

1-5 Study Guide and Intervention

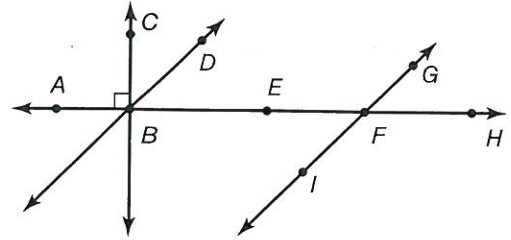
Angle Relationships

Pairs of Angles Adjacent angles are two angles that lie in the same plane and have a common vertex and a common side, but no common interior points. A pair of adjacent angles with noncommon sides that are opposite rays is called a linear pair. Vertical angles are two nonadjacent angles formed by two intersecting lines.

Example Name an angle or angle pair that satisfies each condition.

a. two vertical angles

$\angle EFI$ and $\angle GFH$ are nonadjacent angles formed by two intersecting lines. They are vertical angles.



b. two adjacent angles

$\angle ABD$ and $\angle DBE$ have a common vertex and a common side but no common interior points. They are adjacent angles.

c. two supplementary angles

$\angle EFG$ and $\angle GFH$ form a linear pair. The angles are supplementary.

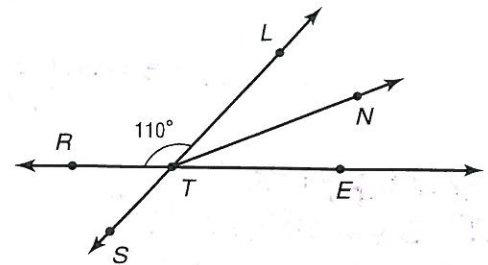
d. two complementary angles

$m\angle CBD + m\angle DBE = 90$. These angles are complementary.

Exercises

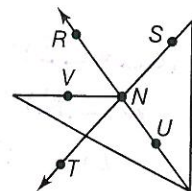
Name an angle or angle pair that satisfies each condition.

- two adjacent angles
 $\angle ETN$ and $\angle NTL$
- two acute vertical angles
 $\angle RTS$ and $\angle LTE$
- two supplementary adjacent angles
 $\angle RTL$ and $\angle LTE$
- an angle supplementary to $\angle RTS$
 $\angle ETS$



For Exercises 5–7, use the figure at the right.

- Identify two obtuse vertical angles.
 $\angle SNU$ and $\angle RNT$
- Identify two acute adjacent angles.
 $\angle RNV$ and $\angle VNT$
- Identify an angle supplementary to $\angle TNU$.
 $\angle RNT$



8. Find the measures of two complementary angles if the difference in their measures is 18.

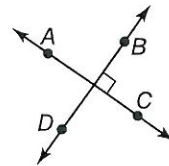
$$\begin{aligned} \angle A + \angle B &= 90^\circ \longrightarrow \\ \angle A - \angle B &= 18 \\ \hline 2\angle A &= 108 \\ \frac{2\angle A}{2} &= \frac{108}{2} \\ \angle A &= 54^\circ \end{aligned}$$

$$\begin{aligned} \angle B &= 90^\circ - 54^\circ \\ \angle B &= 36^\circ \end{aligned}$$

1-5 Study Guide and Intervention *(continued)*

Angle Relationships

Perpendicular Lines Lines, rays, and segments that form four right angles are **perpendicular**. The right angle symbol indicates that the lines are perpendicular. In the figure at the right, \overleftrightarrow{AC} is perpendicular to \overleftrightarrow{BD} , or $\overleftrightarrow{AC} \perp \overleftrightarrow{BD}$.



Example Find x so that \overleftrightarrow{DZ} and \overleftrightarrow{ZP} are perpendicular.

If $\overleftrightarrow{DZ} \perp \overleftrightarrow{ZP}$, then $m\angle DZP = 90$.

$$m\angle DZQ + m\angle QZP = m\angle DZP$$

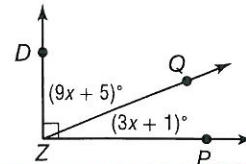
$$(9x + 5) + (3x + 1) = 90$$

$$12x + 6 = 90$$

$$12x = 84$$

$$x = 7$$

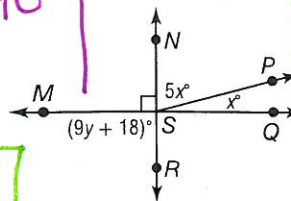
Sum of parts = whole
 Substitution
 Combine like terms.
 Subtract 6 from each side.
 Divide each side by 12.



Exercises

1. Find the value of x and y so that $\overleftrightarrow{NR} \perp \overleftrightarrow{MQ}$.

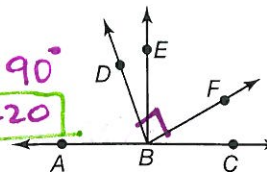
$\rightarrow \angle NSQ = 90^\circ$
 $5x + x = 90^\circ$
 $6x = 90^\circ$
 $\frac{6x}{6} = \frac{90}{6}$
 $x = 15^\circ$



2. Find $m\angle MSN = 90^\circ$ right angle

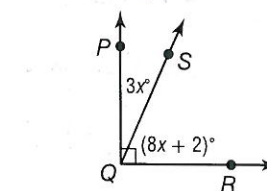
3. $m\angle EBF = 3x + 10$, $m\angle DBE = x$, and $\overleftrightarrow{BD} \perp \overleftrightarrow{BF}$. Find the value of x .

$m\angle EBF + m\angle DBE = 90^\circ$
 $3x + 10 + x = 90^\circ$
 $4x + 10 = 90^\circ$
 $x = 20$



4. If $m\angle EBF = 7y - 3$ and $m\angle FBC = 3y + 3$, find the value of y so that $\overleftrightarrow{EB} \perp \overleftrightarrow{BC}$.

$\rightarrow m\angle EBF + m\angle FBC = 90^\circ$
 $7y - 3 + 3y + 3 = 90^\circ$
 $10y = 90^\circ$
 $y = 9$

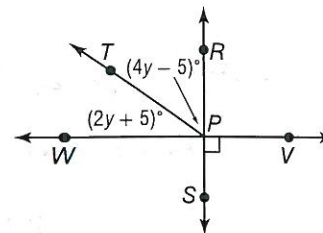


5. Find the value of x , $m\angle PQS$, and $m\angle SQR$.

$m\angle PQR = 90^\circ$
 $m\angle PQS + m\angle SQR = 90^\circ$
 $3x + 8x + 2 = 90^\circ$
 $11x + 2 = 90^\circ$
 $11x = 88$
 $x = 8^\circ$
 $m\angle PQS = 3x = 24^\circ$
 $m\angle SQR = 8x + 2 = 66^\circ$

6. Find the value of y , $m\angle RPT$, and $m\angle TPW$.

Since $m\angle SPV = 90^\circ$, $m\angle RPW = 90^\circ$
 So, $m\angle RPT + m\angle TPW = 90^\circ$
 $4y - 5 + 2y + 5 = 90^\circ$
 $6y = 90^\circ$
 $y = 15$
 $m\angle RPT = 4y - 5 = 55^\circ$



$m\angle TPW = 2y + 5 = 35^\circ$

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