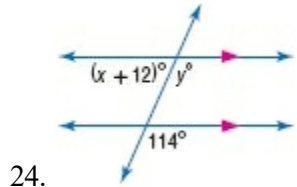


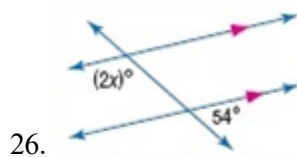
3-2 Angles and Parallel Lines

Find the value of the variable(s) in each figure. Explain your reasoning.



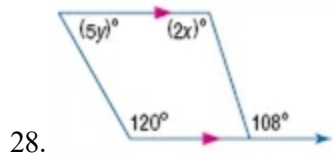
ANSWER:

$y = 114$ by the Corresponding Angles Postulate; $x = 54$ by the Supplement Theorem



ANSWER:

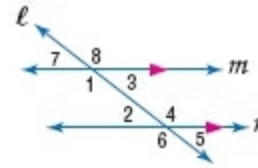
$x = 63$ by the Vertical Angle Theorem and the Consecutive Interior Angles Theorem



ANSWER:

$x = 54$ by the Alternate Interior Angles Theorem; $y = 12$ by the Consecutive Interior Angles Theorem

30. **PROOF** Copy and complete the proof of Theorem 3.2.



Given: $m \parallel n$; ℓ is a transversal.

Prove: $\angle 1$ and $\angle 2$ are supplementary;

$\angle 3$ and $\angle 4$ are supplementary.

Proof:

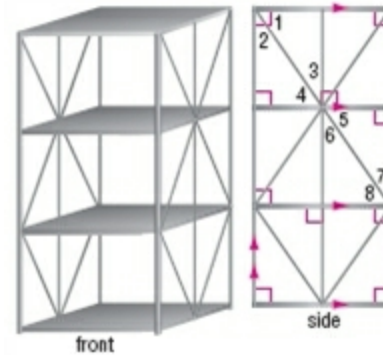
Statements	Reasons
a. ?	a. Given
b. $\angle 1$ and $\angle 3$ form a linear pair; $\angle 2$ and $\angle 4$ form a linear pair.	b. ?
c. ?	c. If two angles form a linear pair, then they are supplementary.
d. $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 3$	d. ?
e. $m\angle 1 = m\angle 4$, $m\angle 2 = m\angle 3$	e. Definition of Congruence
f. ?	f. ?

ANSWER:

3-2 Angles and Parallel Lines

Statements	Reasons
a. $m \parallel n$; ℓ is a transversal.	a. Given
b. $\angle 1$ and $\angle 3$ form a linear pair; $\angle 2$ and $\angle 4$ form a linear pair.	b. Def. of linear pair
c. $\angle 1$ and $\angle 3$ are supplementary. $\angle 2$ and $\angle 4$ are supplementary	c. If two angles form a linear pair, then they are supplementary.
d. $\angle 1 \cong \angle 4$, $\angle 2 \cong \angle 3$	d. Alt. Int. \angle s Theorem
e. $m\angle 1 = m\angle 4$, $m\angle 2 = m\angle 3$	e. Definition of Congruence
f. $\angle 1$ and $\angle 2$ are supp. $\angle 3$ and $\angle 4$ are supp.	f. Substitution

STORAGE When industrial shelving needs to be accessible from either side, additional support is provided on the side by transverse members. Determine the relationship between each pair of angles and explain your reasoning.



32. $\angle 1$ and $\angle 5$

ANSWER:

Congruent; Corresponding angles

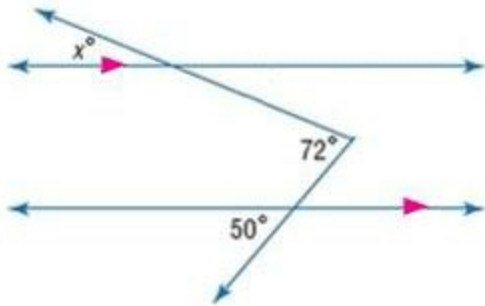
34. $\angle 1$ and $\angle 2$

ANSWER:

Complementary; because the vertical and horizontal lines are perpendicular, they form right angles.

3-2 Angles and Parallel Lines

CCSS TOOLS Find x . (*Hint: Draw an auxiliary line.*)



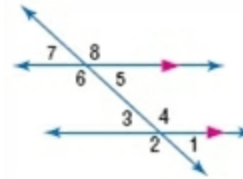
38.

ANSWER:

22

40. **PROBABILITY** Suppose you were to pick any two angles in the figure below.

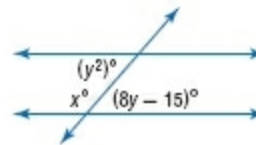
- How many possible angle pairings are there? Explain.
- Describe the possible relationships between the measures of the angles in each pair. Explain.
- Describe the likelihood of randomly selecting a pair of congruent angles. Explain your reasoning.



ANSWER:

- Sample answer: There are 28 possible angle pairings. The first angle can be paired with seven others, then the second angle can be paired with six others since it has already been paired with the first angle. The number of pairings is the sum of the number of angles each subsequent angle can be paired with, $7 + 6 + 5 + 4 + 3 + 2 + 1$ or 28 pairings.
- Sample answer: There are two possible relationships between the pairs of angles. Two angles chosen will be either congruent or supplementary.
- Sample answer: Twelve of the 28 angle pairs are congruent. So, the likelihood of selecting a pair of congruent angles is $\frac{12}{28}$ or $\frac{3}{7}$.

45. **CHALLENGE** Find x and y .



ANSWER:

$$x = 171 \text{ or } x = 155;$$

$$y = 3 \text{ or } y = 5$$

3-2 Angles and Parallel Lines

46. **REASONING** Determine the minimum number of angle measures you would have to know to find the measures of all the angles formed by two parallel lines cut by a transversal. Explain.

ANSWER:

One; sample answer: Once the measure of one angle is known, the rest of the angles are either congruent or supplementary to the given angle.