

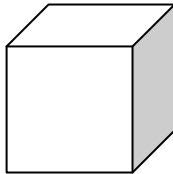
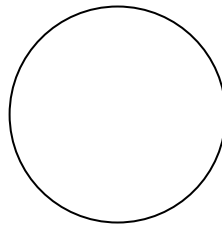
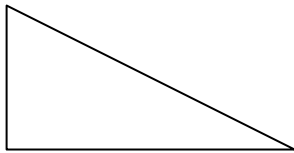
Math 2303
Concepts in Algebra
Section 2.5
Irrational Numbers

Rational Numbers - $\frac{a}{b}$ with a and b integers and b not equal to 0.

With rational numbers we can describe parts of the whole -

Do we have all the numbers we need to describe physical distances?

What about -

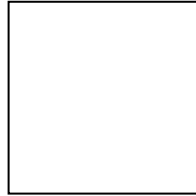
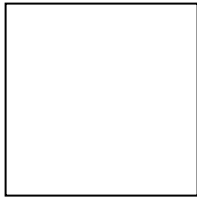


All of these lengths cannot be described precisely as ratios of integers. Thus they are NOT RATIONAL NUMBERS.

Definition: An ***irrational number*** is a real number that cannot be described precisely as a ratio of integers.

Examples: $\sqrt{2}, \sqrt{5}, \pi$

Squares:



Area = Length * Width = Side * Side

Example 1: Given a square with the following area, find the length of a side. Is the length of the side a rational number or an irrational number?

(a). Area = 9 ft^2

(b). Area = $\frac{121}{49} \text{ cm}^2$

(c). Area = $6m^2$

(d). Area = $0.4in^2$

Example 2: Given a square with sides of the following lengths, find the area of the square.

(a). Side = $9in$

(b). Side = $\sqrt{7}$ in

(c). Side = $\frac{2}{3}$ in

Circles

$$C = \pi d$$

$$\frac{C}{d} = \pi$$

Approximating pi -
3.14

$22/7$

Exactly pi -

Find the circumference of a circle with diameter 5 inches

(a). Using 3.14 for pi

(b). Using $22/7$ for pi

(c). Using the pi key on a calculator -

(d). Exactly -