2.4: SQUARE ROOTS OF RATIONAL NUMBERS

Square root: One of two equal factors of a number.
For example, the square root of 81 is 9 because $9 \times 9 = 81$

Perfect square: a number that is the product of 2 identical factors

Knowing the perfect squares helps you find square roots:

$1 \times 1 =$ You should know these Perfect Squares:

$2 \times 2 =$

$3 \times 3 =$

The square root of a perfect square can be determined *exactly*.

ex. $\sqrt{2.56} = 1.6$ $\sqrt{\frac{4}{9}} = \frac{2}{3}$

The square root of a non-perfect square determined using a calculator is an *approximation*.

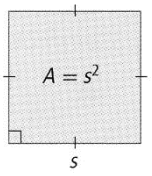
ex. $\sqrt{2} = 1.414213562...$ $\sqrt{0.1} = 0.316227766...$

Ex.1: Determine whether each of the following numbers is a perfect square.

a) $\frac{1}{49}$ b) $\frac{81}{225}$ c) -0.01

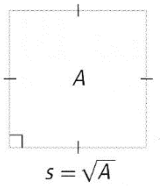
d) 0.16 e) 0.4

Area of a Square



If the side length of a square models a number, the area of the square models the **square** of the number.

If the area of a square models a number, the side length of the square models the **square root** of the number.



Ex.2: If one length of a square is 1.3 m, what is its area?

Ex.3: If the area of a square is 2.56 m^2, what is the length of one side?

Ex.4: Can a square picture with an area of 400 cm^2 fit into a frame that is 15 cm by 25 cm?

Ex.5: Evaluate $\sqrt{\sqrt{\sqrt{429{,}981{,}696}}}$