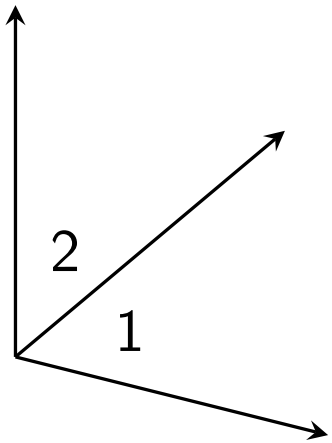
Exploring Angle Pairs

Adjacent Angles

Two angles are adjacent if they

- Share a common side



Adjacent Angles

Two angles are adjacent if they

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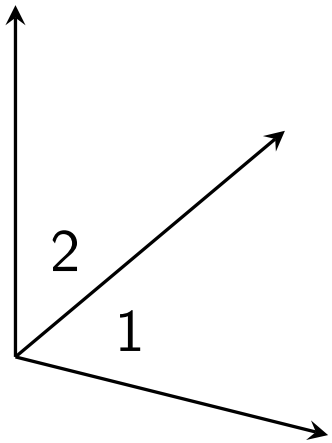

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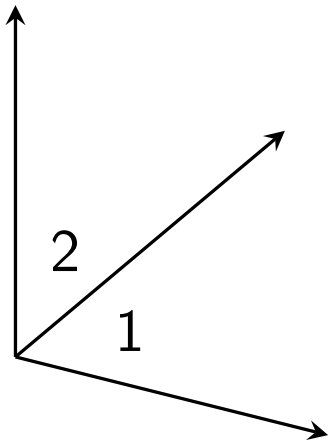
- Share a common vertex
- Have no common interior points



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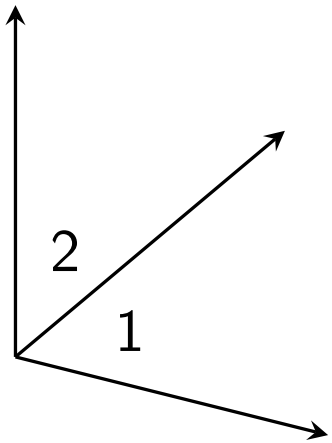
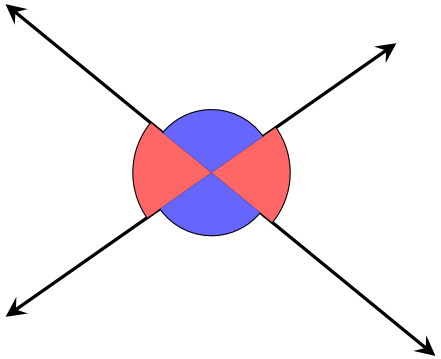


$\angle 1$ and $\angle 2$ are adjacent angles.

Vertical Angles

Vertical angles are formed by 2 intersecting lines.



Complementary Angles

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Two or more angles that add up to 90°

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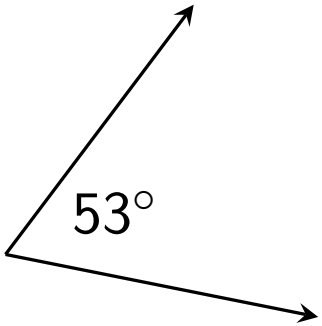

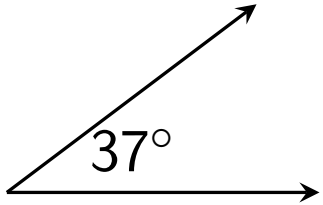

Supplementary Angles

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Two or more angles that add up to 180°

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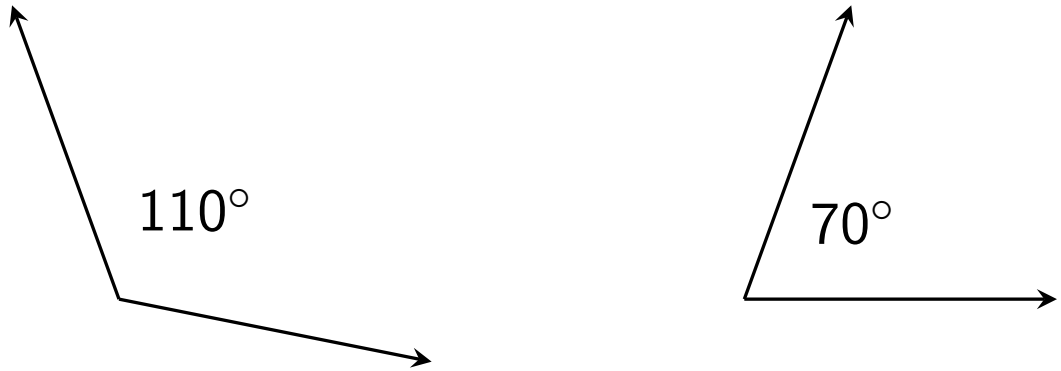
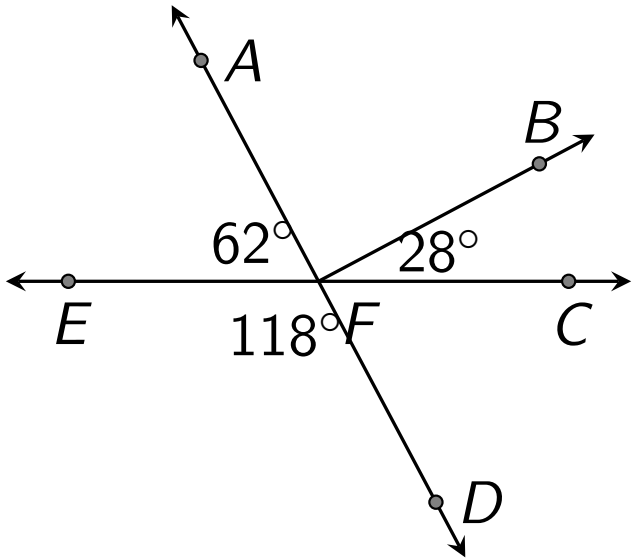


