Geometry: 3.4-3.5 Notes

NAME_____

3.4 Use perpendicular lines to find distance and angles._____ **Date:**_____

Define Vocabulary:

distance from a point to a line –

perpendicular bisector –

Finding the Distance from a Point to a Line

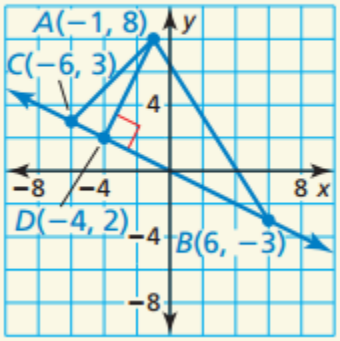
The **distance from a point to a line** is the length of the perpendicular segment from the point to the line. This perpendicular segment is the shortest distance between the point and the line. For example, the distance between point A and line k is AB.

distance from a point to a line

Examples: Find the distance from the point to the line to the nearest tenth.

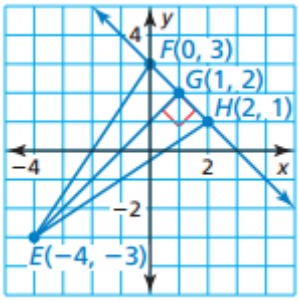
WE DO

Find the distance from point A to $\overleftrightarrow{BC}$.



YOU DO

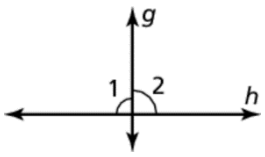
Find the distance from point E to $\overleftrightarrow{FH}$.



Theorem 3.10 Linear Pair Perpendicular Theorem

If two lines intersect to form a linear pair of congruent angles, then the lines are perpendicular.

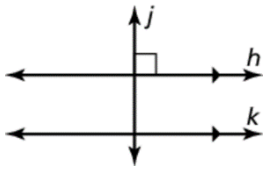
If $\angle 1 \cong \angle 2$, then $g \perp h$.



Theorem 3.11 Perpendicular Transversal Theorem

In a plane, if a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other line.

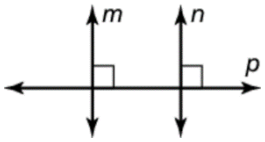
If $h \parallel k$ and $j \perp h$, then $j \perp k$.



Theorem 3.12 Lines Perpendicular to a Transversal Theorem

In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.

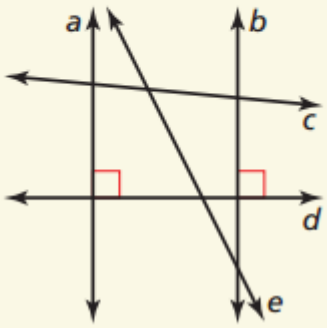
If $m \perp p$ and $n \perp p$, then $m \parallel n$.



Examples: Proving lines are parallel.

WE DO

The diagram shows the layout of walking paths in a town park. Determine which lines, if any, must be parallel in the diagram. Explain your reasoning.



YOU DO

Is $b \parallel a$? Explain your reasoning.

Is $b \perp c$? Explain your reasoning.

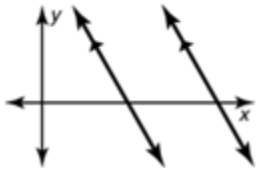
Assignment	

3.5 Identify and write equations of parallel and perpendicular lines using slope____ Date:_____

Theorem 3.13 Slopes of Parallel Lines

In a coordinate plane, two nonvertical lines are parallel if and only if they have the same slope.

Any two vertical lines are parallel.

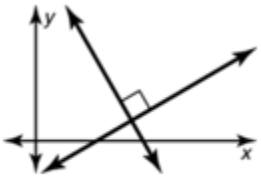


$m_1 = m_2$

Theorem 3.14 Slopes of Perpendicular Lines

In a coordinate plane, two nonvertical lines are perpendicular if and only if the product of their slopes is -1.

Horizontal lines are perpendicular to vertical lines.

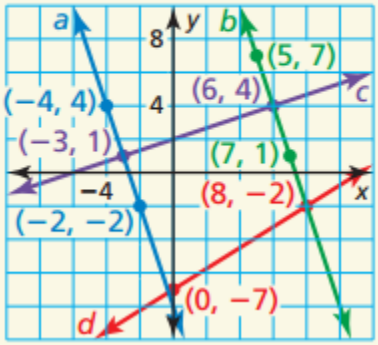


$m_1 \cdot m_2 = -1$

Examples:

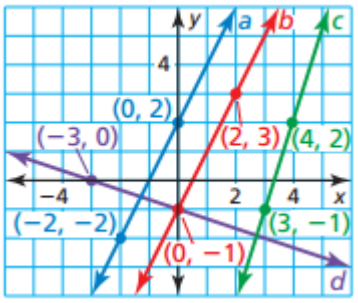
WE DO

Determine which of the lines are parallel and which of the lines are perpendicular.



YOU DO

Determine which of the lines are parallel and which of the lines are perpendicular.



Examples: Write an equation of a parallel line.

WE DO

Write an equation of the line passing through the point (-4, 6) that is parallel to the line y = 3x – 4.

YOU DO

Write an equation of the line passing through the point (1, 5) that is parallel to the line y = -6x – 5.

WE DO

Write an equation of the line passing through the point (-12, 6) that is perpendicular to the line $y = \frac{2}{3}x - 10$.

YOU DO

Write an equation of the line passing through the point (2, 3) that is perpendicular to the line y – 4 = -2(x+3).

WE DO

Write an equation of the perpendicular bisector to line that contains A(-9, 11) and B(-15, 19) .

YOU DO

Write an equation of the perpendicular bisector to line that contains A(11, -5) and B(1, -10) .

Assignment	