}{18} = \frac{1}{18}\sqrt{6}$$

8. $\frac{4 + \sqrt{7 \cdot x}}{6\sqrt{7 \cdot x}}$

Domain: variables are positive $x > 0$

Work:

$$\frac{4 + \sqrt{7 \cdot x}}{6\sqrt{7 \cdot x}} = \frac{(4 + \sqrt{7 \cdot x}) \cdot \sqrt{7 \cdot x}}{6\sqrt{7 \cdot x} \cdot \sqrt{7 \cdot x}}$$

$$\frac{(4 + \sqrt{7 \cdot x}) \cdot \sqrt{7 \cdot x}}{6\sqrt{7 \cdot x} \cdot \sqrt{7 \cdot x}} = \frac{4\sqrt{7 \cdot x} + 7 \cdot x}{42 \cdot x}$$

$$\frac{4\sqrt{7 \cdot x} + 7 \cdot x}{42 \cdot x} = \frac{4\sqrt{7 \cdot x} + 7 \cdot x}{42 \cdot x}$$