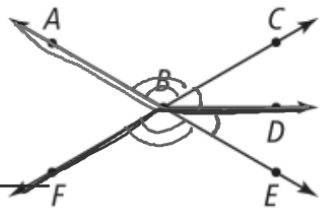
1. Write a two-column proof.

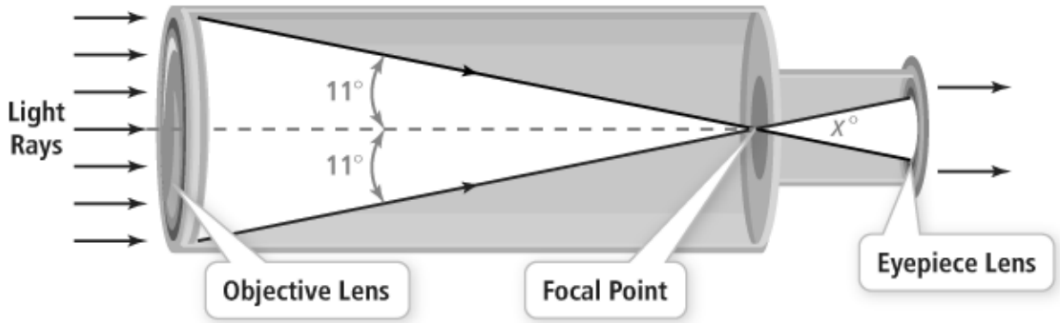


Given: $\overrightarrow{BD}$ bisects $\angle CBE$.
Prove: $\angle ABD \cong \angle FBD$

Statement	Reason
1) $\overrightarrow{BD}$ bisects $\angle CBE$	1) Given
2) $\angle CBD \cong \angle EBD$	2) Definition of Bisector
3) $\angle ABC \cong \angle FBE$	3) Vertical $\angle$'s $\cong$
4) $m\angle ABC + m\angle CBD = m\angle ABD$ $m\angle FBE + m\angle EBD = m\angle FBD$	4) Angle Addition post
5) $m\angle ABC + m\angle CBD = m\angle FBD$	5) Substitution prop.
6) $m\angle ABD = m\angle FBD$	6) Substitution prop.
7) $\angle ABD \cong \angle FBD$	7) Def $\cong$ $\angle$

$4+1=3+2$

The diagram shows how glass lenses change the direction of light rays passing through a telescope. What is the value of *x*, the angle formed by the crossed outermost light rays through the focal point?



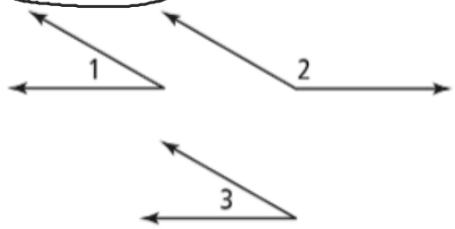
Congruent Supplements Theorem

$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$
$-m\angle 2 \qquad -m\angle 2$

$m\angle 1 = m\angle 3$

If two angles are supplementary to ~~congruent angles~~ (or to the same angle), then they are congruent.

If... $m\angle 1 + m\angle 2 = 180°$ and $m\angle 3 + m\angle 2 = 180°$



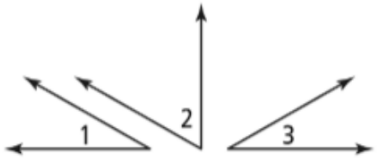
PROOF: SEE EXAMPLE 3.

Then... $\angle 1 \cong \angle 3$

Congruent Complements Theorem

If two angles are complementary to ~~congruent angles~~ (or to the same angle), then they are congruent.

If... $m\angle 1 + m\angle 2 = 90^\circ$ and $m\angle 3 + m\angle 2 = 90^\circ$



Then... $\angle 1 \cong \angle 3$

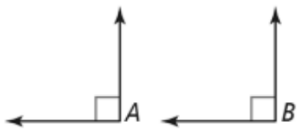
PROOF: SEE EXAMPLE 3 TRY IT.

THEOREM 1-4

Right Angle Theorem

All right angles are congruent.

If...



Then... $\angle A \cong \angle B$

PROOF: SEE EXERCISE 9.

THEOREM 1-5

If two angles are congruent and supplementary, then each is a right angle.

If... $\angle 1 \cong \angle 2$ and $m\angle 1 + m\angle 2 = 180°$

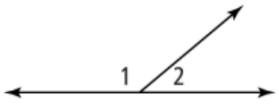
Then... $\angle 1$ and $\angle 2$ are right angles

PROOF: SEE EXERCISE 11.

Linear Pair Posulate

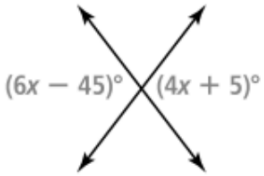
The sum of the measures of a linear pair is 180.

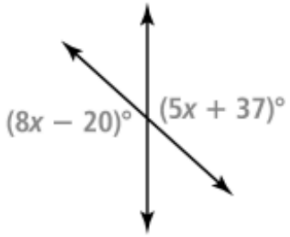
If... $\angle 1$ and $\angle 2$ form a linear pair.



