

Original

31

31. Error Analysis The steps below "show" that  $1 = 2$ . Find the error.

Given:  $a = b$

$a = b$

$ab = b^2$

$ab - a^2 = b^2 - a^2$

$a(b - a) = (b + a)(b - a)$

$a = b + a$

$a = a + a$

$a = 2a$

$1 = 2$

Given

Multiplication Property of Equality

Subtraction Property of Equality

Distributive Property

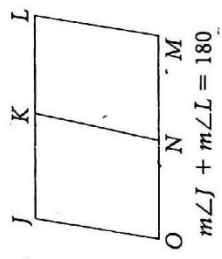
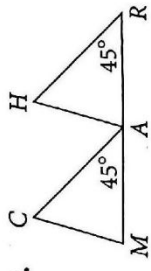
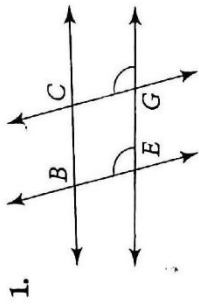
Division Property of Equality

Substitution Property

Simplify.

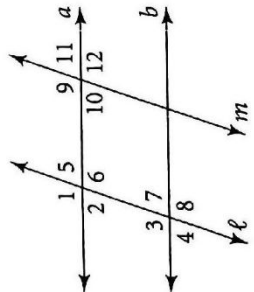
Division Property of Equality

Developing Proof Which lines or segments are parallel? Justify your answer with a theorem or postulate.



Developing Proof Using the given information, which lines, if any, can you conclude are parallel? Justify each conclusion with a theorem or postulate.

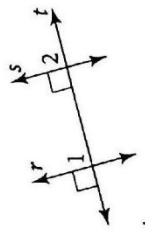
- 4.  $\angle 2$  is supplementary to  $\angle 3$ .
- 5.  $\angle 6$  is supplementary to  $\angle 7$ .
- 6.  $\angle 4$  is supplementary to  $\angle 8$ .
- 7.  $m\angle 7 = 70, m\angle 9 = 110$
- 8.  $\angle 1 \cong \angle 3$
- 9.  $\angle 9 \cong \angle 12$
- 10.  $\angle 3 \cong \angle 6$
- 11.  $\angle 2 \cong \angle 10$
- 12.  $\angle 1 \cong \angle 6$
- 13.  $\angle 8 \cong \angle 6$
- 14.  $\angle 11 \cong \angle 7$
- 15.  $\angle 5 \cong \angle 10$



16. Developing Proof Complete this flow proof of Theorem 3-6.

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

Given:  $r \perp t, s \perp t$   
Prove:  $r \parallel s$



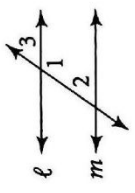
Flow proof diagram:

- Given:  $r \perp t$  →  $\angle 1$  is a right angle. (a. ?)
- Given:  $s \perp t$  →  $\angle 2$  is a right angle. (b. ?)
- Definition of perpendicular lines →  $\angle 1 \cong \angle 2$  (c. ?)
- $r \parallel s$  (d. ?)

17. Developing Proof Complete this paragraph proof of Theorem 3-4.

If two lines and a transversal form supplementary same-side interior angles, then the two lines are parallel.

Given:  $\angle 1$  and  $\angle 2$  are supplementary.  
Prove:  $\ell \parallel m$



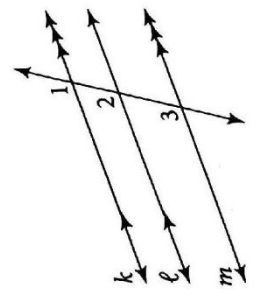
Proof:  $\angle 2$  is a supplement of a. ? and  $\angle 3$  is a supplement of b. ?. Since supplements of the same angle are congruent, c. ?  $\cong$  d. ?. Since  $\angle 2$  and  $\angle 3$  are also corresponding angles,  $\ell \parallel m$  by the e. ? Postulate.

