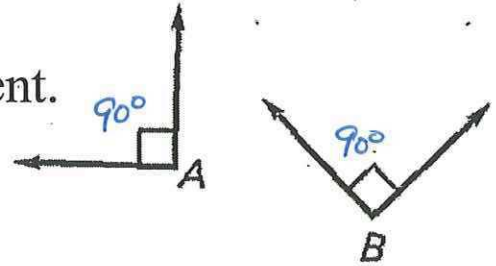


3-2 Theorems About Perpendicular Lines

Objective: Use theorems about perpendicular lines.

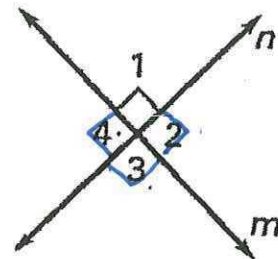
Theorem: All right angles are congruent.

$$A \cong B$$



Theorem: If two lines are perpendicular, then they intersect to form 4 right angles.

$$n \perp m$$



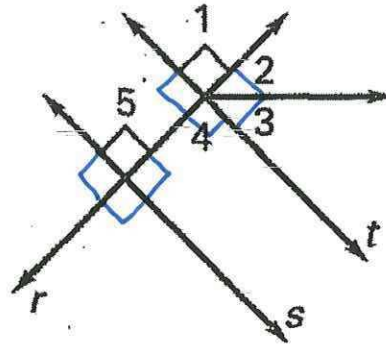
Examples:

1. In the diagram $r \perp s$ and $r \perp t$. Decide whether enough information is given to conclude that the statement is true. Explain your reasoning.

a. $\angle 1 \cong \angle 5$ Yes, both 90°

b. $\angle 4 \cong \angle 5$ Yes, both 90°

c. $\angle 2 \cong \angle 3$ NO



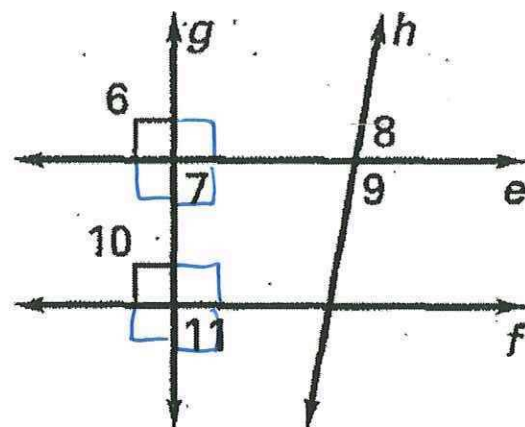
In the diagram $g \perp e$ and $g \perp f$. Decide whether enough information is given to conclude that the statement is true. Explain your reasoning.

2. $\angle 6 \cong \angle 10$ Yes, both 90°

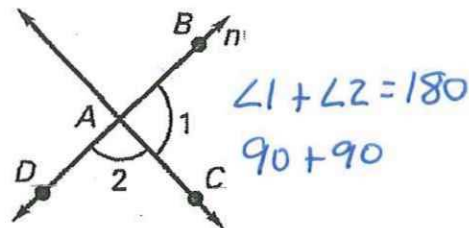
3. $\angle 7 \cong \angle 10$ Yes, both 90°

4. $\angle 6 \cong \angle 8$ NO

5. $\angle 7 \cong \angle 11$ Yes, both 90°

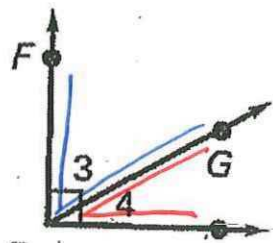


Theorem: If two lines intersect to form adjacent congruent angles, then the lines are perpendicular.



Theorem: If two sides of adjacent acute angles are perpendicular, then the angles are complementary.

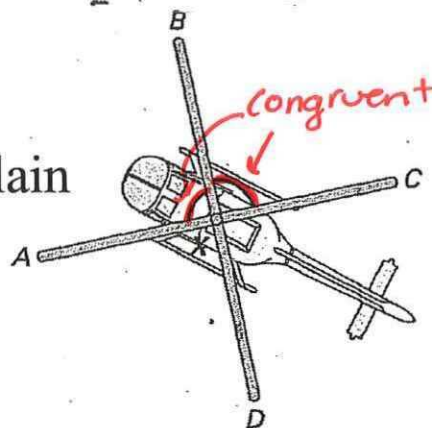
$3 + 4 = 90$



Examples:

6. In the helicopter at the right, are $\angle AXB$ and $\angle CXB$ right angles? Explain

- linear pair
 - congruent
 - both have to be 90°
- Yes.

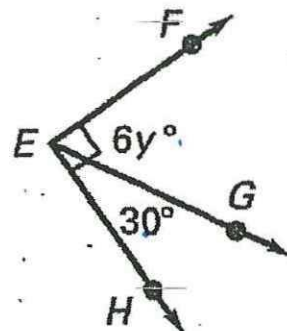


7 In the diagram at the right, $\overline{EF} \perp \overline{EH}$ and $\angle AXB = 30^\circ$. Find the value of y .

$6y + 30 = 90$
 $-30 \quad -30$

$6y = 60$

$y = 10$

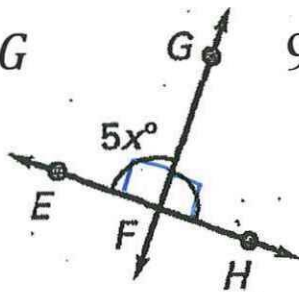


Find the value of the variable. Explain.

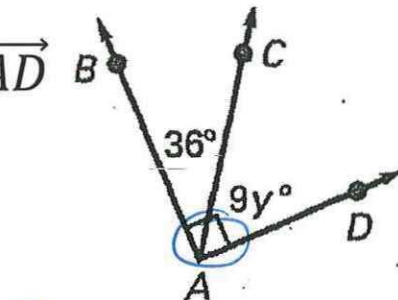
8. $\angle EFG \cong \angle HFG$

$5x = 90$

$x = 18$



9. $\overline{AB} \perp \overline{AD}$



$9y + 36 = 90$
 $-36 \quad -36$

$9y = 54$

$y = 6$

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