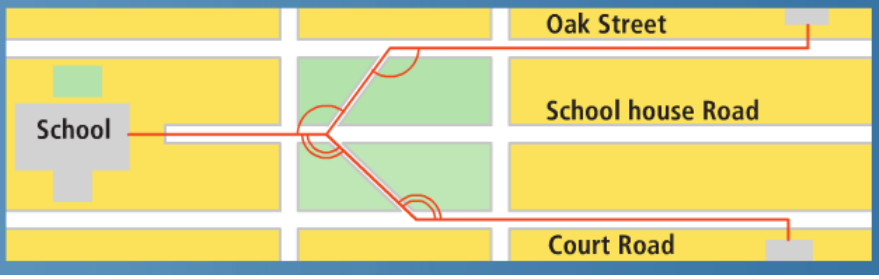
Geometry

Chapter 3
Section 3-4

Using Parallel Relationships

Jude and Jasmine leave school together to walk home. Then Jasmine cuts down a path from Schoolhouse Road to get to Oak Street and Jude cuts down another path to get to Court Road. Below is a diagram of the route each follows home. What conjecture can you make about Oak Street and Court Road? Explain.



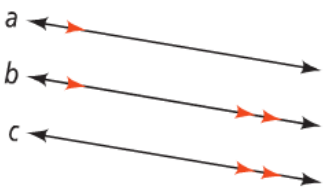
Parallel Lines Theorem

take note

Theorem 3-8

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

If . . .
$a \parallel b$ and $b \parallel c$



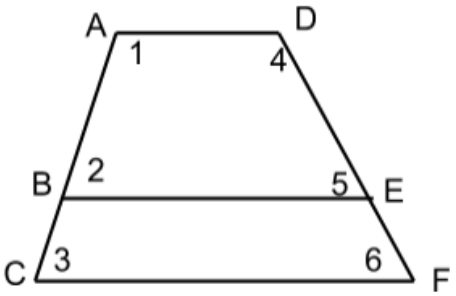
Then . . .
$a \parallel c$

You will prove Theorem 3-8 in Exercise 7.

Written in Proof: Lines parallel to same line

Proof of Theorem 3-8

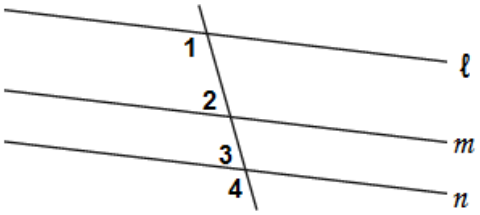
Given: AD // BE, AD // CF
Prove: BE // CF



AD//BE, AD//CF	Given
∠1, ∠2 Supp ∠1, ∠3 Supp	Same-Side Interior Supp
∠2 ≅ ∠3	Congruent Supplements
BE // CF	Converse of Corresponding Angles

Using Theorem 3-8

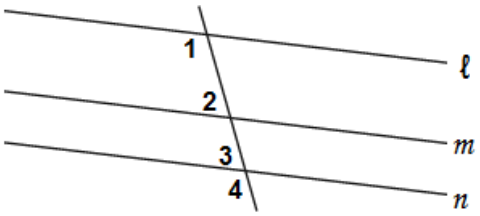
Given: ∠1≅∠4 , ∠2 ≅∠3
Prove: ℓ // m



Statements	Reasoning
∠1≅∠4, ∠2≅∠3	Given
m∠1 = m∠4, m∠2 = m∠3	Def of Congruent Angles
m∠3 + m∠4 = 180	Def of Supplementary Angles
m∠2 + m∠1 = 180	Substitution
ℓ // m	Converse of Same-Side Interior Angles (3-6)

Using Theorem 3-8

Given: ∠1≅∠4 , ∠2 ≅∠3
Prove: ℓ // m



∠1≅∠4 , ∠2 ≅∠3	Given
ℓ // n n // m	Converse of Corresponding Angles
ℓ // m	Lines parallel to same line

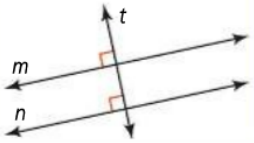
Other Theorems

take note

Theorem 3-9

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

If . . .
$m \perp t$ and $n \perp t$



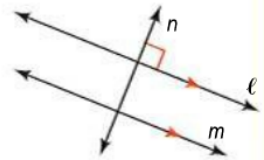
Then . . .
$m \parallel n$

take note

Theorem 3-10 Perpendicular Transversal Theorem

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

If . . .
$n \perp \ell$ and $\ell \parallel m$



Then . . .
$n \perp m$

Homework

Pages 167-168
 # 8-16 even, 19-24