Example 1

Use the diagram to determine if each statement is true.



(a) $\angle BFD$ and $\angle AFB$ are adjacent angles.

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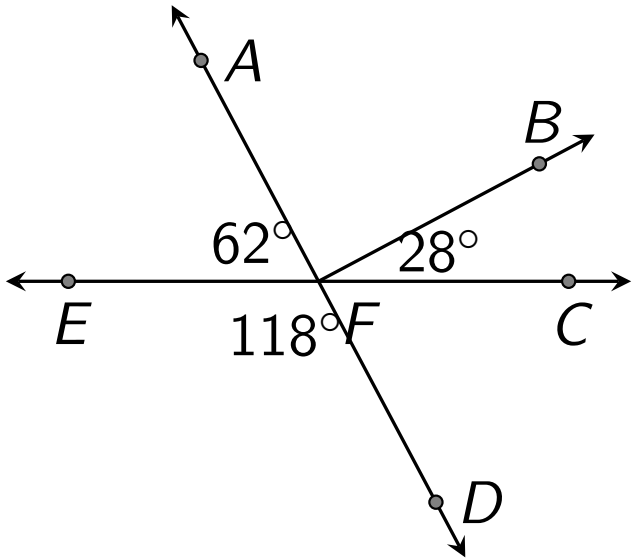

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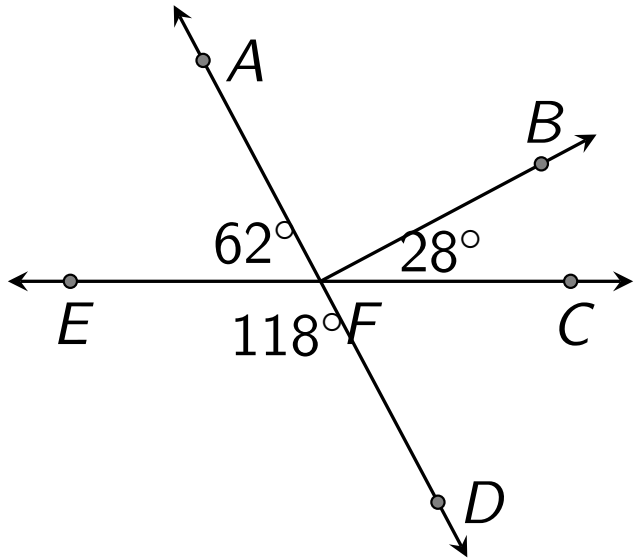

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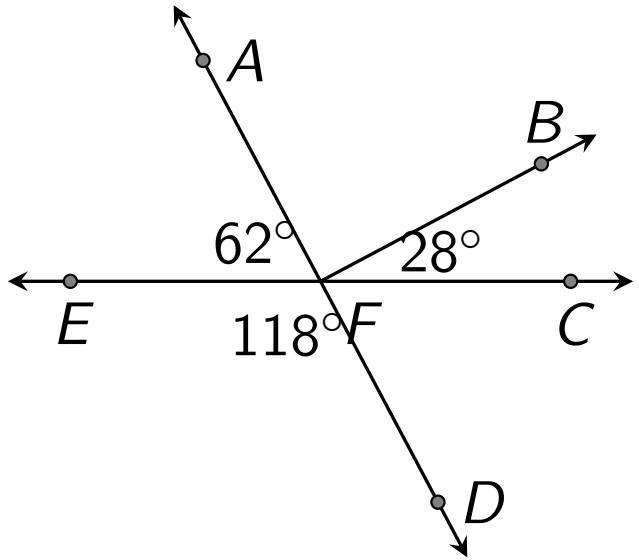