Then... $m\angle 1 + m\angle 2 = 180$.

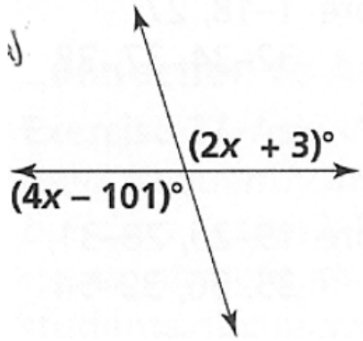
2. a. Find the value of x and the measure of each labeled angle.



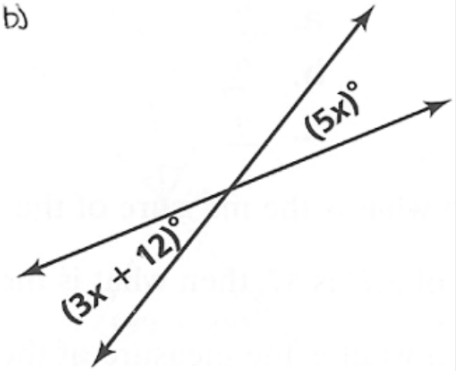


Find the value of the varibale.

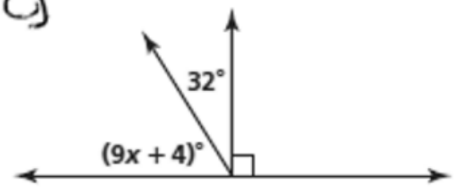
a)



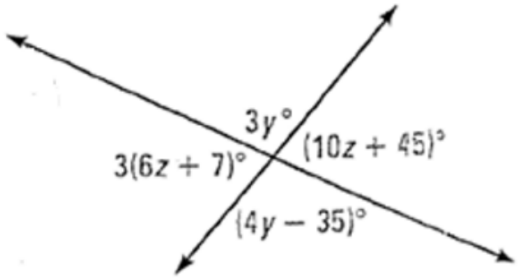
b)



c)

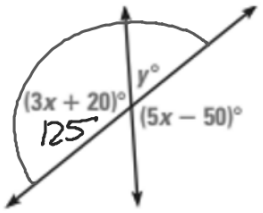


d)



3. Solve for the variable using what you know about angle relationships. *Show Work.*

a.



$3x+20 = 5x-50$

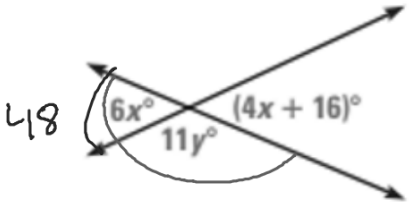
$2x = 70$

$x = 35$

$y + 125 = 180$

$y = 55$

b.



$6x = 4x + 16$

$2x = 16$

$x = 8$

$11y + 48 = 180$

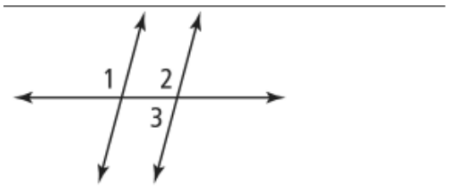
$\frac{11y}{11} = \frac{132}{11}$

$y = 12$

Write a two-column proof.

Given: $m\angle 1 = m\angle 2$, $m\angle 1 = 105$

Prove: $m\angle 3 = 75$

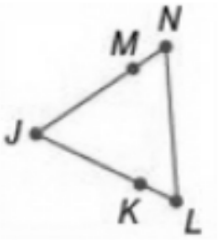


Statement	Reason
1) $m\angle 1 = m\angle 2$, $m\angle 1 = 105$	1) Given
2) $m\angle 2 = 105$	2) Substitution prop.
3) $\angle 2$ + $\angle 3$ form a Linear pair	3) Definition of Linear Pair
4) $m\angle 2 + m\angle 3 = 180$	4) Linear Pair Postulate
5) $105 + m\angle 3 = 180$	5) Substitution prop.
6) $m\angle 3 = 75$	6) Subtraction prop.

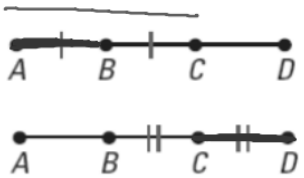
Given: $\overline{LK} \cong \overline{NM}, \overline{KJ} \cong \overline{MJ}$

Prove: $\overline{LJ} \cong \overline{NJ}$

Proof:



GIVEN: B **is the midpoint of** $\overline{AC}$ **.**
C **is the midpoint of** $\overline{BD}$ **.**



PROVE: $AB = CD$

Statement	Reason
1) B is midpt of $\overline{AC}$ C is midpt of $\overline{BD}$	1) Given
2) $AB = BC$ $BC = CD$	2) Def of midpt
3) $AC = AB + BC$ $BD = BC + CD$	3) Segment Add Post.
4) $AC = BC + BC$ $BD = BC + B$	4) Substitution prop.
5) $AC = BD$	5) Substitution prop
6) $AB + \cancel{BC} = BC + CD$	6) Substitution prop.
7) $AB = CD$	7) Subtraction prop