Side Lengths and Areas of Squares

- the area is the square of the side length

\[
\text{Area} = \text{length}^2 = 5^2 = 25
\]

- the side length is the square root of the area

\[
\text{length} = \sqrt{\text{Area}} = \sqrt{25} = 5
\]

Whole Number Squares and Square Roots
- The square of a # is the multiplied by itself.

\[ 5^2 = 5 \times 5 \]

- A square root of a # is one of 2 equal factors of a #.

\[ \sqrt{25} = \sqrt{5 \times 5} = 5 \]

**Perfect Squares**

- A product of 2 equal factors

25 is a perfect square

\[ 25 = 5 \times 5 \]

24 is a non-perfect square

- The square of a fraction or decimal is the # multiplied by itself.
Ex 1
\[
\left( \frac{2}{3} \right)^2 = \frac{2 \times 2}{3 \times 3} = \frac{4}{9}
\]

Ex 2
\[
(1.5)^2 = 1.5 \times 1.5 = 2.25
\]

Is each fraction a perfect square?

a) \[
\frac{16}{25} = \frac{4 \times 4}{5 \times 5} = \frac{16}{25} = \frac{4}{5}
\]

b) \[
\frac{9}{20} = \frac{3 \times 3}{5 \times 4}
\]

- A terminating decimal ends after a certain number of decimal places.
- A repeating decimal has a repeating pattern of digits.
terminating \[ 0 \ 5 \ \ \ \ 0 \ 2 \ 8 \]

repeating \[ 0.\overline{3} \ 3 \ 3 \ 3 \ 3 \ 3 \ 0.\overline{3} \]

\[ 0.191919191 \ldots \ 0.\overline{1}9 \]

Non-terminating and Non-Repeating

\[ 0.41421356 \ldots \ 7.071067812 \ldots \]

* the square root of a perfect square decimal is either a

* terminating decimal or a repeating decimal

Ex 1 \[ \frac{1}{(a.)} \ 1.69 \ (b.) \ 3.5 \]

\[ \sqrt{1.69} \]

= 1.3

\[ \sqrt{3.5} \]

\[ = 1.870828693 \]

\[ \times \ \text{not a perfect square} \]
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