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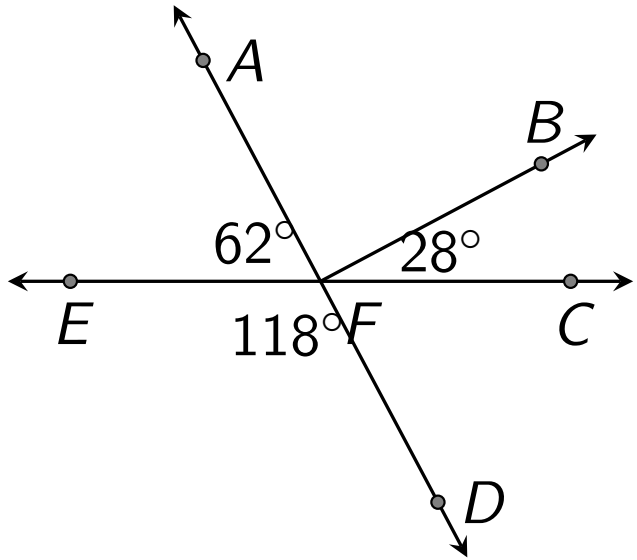

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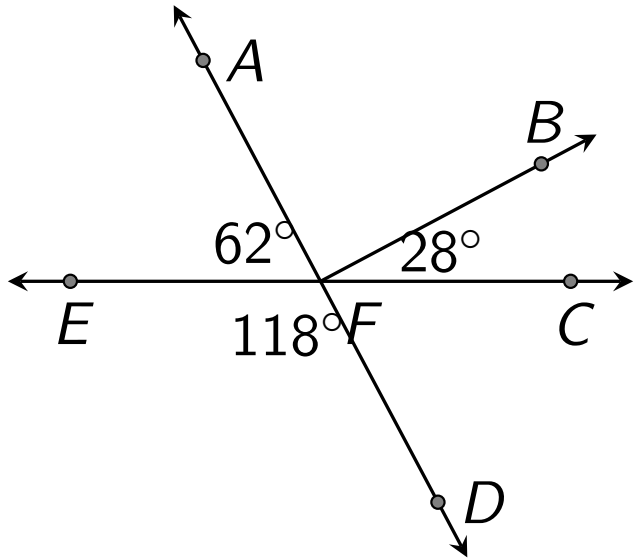

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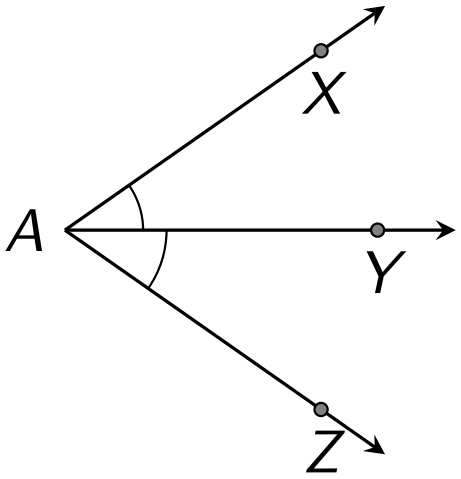
Angle Bisectors

An **angle bisector** is a ray (or segment) that divides an angle into 2 congruent angles.



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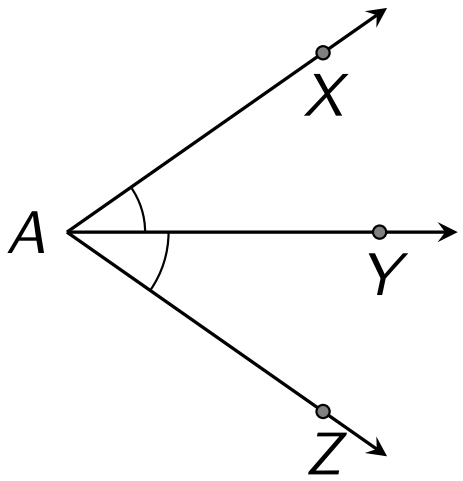

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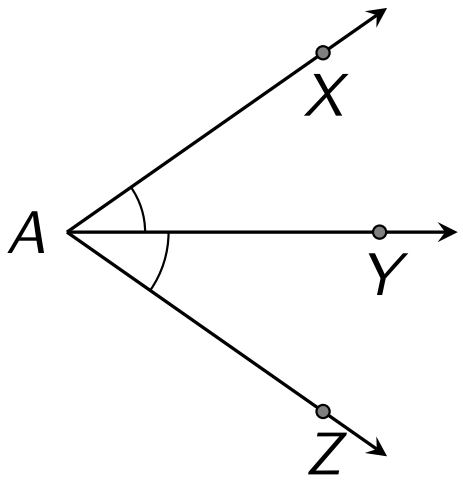
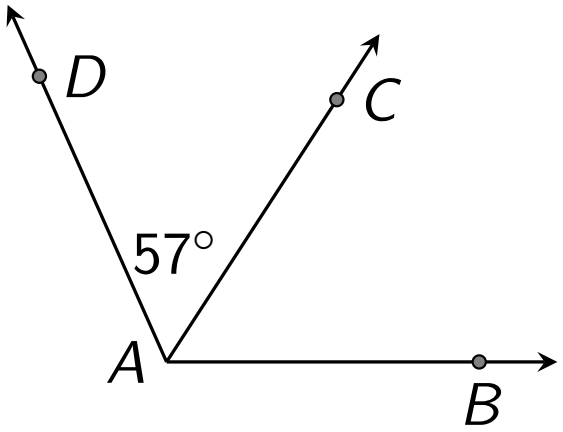


