

TOPIC: SQUARE ROOTS AND THE PYTHAGOREAN THEOREM

Introduction to Square Roots

◆ Recall: The square of a number is the number times itself. The reverse process is finding the **square root**.

New

The Square Root

The **square** of 5 is 25.

$(\quad)^2$

$\sqrt{\quad}$

$-\sqrt{\quad}$

25

$(\quad)^2$

$\sqrt{25} = \underline{\quad}$
Principal Square Root

The **square root** of 25 is $\underline{\quad}$ and $\underline{\quad}$

◆ The **radical sign** $\sqrt{\quad}$ indicates the $\underline{\hspace{2cm}}$ (or principal) square root of a nonnegative number.

EXAMPLE

Find the square root.

(A) $\sqrt{9}$

(B) $\sqrt{144}$

(C) $\sqrt{\frac{1}{81}}$

PRACTICE

Evaluate.

(A) $\sqrt{225}$

(B) $\sqrt{\frac{4}{121}}$

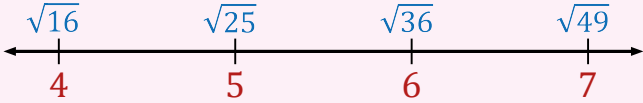
(C) $\sqrt{\frac{25}{64}}$

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Approximating Square Roots

◆ Numbers whose square roots are whole numbers or fractions are called **perfect squares**.

► If a number is not a perfect square we must _____ its square root.

With a Calculator	With a Number Line
To approximate with a calculator, look for the key $\sqrt{}$ or $\sqrt[n]{}$. You may need to press the 2ND key first. $\sqrt{27} \approx$	To approximate with a number line, compare the values inside the radicals with perfect square numbers. 

EXAMPLE

(A) Using a calculator, approximate to the nearest *hundredth*.

$$\sqrt{222}$$

(B) Without using a calculator, approximate to the nearest whole number.

$$\sqrt{38}$$

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EXAMPLE

Is the following number a perfect square?

(A) 36

[PERFECT SQUARE |
NOT A PERFECT SQUARE]

(B) 26

[PERFECT SQUARE |
NOT A PERFECT SQUARE]

(C) $\frac{4}{9}$

[PERFECT SQUARE |
NOT A PERFECT SQUARE]

PRACTICE

Determine what two whole numbers the square root is between without using a calculator.

(A) $\sqrt{58}$

(B) $\sqrt{175}$

PRACTICE

Approximate using a calculator and round to the nearest *thousandth*.

(A) $\sqrt{19}$

(B) $\sqrt{51}$

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Right Triangles & Pythagorean Theorem

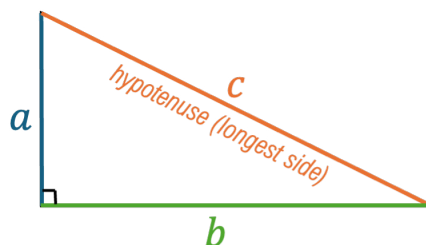
◆ Whenever 2 sides of a right triangle are known, solve for the unknown side by using the **Pythagorean Theorem**.

► Always set **a** and **b** as the _____ legs that form the 90°, and **c** as the _____.

New

$$a^2 + b^2 = c^2$$

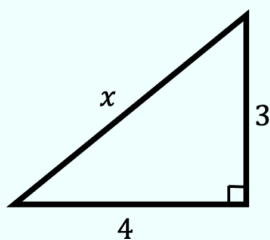
(Pythagorean Theorem)



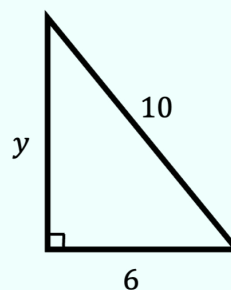
EXAMPLE

Find the missing side of each right triangle below.

(A)



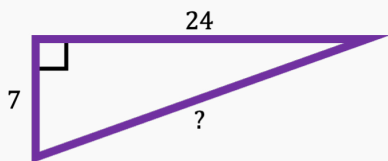
(B)



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PRACTICE

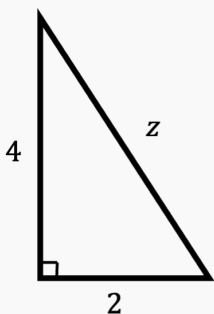
Calculate the missing side of the triangle below.



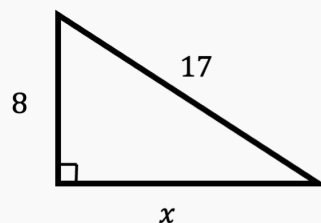
PRACTICE

Calculate the missing side of the triangle below.

(A)



(B)



EXAMPLE

A 32-inch security screen (measured along the diagonal) has a height of 18 inches. How wide is the screen?
Approximate to the *hundredths*.