

Slope(4): Slope of Perpendicular Lines

Name: _____ Class: _____ () Date: _____

Go to “GeoGebra Classroom” and follow your teacher’s instructions.

Check “Show coordinate changes”, “Show axes” and “Show second line”.

In each of the following question, drag the two red points and one the of the pink point to the given positions, then drag the remaining pink point to a position such that the two lines become perpendicular to each other. Note that a right angle appears when the two lines become perpendicular.

<p>1. Draw the line that is perpendicular to the given line and passes through (1, 2).</p>	<p>Horizontal change of the first line = _____</p> <p>Vertical change of the first line = _____</p> <p>∴ Slope of the first line m_1 = _____</p> <p>Horizontal change of the second line = _____</p> <p>Vertical change of the second line = _____</p> <p>∴ Slope of the second line m_2 = _____</p> <p>Is m_1 equal to m_2? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>What is $m_1 \times m_2$? _____</p>
<p>2. Draw the line that is perpendicular to the given line and passes through (1, 2).</p>	<p>Horizontal change of the first line = _____</p> <p>Vertical change of the first line = _____</p> <p>∴ Slope of the first line m_1 = _____</p> <p>Horizontal change of the second line = _____</p> <p>Vertical change of the second line = _____</p> <p>∴ Slope of the second line m_2 = _____</p> <p>Is m_1 equal to m_2? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>What is $m_1 \times m_2$? _____</p>
<p>3. Draw the line that is perpendicular to the given line and passes through (2, 4).</p>	<p>Horizontal change of the first line = _____</p> <p>Vertical change of the first line = _____</p> <p>∴ Slope of the first line m_1 = _____</p> <p>Horizontal change of the second line = _____</p> <p>Vertical change of the second line = _____</p> <p>∴ Slope of the second line m_2 = _____</p> <p>Is m_1 equal to m_2? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>What is $m_1 \times m_2$? _____</p>

4. Draw the line that is perpendicular to the given line and passes through (2, 1).

Horizontal change of the first line = _____
 Vertical change of the first line = _____
 \therefore Slope of the first line $m_1 =$ _____
 Horizontal change of the second line = _____
 Vertical change of the second line = _____
 \therefore Slope of the second line $m_2 =$ _____
 Is m_1 equal to m_2 ? Yes No
 What is $m_1 \times m_2$? _____

Conclusion:

Let m_1 and m_2 be the slopes of the lines L_1 and L_2 respectively.
 If L_1 is _____ to L_2 , then _____, and vice versa.

Exercises:

1. There are three pairs of perpendicular lines. Can you find them out?

Line	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9
Slope	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{2}{3}$	$-\frac{3}{2}$	-2	$\frac{4}{3}$	$-\frac{4}{3}$	$-\frac{3}{4}$	1.5

$\therefore \frac{1}{2} \times \underline{\hspace{2cm}} = -1 \quad \therefore L_1$ is perpendicular to _____

$\therefore \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = -1 \quad \therefore \underline{\hspace{2cm}}$ is perpendicular to _____

$\therefore \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = -1 \quad \therefore \underline{\hspace{2cm}}$ is perpendicular to _____

2. Given L_1 is perpendicular to L_2 . Finish the following table.

Slope of L_1	$\frac{2}{5}$	$-\frac{3}{8}$		1		-6
Slope of L_2			-4		$\frac{1}{5}$	