$\overrightarrow{AY}$ bisects $\angle XAZ \longrightarrow \angle XAY \cong \angle ZAY$

Example 2

(a) $\overrightarrow{AC}$ bisects $\angle DAB$. What is $m\angle DAB$?



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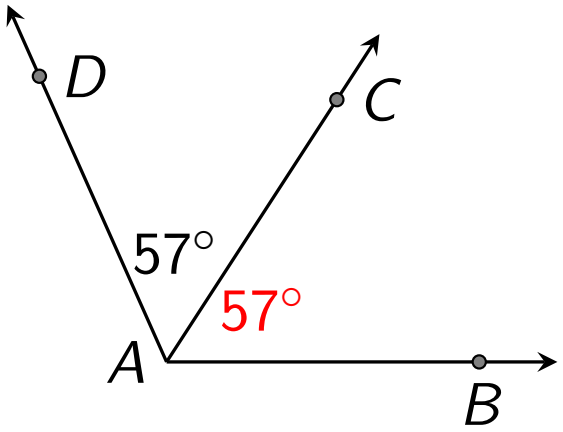

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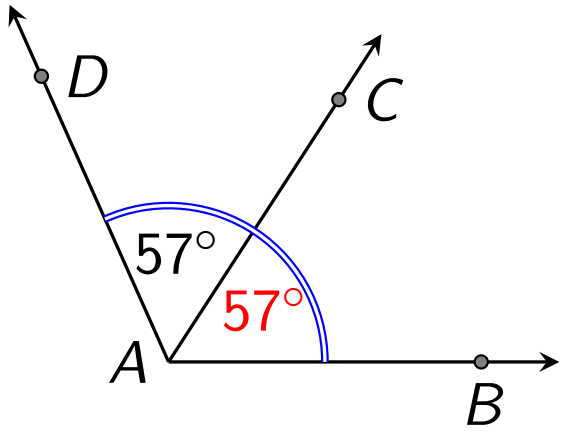

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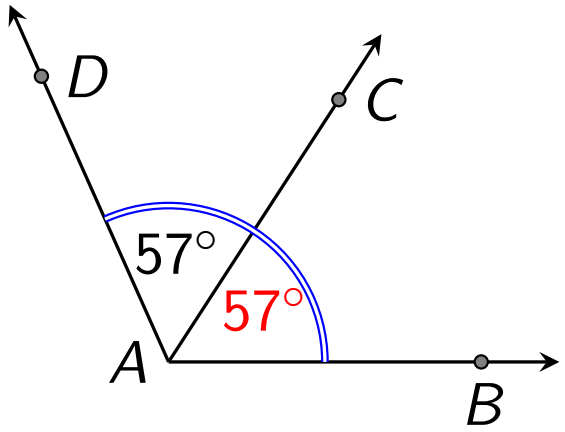

$m\angle DAB = 114°$

Example 2

(b) $\overrightarrow{KM}$ bisects $\angle JKL$. If $m\angle JKL = 72^\circ$, what is $m\angle JKM$?

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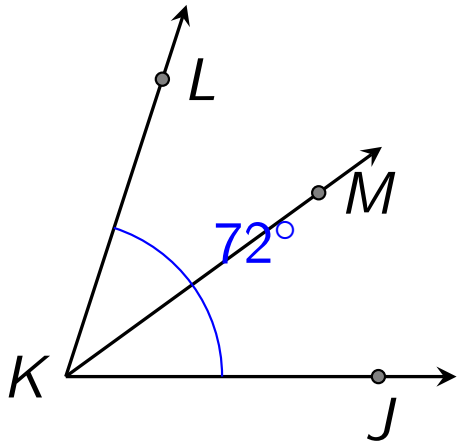

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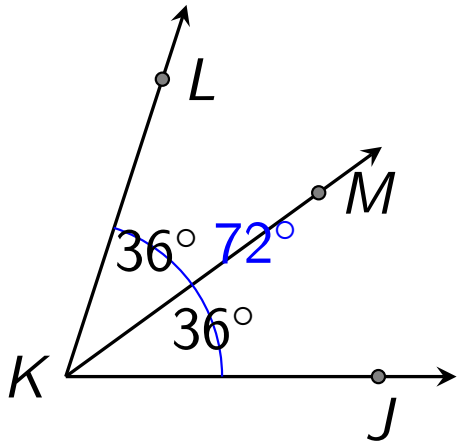

