Which of these are rational numbers?

Rational numbers are any number that can be written as a fraction (ratio of two integers).

1. 12.8
2. $\sqrt{25}$
3. $\sqrt{3}$
4. $\frac{19}{7}$

If a real number isn't rational it is Irrational

Simplify each.

1. $\sqrt{5} \cdot \sqrt{5} = 5$

$= \sqrt{5 \cdot 5}$

$= \sqrt{25}$

2. $3\sqrt{7} \cdot 4\sqrt{7}$

$3 \cdot 4 \cdot \sqrt{7} \cdot \sqrt{7}$

$3 \cdot 4 \cdot 7$

$12 \cdot 7$

$= 84$

3. $\sqrt{8} \cdot \sqrt{2}$

$\sqrt{8 \cdot 2}$

$\sqrt{16}$

$= 4$

Sec 7-2: Rationalizing Denominators of Radical Expressions

To rationalize a denomintor means to remove any irrational number from the denominator.

Rationalize each denominator and simplify. Assume all variables are positive.

1. $\frac{2}{\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}}$

$= \frac{2\sqrt{11}}{11}$

2. $\frac{10}{\sqrt{6w}} \cdot \frac{\sqrt{6w}}{\sqrt{6w}}$

$= \frac{10\sqrt{6w}}{6w} = \frac{5\sqrt{6w}}{3w}$

Rationalize each denominator and simplify.

$\frac{7}{\sqrt{8}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{7\sqrt{2}}{4}$

$\sqrt{16} = 4$

$\frac{10}{\sqrt{12}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$ → $\sqrt{36} = 6$

$= \frac{10\sqrt{3}}{6} = \frac{5\sqrt{3}}{3}$

$\frac{1}{\sqrt[3]{25}} = \frac{1}{\sqrt[3]{5^2}} \cdot \frac{\sqrt[3]{5}}{\sqrt[3]{5}} = \frac{1 \cdot \sqrt[3]{5}}{\sqrt[3]{5^3}} = \frac{\sqrt[3]{5}}{5}$

Rationalize each denominator and simplify.

$$\frac{3}{\sqrt[3]{7}} \cdot \frac{\sqrt[3]{7^2}}{\sqrt[3]{7^2}} \to \sqrt[3]{7^3}$$

$$= \frac{3\sqrt[3]{7^2}}{7}$$

$$\frac{15}{\sqrt[5]{36}} \cdot \frac{\sqrt[5]{6^3}}{\sqrt[5]{6^3}} \to \sqrt[5]{6^5}$$

$$\sqrt[5]{36} = 6^2$$

$$= \frac{15\sqrt[5]{6^3}}{6}$$

$$= \frac{5\sqrt[5]{6^3}}{2}$$