



**Take out Your
homework...**

Section 3.3

Proving Lines Parallel

Homework

p.165 #3-8, 10-14

What is a converse statement...?

Statement

$$p \rightarrow q$$

If..... Then.....

If there is no heartbeat, then it is dead.

hypothesis

Conclusion

Converse

$$q \rightarrow p$$

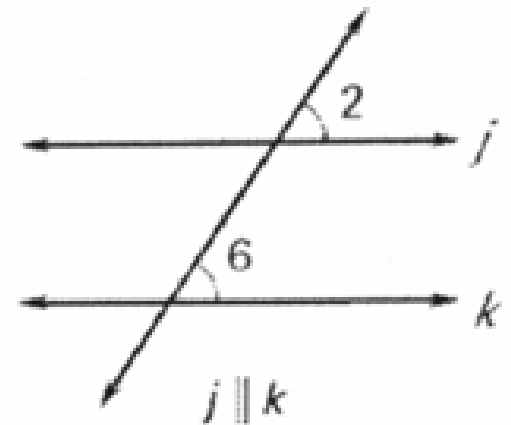
Switch the hypothesis (p) and the conclusion (q).

If it is dead, then there is no heartbeat.

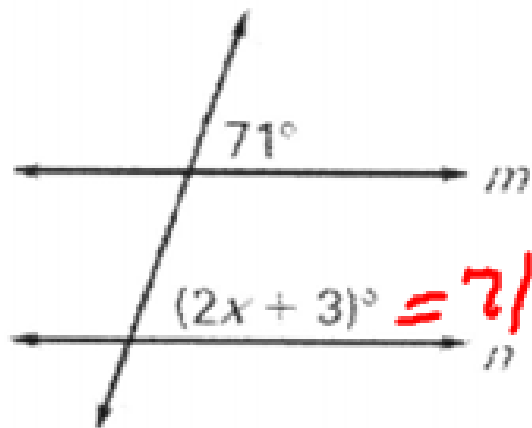
POSTULATE 16 CORRESPONDING ANGLES CONVERSE

If two lines are cut by a transversal so the corresponding angles are congruent, then the lines are

parallel



Example 1 Find the value of x that makes $m \parallel n$.



$$2x + 3 = 71$$

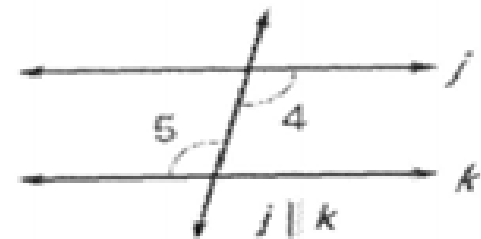
$$2x = 68$$

$$x = 34$$

THEOREM 3.4 ALTERNATE INTERIOR ANGLES CONVERSE

If two lines are cut by a transversal so the alternate interior angles are congruent, then the lines are

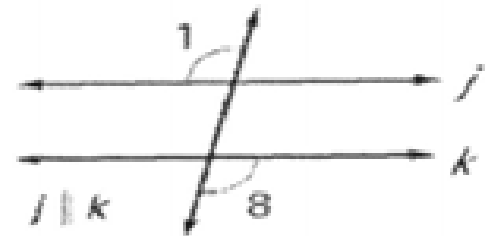
parallel



THEOREM 3.5 ALTERNATE EXTERIOR ANGLES CONVERSE

If two lines are cut by a transversal so the alternate exterior angles are congruent, then the lines are

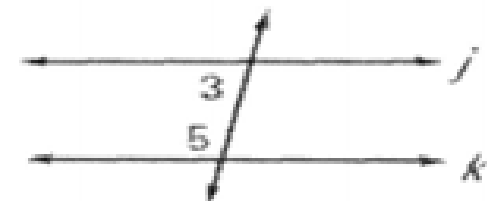
parallel



THEOREM 3.6 CONSECUTIVE INTERIOR ANGLES CONVERSE

If two lines are cut by a transversal so the consecutive interior angles are supplementary, then the lines are