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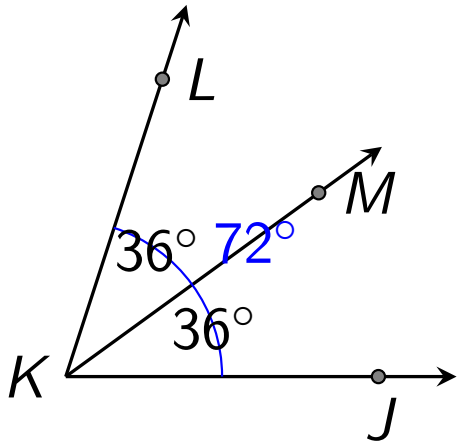
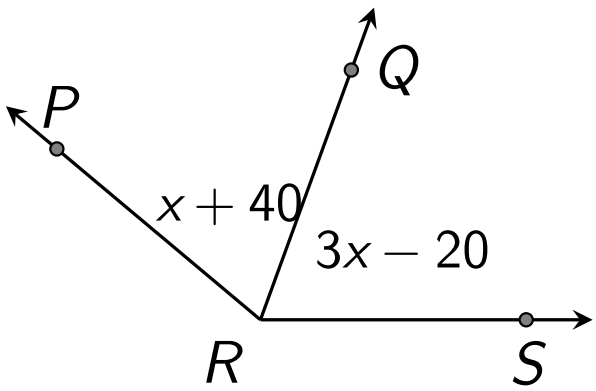


$m\angle JKM = 36°$

Example 2

(c) In the diagram, RQ bisects $angle PRS$. Find the value of x.



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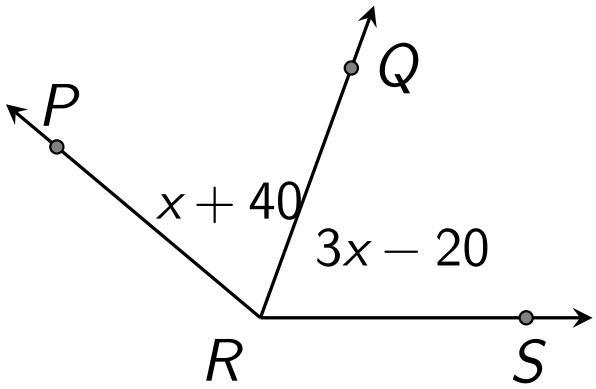

$$x + 40 = 3x - 20$$

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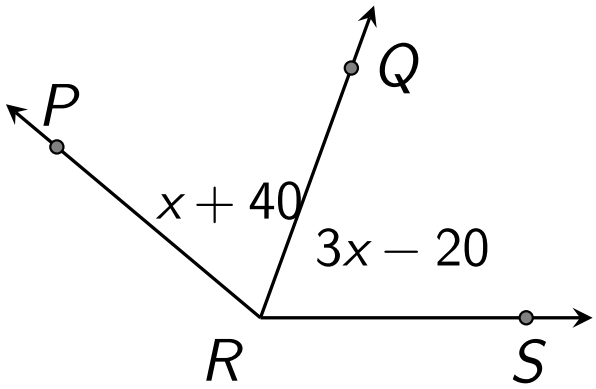

$$x + 40 = 3x - 20$$
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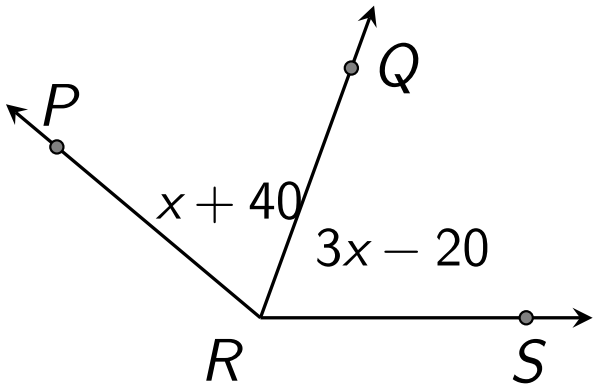

$$\begin{aligned} x + 40 &= 3x - 20 \\ 40 &= 2x - 20 \\ 60 &= 2x \end{aligned}$$

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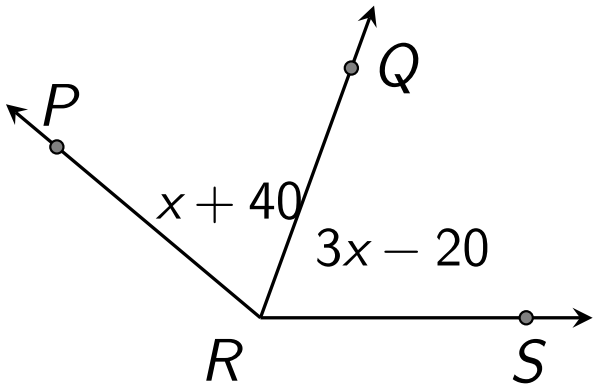

