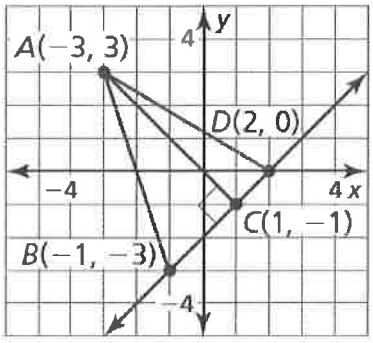
distance from a point to a line - the length of the perpendicular segment from the point to the line.

(the shortest distance from a point to a line is the perpendicular segment)

Oct 17-8:30 AM

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



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

$AC = \sqrt{(-3-1)^2 + (-1-3)^2}$

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

$AC = \sqrt{16 + 16}$

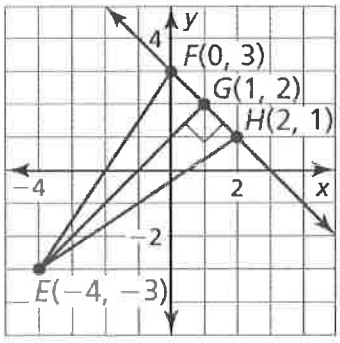
$AC = \sqrt{32} = 4\sqrt{2}$

$\sqrt{16}\sqrt{2}$

$\sqrt{4}\sqrt{4}$

Example 1

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



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

$EG = \sqrt{(-4-1)^2 + (-3-2)^2}$

$EG = \sqrt{(-5)^2 + (-5)^2}$

$EG = \sqrt{25 + 25}$

$EG = \sqrt{50}$

$\sqrt{25}\sqrt{2}$

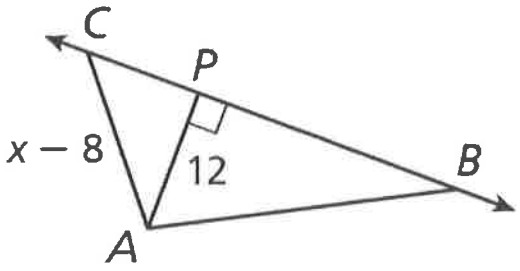
$\sqrt{5}\sqrt{5}$

$= 5\sqrt{2}$

Monitoring Progress 1

A. Name the shortest segment from point *A* to *BC*.

$\overline{AP}$



B. Write and solve an inequality for *x*.

$x - 8 > 12$

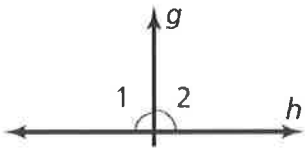
$x > 20$

Oct 12-3:22 PM

Theorem 3.10 Linear Pair Perpendicular Theorem

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

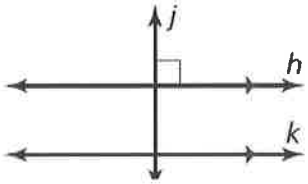
If $\angle 1 \cong \angle 2$, then $g \perp h$.



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.

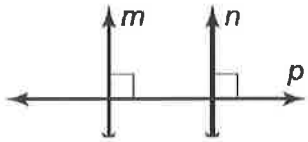
If $h \parallel k$ and $j \perp h$, then $j \perp k$.



Theorem 3.12 Lines Perpendicular to a Transversal Theorem

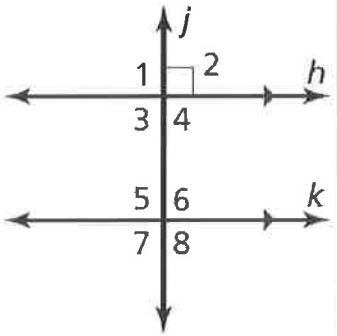
In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.

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



Theorems

Use the diagram to prove the Perpendicular Transversal Theorem.



Statement	Reason
$j \perp h$	Given
$h \parallel k$	Given
$\angle 2$ is a right $\angle$	Def. of $\perp$
$m\angle 2 = 90°$	Def. of Right $\angle$'s
$\angle 2 \cong \angle 6$	Corresponding $\angle$'s Postulate
$m\angle 2 = m\angle 6$	Def. of $\cong$
$m\angle 6 = 90$	transitive POE
$\angle 6$ is a right $\angle$	Def. of right $\angle$
$j \perp k$	Def. of $\perp$

Example 2

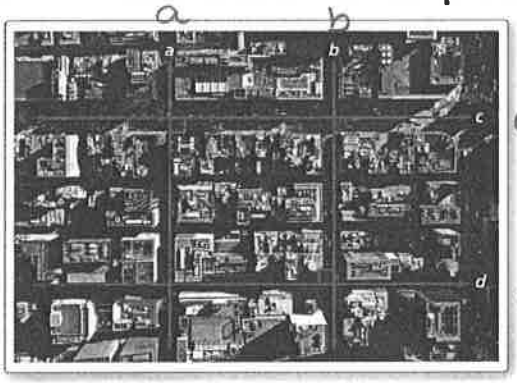
The photo shows the layout of a neighborhood. Determine which lines, if any, must be parallel in the diagram. Explain your reasoning.

s || t , p || q

Both are true by "lines ⊥ to transversal thm"

Example 3

Use the lines marked in the photo.



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

yes, "lines ⊥ to transversal thm"

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

Yes, a || b and a ⊥ c, so b ⊥ c by "⊥ Transversal Thm"

Monitoring Progress 3-4

The **perpendicular bisector** of a segment is a line perpendicular to a segment at the segment's midpoint.

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Homework:

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