

Math 365 Lecture Notes Section 6.6 – Real Numbers

★ Irrational Numbers

Definition

1) Irrational Numbers –

examples -

2) Pythagorean Theorem -

3) The Real Numbers –

How would you plot an irrational number (like $\sqrt{2}$) on a number line?

★ Simplifying Radicals

$$\longrightarrow \sqrt[n]{x^m} = x^{m/n}$$

1) What does $\sqrt[4]{16}$ mean? _____

2) Find $\sqrt[4]{16}$. _____

3) What does $\sqrt[5]{-243}$ mean? _____

4) Find $\sqrt[5]{-243}$. _____

5) Find $\sqrt[6]{-64}$. _____

Definition:

1) Principal n^{th} Root –

Properties of Radicals: Let x , y , and s be any real numbers, and n be any natural number.

a) If $\sqrt[n]{xy}$ is real, then $\sqrt[n]{xy} = \sqrt[n]{x} \cdot \sqrt[n]{y}$.

b) If $\sqrt[n]{\frac{x}{y}}$ is real, then $\sqrt[n]{\frac{x}{y}} = \frac{\sqrt[n]{x}}{\sqrt[n]{y}}$.

c) $(\sqrt[n]{x})^s = \sqrt[n]{x^s}$

Example: Simplify the following

a) $\sqrt[3]{432}$

b) $\sqrt[5]{\frac{64x^7}{y^8}}$

★ Estimating a Square Root

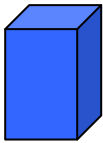
Estimate the value of the square root of 23.

★ **Sample Problems**

1. Find the length of the diagonal of a rectangle that measures 5ft by 7ft.



2. Find the value of x in the figure below.



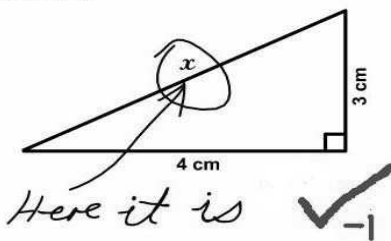
3. Solve for x in the following equation.

$$\sqrt{x} = -6$$

4. A student asks the following question: "If $\sqrt{2}$ can be written as a fraction, ie: $\frac{\sqrt{2}}{1}$, then why isn't $\sqrt{2}$ a rational number?" How do you answer the student?

5. How should this test question have been worded?

3. Find x.



6. Is $\sqrt{a^2 + b^2} = a + b$?