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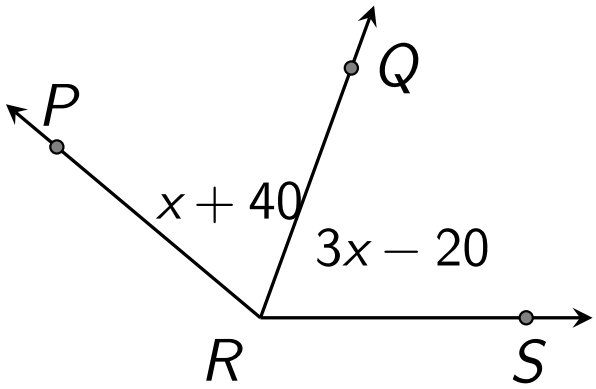

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Check:

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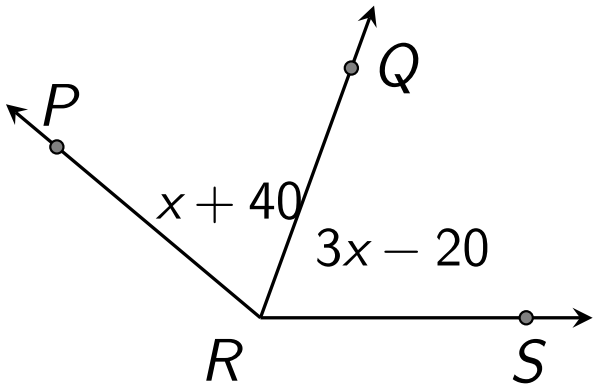

$$\begin{aligned} x + 40 &= 3x - 20 \\ 40 &= 2x - 20 \\ 60 &= 2x \\ x &= 30 \end{aligned}$$

Check:

$$30 + 40 \stackrel{?}{=} 3(30) - 20?$$

Example 2

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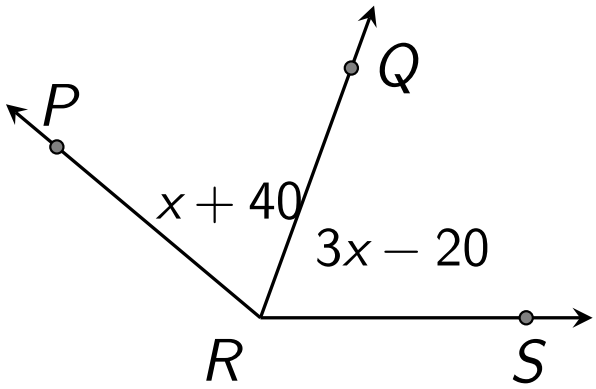

$$\begin{aligned} x + 40 &= 3x - 20 \\ 40 &= 2x - 20 \\ 60 &= 2x \\ x &= 30 \end{aligned}$$

Check:

$$30 + 40 \stackrel{?}{=} 3(30) - 20?$$
$$70 = 70$$

Linear Pairs

Linear Pair

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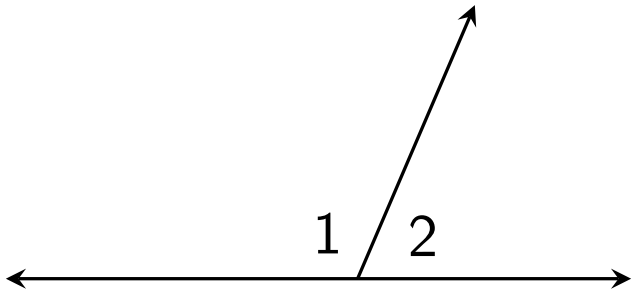

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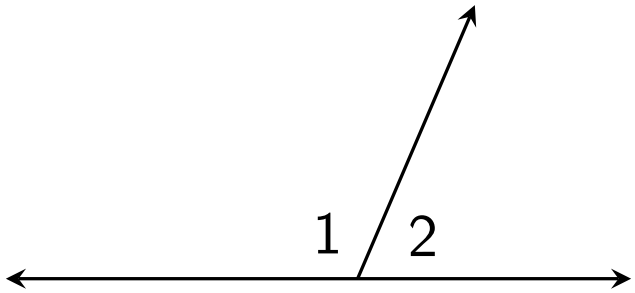

Angles 1 and 2 form a linear pair.

