

## Unit 4: Radical Expressions & Equations

### 4.1 Rational Exponents & The Real Number System

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#### Connecting Rational Exponents and Radicals

We can use our exponent laws to deal with rational exponents, but what do they mean?

$$\left(25^{\frac{1}{2}}\right)\left(25^{\frac{1}{2}}\right) =$$

What else when multiplied by itself gives a product of 25? \_\_\_\_\_

What is the relationship between  $25^{\frac{1}{2}}$  and 5?

Label:  $\sqrt[n]{x}$

#### Rational Exponent Law:

**Ex.** Express each power as an equivalent radical. Evaluate where possible.

a)  $64^{\frac{1}{2}}$

b)  $16^{\frac{3}{4}}$

c)  $(8x^2)^{\frac{1}{3}}$

**Ex.** Express each radical as a power with a rational exponent.

a)  $\sqrt[4]{5^3}$

b)  $(\sqrt[n]{27^2})$

c)  $(\sqrt{s^3})$

**Ex.** Simplify and evaluate where possible.

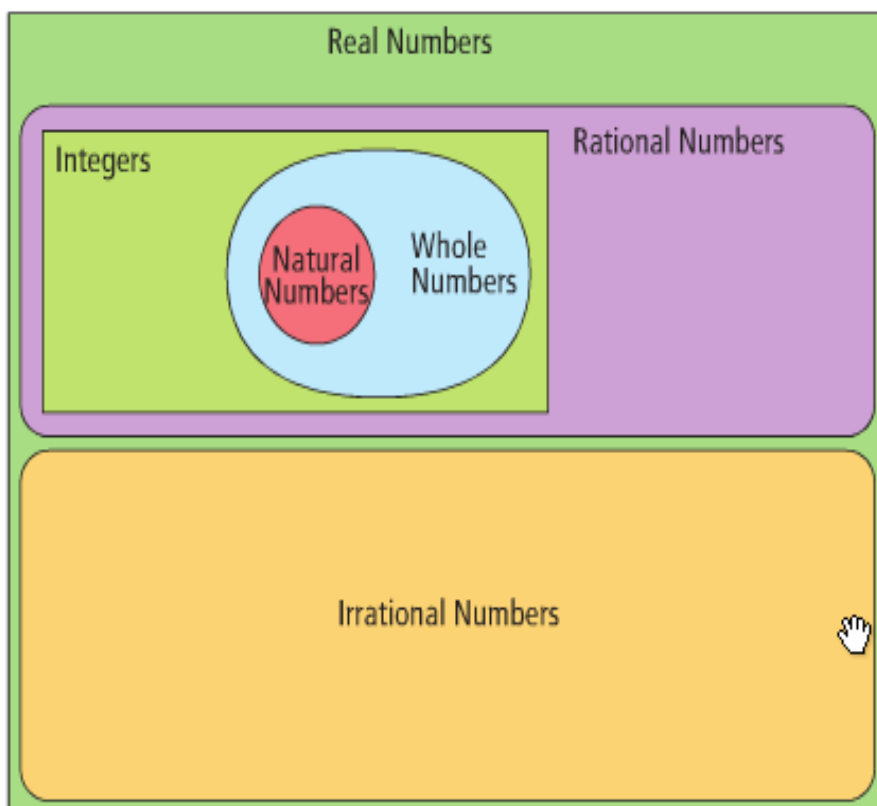
a)  $(27x^6)^{\frac{2}{3}}$

b)  $\left[\left(x^{\frac{4}{3}}\right)\left(x^{\frac{1}{3}}\right)\right]^9$

c)  $\left(\frac{x^3}{64}\right)^{-\frac{2}{3}}$

### Number Sets:

Place the letter corresponding with the correct description in the appropriate area on the diagram.



A.

Examples include  $\pi$  &  $\sqrt{2}$

B.

Examples include  
 $0.3, \frac{4}{5},$  &  $\sqrt{25}$

C.

$1, 2, 3, \dots$

D.

$\dots -3, -2, -1, 0, 1, 2, 3 \dots$

E.

$0, 1, 2, 3, \dots$

F.

All rational & irrational  
numbers



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