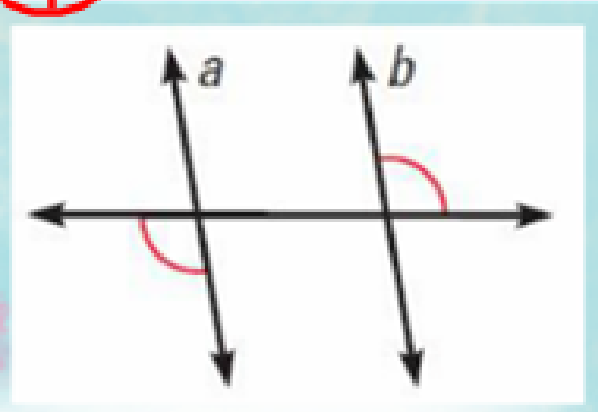
parallel



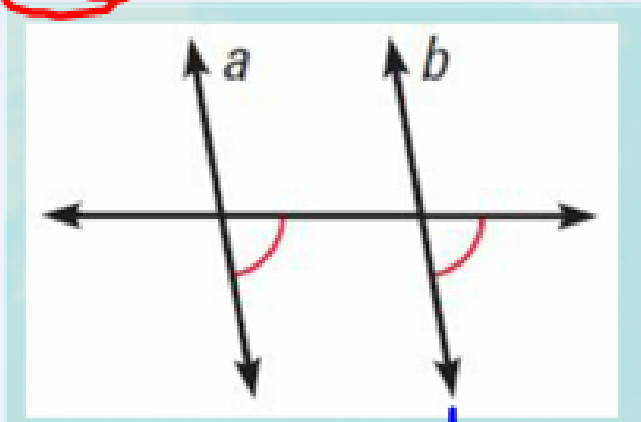
If $\angle 3$ and $\angle 5$ are supplementary, then $j \parallel k$.

Can you prove that lines a and b are parallel? *Explain why or why not.*

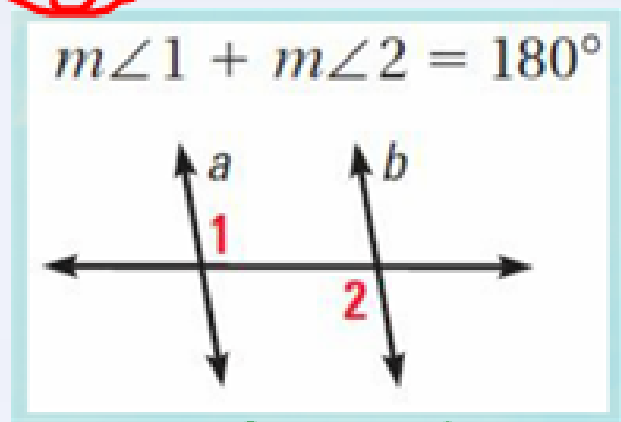
①



②



③



$A \parallel B$
b/c Alt.
ext. &
converse.

$a \parallel b$
b/c Corresponding
angle converse.

No, b/c
Alt int.
angles are
supplementary
(when there are \parallel lines)

Corresponding \angle s

\parallel

$\angle 8, 4$ $\angle 1, 5, 2, 6$

Alt int \angle s

\parallel

$\angle 5, 4$ $\angle 3, 6$

Alt ext angles -

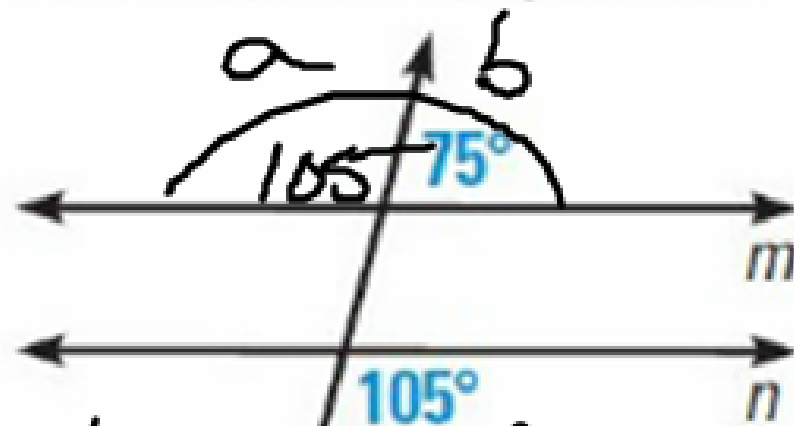
$\angle 8, 1, 7, 2$



Consecutive interior angles...

- supplementary - $\angle 5, 3$ - $\angle 4, 6$

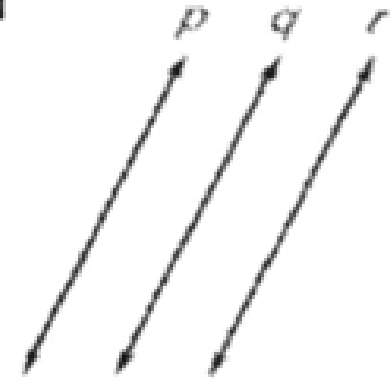
Is there enough information in the diagram to conclude that $m \parallel n$? Explain.



yes b/c angle a & b are supplementary so $\angle A = 105^\circ$
 Alt ext \angle 's \cong therefore $m \parallel n$ b/c
 Alt ext \angle 's converse.