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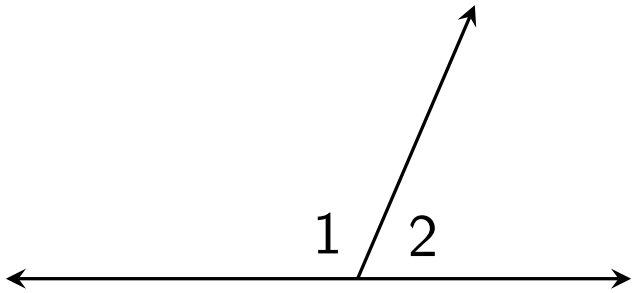
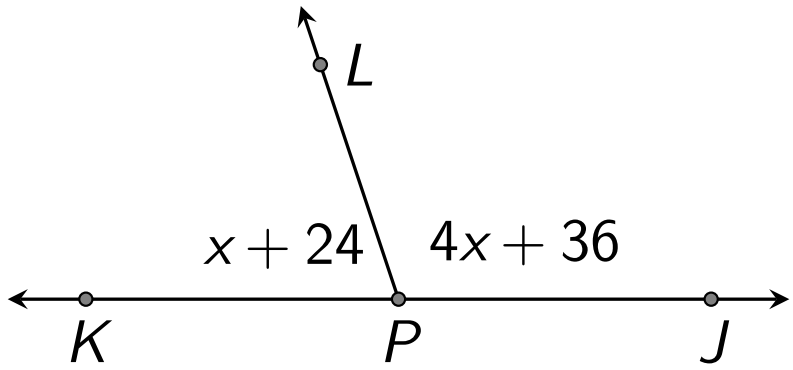


Angles 1 and 2 form a linear pair.

$m\angle 1 + m\angle 2 = 180^\circ$

Example 3

(a) Find the $m\angle KPL$ and $m\angle JPL$ in the diagram.



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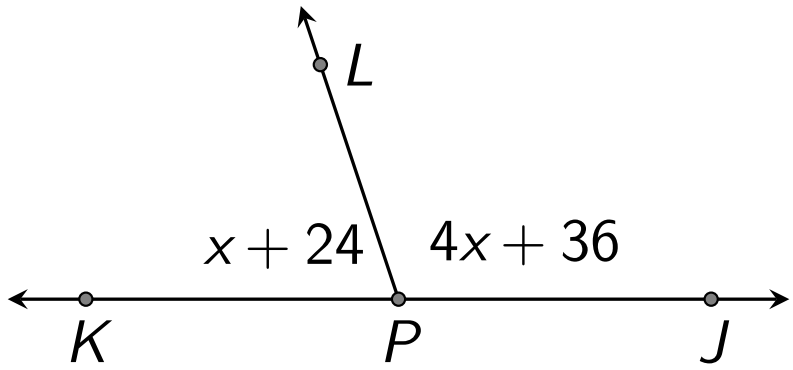

$$x + 24 + 4x + 36 = 180$$

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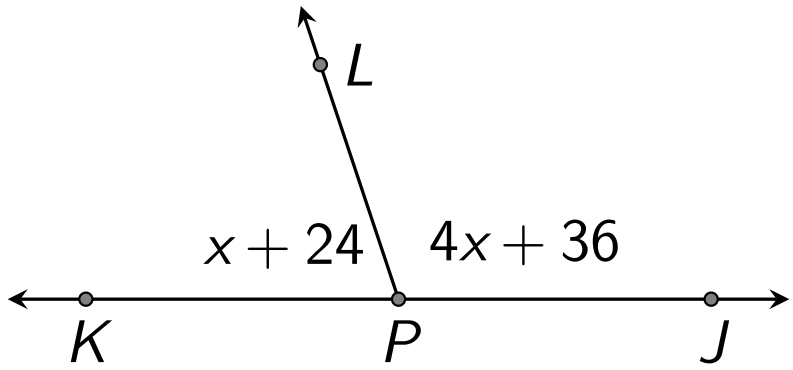

$$x + 24 + 4x + 36 = 180$$
$$5x + 60 = 180$$

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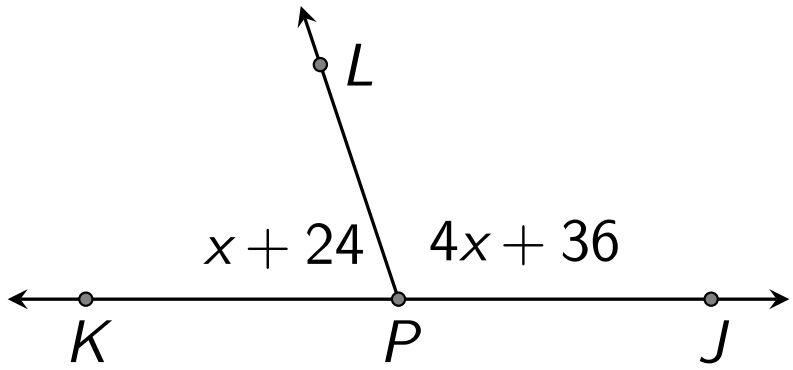

