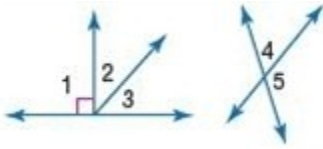


2-8 Proving Angle Relationships

Find the measure of each numbered angle, and name the theorems that justify your work.



1. $m\angle 2 = 26$

ANSWER:

$m\angle 1 = 90, m\angle 3 = 64$; Comp. Thm.

2. $m\angle 2 = x, m\angle 3 = x - 16$

ANSWER:

$m\angle 2 = 53, m\angle 3 = 37$; Comp. Thm.

3. $m\angle 4 = 2x, m\angle 5 = x + 9$

ANSWER:

$m\angle 4 = 114, m\angle 5 = 66$; Suppl. Thm.

4. $m\angle 4 = 3(x - 1), m\angle 5 = x + 7$

ANSWER:

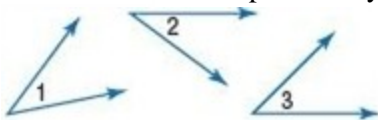
$m\angle 4 = 129, m\angle 5 = 51$; Suppl. Thm.

2-8 Proving Angle Relationships

6. **PROOF** Copy and complete the proof of Theorem 2.7.

Given: $\angle 1$ and $\angle 3$ are complementary.

$\angle 2$ and $\angle 3$ are complementary.



Prove: $\angle 1 \cong \angle 2$

Statements	Reasons
a. $\angle 1$ and $\angle 3$ are complementary. $\angle 2$ and $\angle 3$ are complementary.	a. ___ ?
b. $m\angle 1 + m\angle 3 = 90$; $m\angle 2 + m\angle 3 = 90$	b. ___ ?
c. $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	c. ___ ?
d. ___ ?	d. Reflexive Property
e. $m\angle 1 = m\angle 2$	e. ___ ?
f. $\angle 1 \cong \angle 2$	f. ___ ?

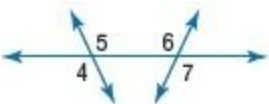
ANSWER:

Statements	Reasons
a. $\angle 1$ and $\angle 3$ are complementary. $\angle 2$ and $\angle 3$ are complementary.	a. ___ ? Given
b. $m\angle 1 + m\angle 3 = 90$; $m\angle 2 + m\angle 3 = 90$	b. ___ ? Def. of comp. Δ
c. $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	c. ___ ? Subs.
d. ___ ? $m\angle 3 = m\angle 3$	d. Reflexive Property
e. $m\angle 1 = m\angle 2$	e. ___ ? Subt. Prop.
f. $\angle 1 \cong \angle 2$	f. ___ ? Def $\cong \Delta$

7. **PROOF** Write a two-column proof.

Given: $\angle 4 \cong \angle 7$

Prove: $\angle 5 \cong \angle 6$



ANSWER:

Given: $\angle 4 \cong \angle 7$

Prove: $\angle 5 \cong \angle 6$

Proof:

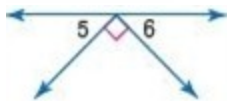
Statements (Reasons)

- $\angle 4 \cong \angle 7$ (Given)
- $\angle 4 \cong \angle 5$ and $\angle 6 \cong \angle 7$ (Vert. \angle s Thm.)
- $\angle 7 \cong \angle 5$ (Subs.)
- $\angle 5 \cong \angle 6$ (Subs.)

2-8 Proving Angle Relationships

Find the measure of each numbered angle, and name the theorems used that justify your work.

8. $m\angle 5 = m\angle 6$

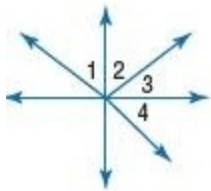


ANSWER:

$$m\angle 5 = m\angle 6 = 45 \text{ (} \cong \text{ Supp. Thm.)}$$

9. $\angle 2$ and $\angle 3$ are complementary.

$$\angle 1 \cong \angle 4 \text{ and } m\angle 2 = 28$$



ANSWER:

$$m\angle 3 = 62, m\angle 1 = m\angle 4 = 45 \text{ (} \cong \text{ Comp. and Supp. Thm.)}$$

10. $\angle 2$ and $\angle 4$, and $\angle 4$ and $\angle 5$ are supplementary. $m\angle 4 = 105$

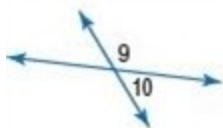


ANSWER:

$$m\angle 2 = 75, m\angle 3 = 105, m\angle 5 = 75 \text{ (} \cong \text{ Supp. Thm.)}$$

Find the measure of each numbered angle and name the theorems used that justify your work.

11. $m\angle 9 = 3x + 12$
 $m\angle 10 = x - 24$

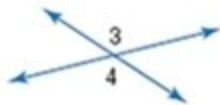


ANSWER:

$$m\angle 9 = 156, m\angle 10 = 24 \text{ (Supp. Thm.)}$$

2-8 Proving Angle Relationships

12. $m\angle 3 = 2x + 23$
 $m\angle 4 = 5x - 112$



ANSWER:

$$m\angle 3 = 113, m\angle 4 = 113 \text{ (Vert. } \angle\text{s Thm.)}$$

13. $m\angle 6 = 2x - 21$
 $m\angle 7 = 3x - 34$

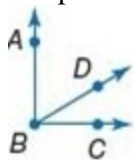


ANSWER:

$$m\angle 6 = 73, m\angle 7 = 107, m\angle 8 = 73 \text{ (} \cong \text{ Supp. Thm. and Vert. } \angle\text{s Thm.)}$$

PROOF Write a two-column proof.

14. Given: $\angle ABC$ is a right angle.
Prove: $\angle ABD$ and $\angle CBD$ are complementary.



ANSWER:

Proof:

Statements (Reasons)

1. $\angle ABC$ is a right angle. (Given)
2. $m\angle ABC = 90$ (Def. of rt. angle)
3. $m\angle ABC = m\angle ABD + m\angle CBD$ (\angle Add. Post.)
4. $m\angle ABD + m\angle CBD = 90$ (Subs.)
6. $\angle ABD$ and $\angle CBD$ are complementary. (Def. of compl. \angle s)

2-8 Proving Angle Relationships

15. Given: $\angle 5 \cong \angle 6$

Prove: $\angle 4$ and $\angle 6$ are supplementary.



ANSWER:

Proof:

Statements (Reasons)

1. $\angle 5 \cong \angle 6$ (Given)
2. $m\angle 5 = m\angle 6$ (Def. of $\cong \angle s$)
3. $\angle 4$ and $\angle 5$ are supplementary. (Def. of linear pairs)
4. $m\angle 4 + m\angle 5 = 180$ (Def. of supp. $\angle s$)
5. $m\angle 4 + m\angle 6 = 180$ (Subst.)
6. $\angle 4$ and $\angle 6$ are supplementary. (Def. of supp. $\angle s$)