THEOREM 3.7 TRANSITIVE PROPERTY OF PARALLEL LINES

If two lines are parallel to the same line, then they are parallel to each other.



If $p \parallel q$ and $q \parallel r$, then $p \parallel r$.

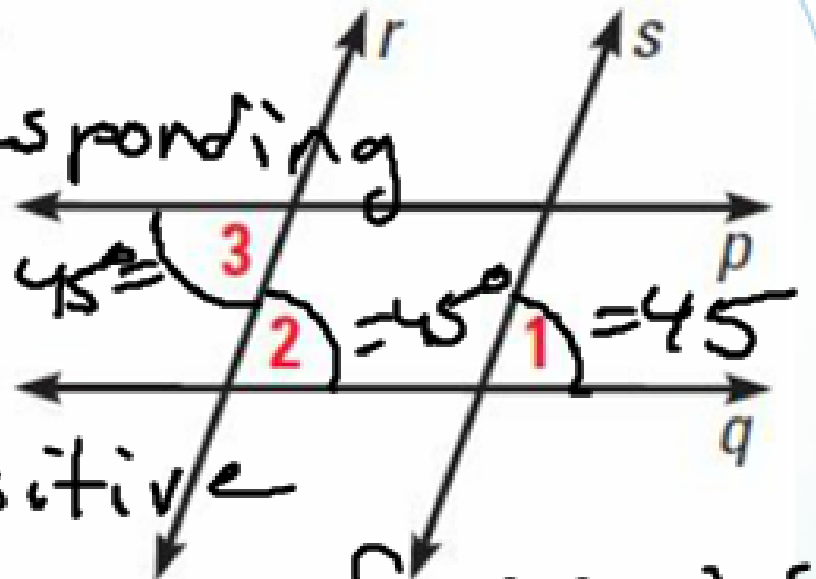
The Transitive property of congruence for angles...

If two angles are congruent to the same angle, then they are congruent to each other.

ex: if $\angle 1 = \angle 2$ and $\angle 2 = \angle 3$ then $\angle 1 = \angle 3$

In the figure, $r \parallel s$ and $\angle 1$ is congruent to $\angle 3$.
Prove $p \parallel q$.

if $\angle 1$ & $\angle 2$ are corresponding
then they are \cong



Through the transitive
property of congruence for angles
we know $\angle 2 = \angle 3$

Therefore $p \parallel q$ through the alt. int
angles converse.

Prove that if alternate interior angles are congruent, then the lines are parallel.

Statement	Reason
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1. $\angle 4 \cong \angle 5$

1. Given

2. $\angle 1 = \angle 4$

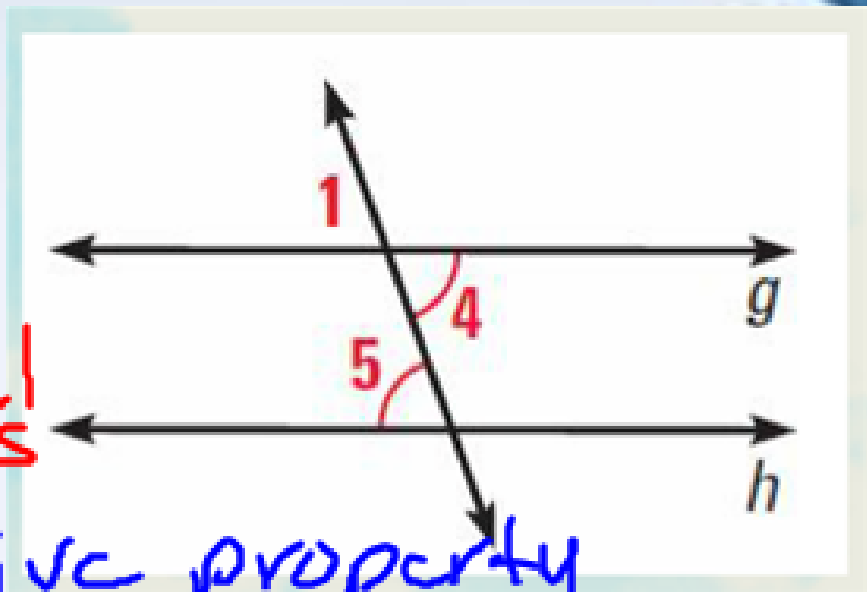
2. Vertical angles

3. $\angle 1 = \angle 5$

3. Transitive property

4. $g \parallel h$

4. Corresponding angles converse
 Given: $\angle 4 \cong \angle 5$
 Prove: $g \parallel h$



~~$\frac{a}{b} = \frac{b}{a}$~~