$$x + 24 + 4x + 36 = 180$$
$$5x + 60 = 180$$
$$5x = 120$$

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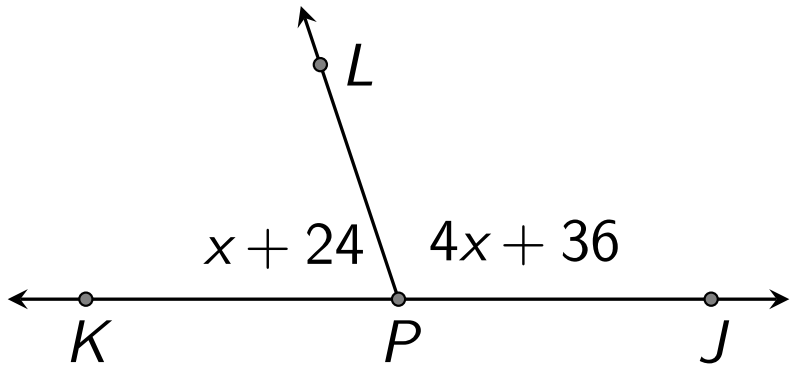
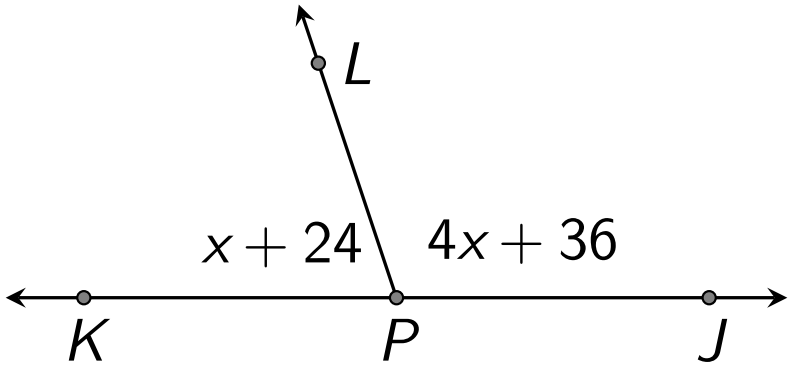


$$\begin{aligned} x + 24 + 4x + 36 &= 180 \\ 5x + 60 &= 180 \\ 5x &= 120 \\ x &= 24 \end{aligned}$$

Example 3a $x = 24$



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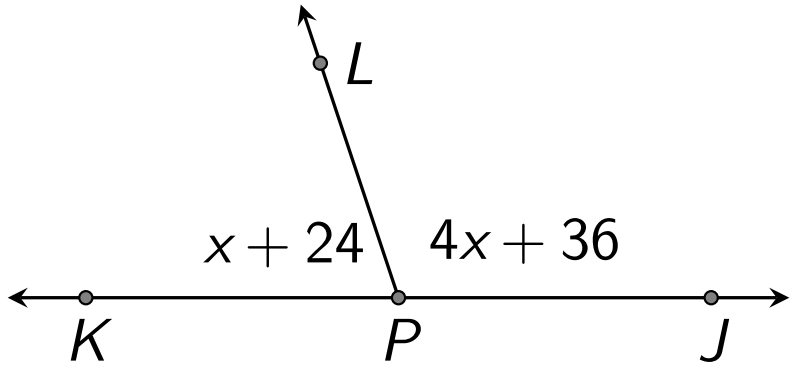

$m\angle KPL = 24 + 24$

$m\angle JPL = 4(24) + 36$

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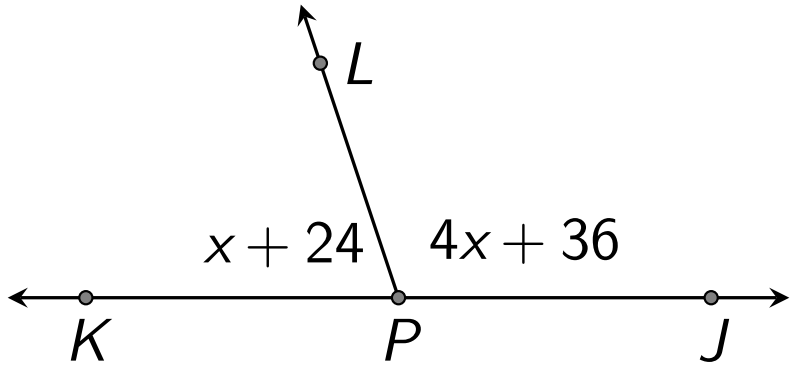

$m\angle KPL = 24 + 24$

$m\angle KPL = 48^\circ$

$m\angle JPL = 4(24) + 36$

$m\angle JPL = 132^\circ$