26. Developing Proof Copy and complete the paragraph proof of Theorem 3-5 for three coplanar lines.

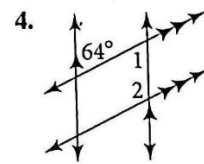
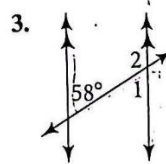
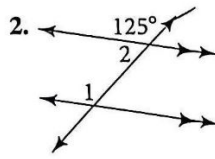
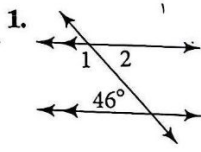
If two lines are parallel to the same line, then they are parallel to each other.

Given:  $\ell \parallel k$  and  $m \parallel k$   
Prove:  $\ell \parallel m$

Proof:  $\ell \parallel k$  means that  $\angle 2 \cong \angle 1$  by the a. ? Postulate.  $m \parallel k$  means that b. ?  $\cong$  c. ? for the same reason. By the Transitive Property of Congruence,  $\angle 2 \cong \angle 3$ . By the d. ? Postulate,  $\ell \parallel m$ .



- **Lesson 3-1** Find  $m\angle 1$  and then  $m\angle 2$ . State the theorems or postulates that justify your answers.



- **Lesson 3-2** Refer to the diagram at the right. Use the given information to determine which lines, if any, must be parallel. If any lines are parallel, use a theorem or postulate to tell why.

5.  $\angle 9 \cong \angle 14$     6.

7.  $\angle 2$  is supplementary to  $\angle 3$ .

9.  $m\angle 6 = 60, m\angle 13 = 120$

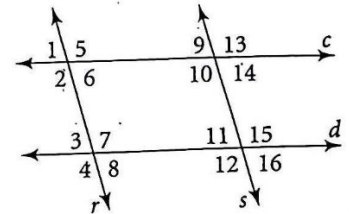
11.  $\angle 3$  is supplementary to  $\angle 10$ .

$\angle 1 \cong \angle 9$

8.  $\angle 7 \cong \angle 14$

10.  $\angle 4 \cong \angle 13$

12.  $\angle 10 \cong \angle 15$



**Open-Ended** In each exercise, information is given about the figure below. State another fact about  $\angle 1, \angle 2, \angle 3,$  or  $\angle 4$  that will guarantee two lines are parallel. Tell which lines will be parallel and why.

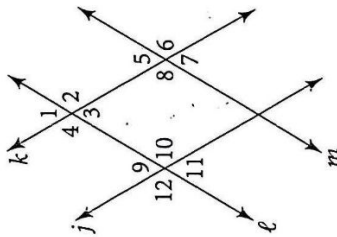
40.  $\angle 1 \cong \angle 3$

41.  $m\angle 8 = 70, m\angle 9 = 110$

42.  $\angle 5 \cong \angle 11$

43.  $\angle 11$  and  $\angle 12$  are supplementary.

44. **Reasoning** If  $\angle 1 \cong \angle 7$  in the diagram, what two theorems or postulates can you use to show that  $\ell \parallel m$ ?



**Developing Proof** For Exercises 45 and 46, use the diagram at the right and this plan for a proof.

**Given:**  $\ell \parallel m, \angle 12 \cong \angle 8$

**Prove:**  $j \parallel k$

**Plan:** To prove that  $j \parallel k$ , show that  $\angle 12 \cong \angle 4$ . It is given that  $\angle 12 \cong \angle 8$ , so  $\angle 12 \cong \angle 4$  if  $\angle 4 \cong \angle 8$ . But  $\angle 4 \cong \angle 8$  because  $\ell \parallel m$  and corresponding angles are congruent.

45. Write a paragraph proof.

46. Write a flow proof.

- **Lesson 2-4 Algebra** You are given that  $2c^2 = 2bc + \frac{ac}{2}$  with  $c \neq 0$ . Show that  $4b = 4c - a$  by filling in the blanks.

13. a.  $2c^2 = 2bc + \frac{ac}{2}$

b.  $4c^2 = 4bc + ac$

c.  $4c = 4b + a$

d.  $\underline{\quad}$

e.  $4b = 4c - a$

a. Given

b.  $\underline{\quad}$  and  $\underline{\quad}$

c.  $\underline{\quad}$  and Distributive Property

d. Subtraction Property

e.  $\underline{\quad}$

- **Lesson 2-5 Algebra** Find the value of  $x$ .

