

Length of a Line Segment

Thank you for your interest in my product. This Sample should give you a good idea of the quality of the material as well as the method of content presentation you will see in the complete version. Most of the content has been removed.

This Sample showcases the Teacher version that has all the blanks filled in. In the student version, anything that is bolded and enlarged here will not be present. I do this to ensure my students are engaged in the lesson but at the same time, aren't spending all their time writing. This leaves more time for discussion and practice.

Review of Prerequisite Skills

Square Roots

Perfect Squares i.e. 0, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, ...

$$\sqrt{\text{perfect square}} = \text{Whole \#}$$

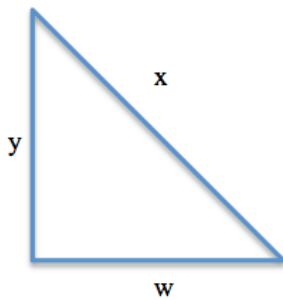
i.e. $\sqrt{36} = 6$ is a perfect square but, $\sqrt{34} = 5.8$ is not a perfect square

Square Roots and Order

$$\begin{array}{cccccccccc} \sqrt{0}, \sqrt{1}, \sqrt{2}, \sqrt{3}, \sqrt{4}, \sqrt{5}, \sqrt{6}, \sqrt{7}, \sqrt{8}, \sqrt{9}, \dots \\ = 0, = 1, & & = 2 & & & & = 3 \end{array}$$

The Pythagorean Theorem

This section of the lesson has been removed.



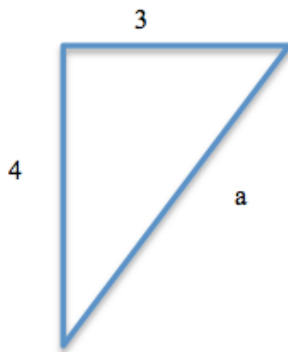
$$x^2 = y^2 + w^2$$

Hypotenuse - the side opposite (across from) the right (90°) angle.

Can this relationship be used if the triangle is NOT a right triangle? **NO**

Example 1: Solve for the missing side rounded to 1 decimal place.

a)



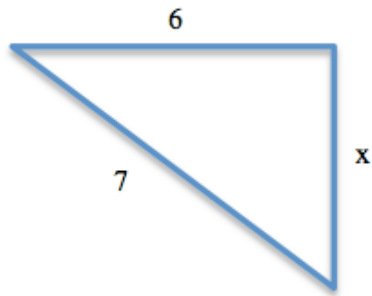
$$a^2 = 3^2 + 4^2$$

$$a^2 = 9 + 16$$

$$a^2 = 25$$

$$a = \sqrt{25} \quad a = 5$$

b)



$$7^2 = x^2 + 6^2$$

$$49 = x^2 + 36$$

$$49 - 36 = x^2$$

$$13 = x^2$$

$$\sqrt{13} = x$$

$$3.6 = x$$

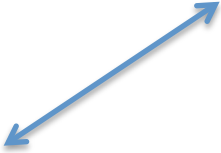
Slope (m): This section of the lesson has been removed.

$$\begin{aligned}\text{Slope} &= \frac{\text{change in } y}{\text{change in } x} \\ &= \frac{\Delta y}{\Delta x} \\ &= \frac{\text{vertical part}}{\text{horizontal part}} \\ &= \frac{y_2 - y_1}{x_2 - x_1}\end{aligned}$$

Example 1: Determine the slope of the line

This section of the lesson has been removed.

Slope also tells us a lot about the line.

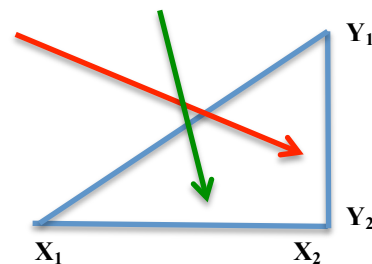
Slope = $m = \frac{\text{rise}}{\text{run}}$	Diagram
Positive slope (Line rises from left to right)	Right 
Negative (Line rises from right to left)	Left 
0 (Line does not rise)	Flat 
Undefined (Line does not run)	Vertical 

Length of a Line Segment

Summary: Length of a line segment AB, where A(x_1, y_1) and B (x_2, y_2) can be determine using the equation. You are finding the hypotenuse of the vertical and horizontal components.

$$l_{AB} = \sqrt{(\text{change in } x)^2 + (\text{change in } y)^2}$$

$$= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$



Recall

A scalene triangle has no equal sides.	An isosceles triangle has two equal sides.	An equilateral triangle has three equal sides	A right triangle satisfies the Pythagorean Theorem. $c^2 = a^2 + b^2$
--	--	---	--

Example 1: Determine the length of the line segment with endpoints A(-1, 4) and B(-5, 8).
Express the answer as:

a) an exact solution.

$$l_{Ab} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$l_{Ab} = \sqrt{(-5 - (-1))^2 + (8 - 4)^2}$$

$$l_{Ab} = \sqrt{(-4)^2 + 4^2}$$

$$l_{Ab} = \sqrt{32}$$

$$l_{Ab} = \sqrt{16 \times 2}$$

$$l_{Ab} = \sqrt{16} \times \sqrt{2}$$

$$l_{Ab} = 4\sqrt{2}$$

This section of the lesson has been removed.

Example 2: **This section of the lesson has been removed.**

$\begin{aligned}PQ &= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\&= \sqrt{(4 - (-2))^2 + (1 - (-3))^2} \\&= \sqrt{6^2 + 4^2} \\&= \sqrt{36 + 16} \\&= \sqrt{52}\end{aligned}$	This section of the lesson has been removed.	$\begin{aligned}PR &= \sqrt{(2 - (-2))^2 + (4 - (-3))^2} \\&= \sqrt{65}\end{aligned}$
---	---	---

In a right triangle, the longest side is always the hypotenuse. In this case, PR would be the hypotenuse. Therefore, to determine if it is a right-angled triangle, check

This section of the lesson has been removed.

Since the Pythagorean Relationship is valid, PQR forms a right triangle.

Example 3: This section of the lesson has been removed.

Length of a Line Segment Worksheet