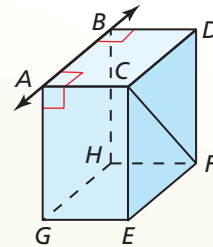


### 3.1 Pairs of Lines and Angles (pp. 125–130)

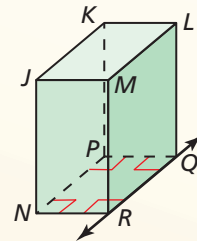
Think of each segment in the figure as part of a line.

- Which line(s) appear perpendicular to  $\overleftrightarrow{AB}$ ?  
▶  $\overleftrightarrow{BD}$ ,  $\overleftrightarrow{AC}$ ,  $\overleftrightarrow{BH}$ , and  $\overleftrightarrow{AG}$  appear perpendicular to  $\overleftrightarrow{AB}$ .
- Which line(s) appear parallel to  $\overleftrightarrow{AB}$ ?  
▶  $\overleftrightarrow{CD}$ ,  $\overleftrightarrow{GH}$ , and  $\overleftrightarrow{EF}$  appear parallel to  $\overleftrightarrow{AB}$ .
- Which line(s) appear skew to  $\overleftrightarrow{AB}$ ?  
▶  $\overleftrightarrow{CF}$ ,  $\overleftrightarrow{CE}$ ,  $\overleftrightarrow{DF}$ ,  $\overleftrightarrow{FH}$ , and  $\overleftrightarrow{EG}$  appear skew to  $\overleftrightarrow{AB}$ .
- Which plane(s) appear parallel to plane  $ABC$ ?  
▶ Plane  $EFG$  appears parallel to plane  $ABC$ .



Think of each segment in the figure as part of a line. Which line(s) or plane(s) appear to fit the description?

- line(s) perpendicular to  $\overleftrightarrow{QR}$
- line(s) parallel to  $\overleftrightarrow{QR}$
- line(s) skew to  $\overleftrightarrow{QR}$
- plane(s) parallel to plane  $LMQ$



### 3.2 Parallel Lines and Transversals (pp. 131–136)

Find the value of  $x$ .

By the Vertical Angles Congruence Theorem (Theorem 2.6),  $m\angle 6 = 50^\circ$ .

$$(x - 5)^\circ + m\angle 6 = 180^\circ$$

$$(x - 5)^\circ + 50^\circ = 180^\circ$$

$$x + 45 = 180$$

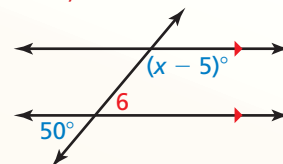
$$x = 135$$

Consecutive Interior Angles Theorem (Thm. 3.4)

Substitute  $50^\circ$  for  $m\angle 6$ .

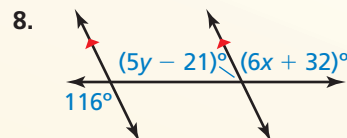
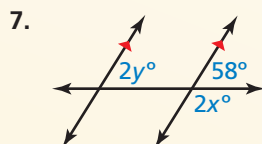
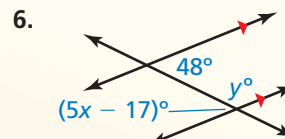
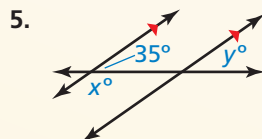
Combine like terms.

Subtract 45 from each side.



▶ So, the value of  $x$  is 135.

Find the values of  $x$  and  $y$ .

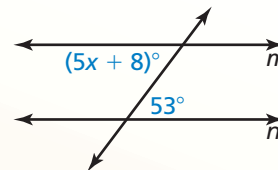


### 3.3 Proofs with Parallel Lines (pp. 137–144)

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

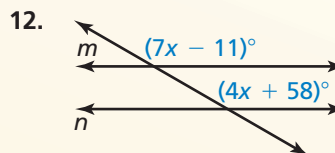
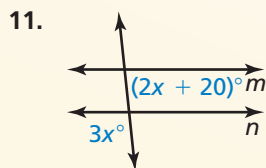
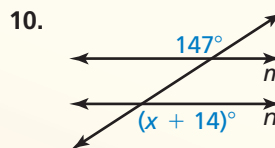
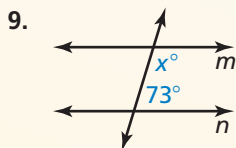
By the Alternate Interior Angles Converse (Theorem 3.6),  $m \parallel n$  when the marked angles are congruent.

$$\begin{aligned}(5x + 8)^\circ &= 53^\circ \\ 5x &= 45 \\ x &= 9\end{aligned}$$



▶ The lines  $m$  and  $n$  are parallel when  $x = 9$ .

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

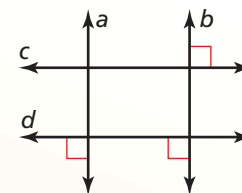


### 3.4 Proofs with Perpendicular Lines (pp. 147–154)

Determine which lines, if any, must be parallel. Explain your reasoning.

Lines  $a$  and  $b$  are both perpendicular to  $d$ , so by the Lines Perpendicular to a Transversal Theorem (Theorem 3.12),  $a \parallel b$ .

Also, lines  $c$  and  $d$  are both perpendicular to  $b$ , so by the Lines Perpendicular to a Transversal Theorem (Theorem 3.12),  $c \parallel d$ .



Determine which lines, if any, must be parallel. Explain your reasoning.

