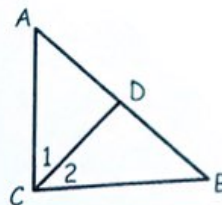


Proving Theorems about Angles and Lines

Vocabulary:

1. Use the figure at the right.

- a. Name $\angle 1$ in two other ways. $\angle ACD, \angle C, \angle DCA$
- b. Name a pair of angles that form a linear pair.
 $\angle ADC$ and $\angle CDB$
- c. Name a pair of adjacent angles that are not supplementary.
 $\angle 1$ and $\angle 2$



2. Identify all pairs of each type of angles in the diagram.

a. Linear pair

$\angle 1$ and $\angle 5, \angle 5$ and $\angle 2$

b. Complementary angle

$\angle 3$ and $\angle 4$

c. Vertical angles

$\angle 1$ and $\angle 2$

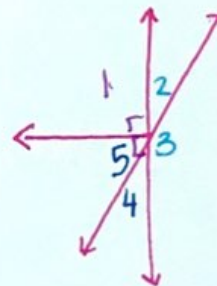
d. Supplementary angles

$\angle 1$ and $\angle 5, \angle 5$ and $\angle 2$



3. Make a diagram that matches the following description:

- $\angle 1$ is adjacent to $\angle 2$.
- $\angle 2$ and $\angle 3$ are a linear pair.
- $\angle 2$ and $\angle 4$ are vertical angles.
- $\angle 4$ and $\angle 5$ are complementary.



4. If $m\angle B = 87^\circ$, find the measure of its supplement.

$180 - 87 = \boxed{93^\circ}$

5. If $m\angle B = 37^\circ$, find the measure of its complement.

$90 - 37 = \boxed{53^\circ}$

6. $m\angle A$ and $m\angle B$ are complementary.

Find x and $m\angle A$ and $m\angle B$

if $m\angle A = 2x$ and $m\angle B = 3x + 10$

$2x + 3x + 10 = 90$

$5x + 10 = 90$

$5x = 80$

$x = \boxed{16}$

$m\angle A = \boxed{32}$

$m\angle B = \boxed{58^\circ}$

7. $m\angle A$ and $m\angle B$ are supplementary.

Find x and $m\angle A$ and $m\angle B$

if $m\angle A = 2x + 5$ and $m\angle B = 3x - 10$

$2x + 5 + 3x - 10 = 180$

$5x - 5 = 180$

$5x = 185$

$x = \boxed{37}$

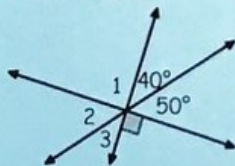
$m\angle A = \boxed{79^\circ}$

$m\angle B = \boxed{101^\circ}$

Finding Measures of Angles:

8. What are the measures of $\angle 1, \angle 2,$ and $\angle 3$?

- $\angle 1 = 90^\circ$
- $\angle 2 = 50^\circ$
- $\angle 3 = 40^\circ$

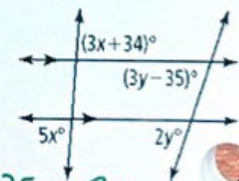


9. Solve for x and y .

$3x + 34 = 5x$

$34 = 2x$

$x = \boxed{17}$



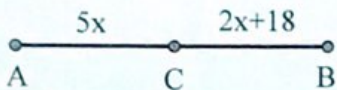
$3y - 35 = 2y$

$-3y - 35 = -y$

$y = \boxed{35}$

Proofs: Construct a proof for each problem. Be sure to justify each step.

10. Given: C is the midpoint of \overline{AB}
 Prove: $x = 6$



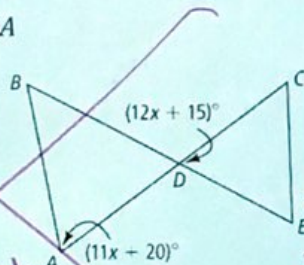
Statement	Reason
1. C is midpoint \overline{AB}	1. Given
2. $\overline{AC} \cong \overline{CB}$	2. C is the midpt.
3. $5x = 2x + 18$	3. Substitution
4. $3x = 18$	4. Subtraction
5. $x = 6$	5. Division Property

11. Given: $DF = 27$
 Prove: $x = 4$



Statement	Reason
1. $DF = 27$	1. Given
2. $DE + EF = DF$	2. Segment Add. Postulate
3. $2x + 5x - 1 = 27$	3. Substitution
4. $7x - 1 = 27$	4. combine like-term
5. $7x = 28$	5. Addition Prop.
6. $x = 4$	6. Division

12. Given: $\angle A \cong \angle BDA$
 Prove: $x = 5$



NOT ENOUGH ROOM!

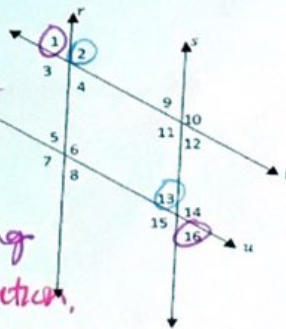
13. Given: $l \parallel m$, prove that $m\angle 2 + m\angle 5 = 180^\circ$.

Statement	Reason
1. $l \parallel m$	1. Given
2. $m\angle 2 + m\angle 4 = 180$	2. Linear pair
3. $\angle 4 \cong \angle 5$	3. Alternat Interior Angle Theorem
4. $m\angle 2 + m\angle 5 = 180$	4. By substitution.

Use the figure on the right for questions 14-15 to form a two column proof.

14. Given: $r \parallel s$ and $t \parallel u$
 Prove: $\angle 2$ and $\angle 13$ are supplementary.

15. Given: $r \parallel s$ and $t \parallel u$
 Prove: $\angle 1 \cong \angle 16$.



Statement	Reason
1. $r \parallel s$ and $t \parallel u$	1. Given
2. $\angle 2 + \angle 9 = 180$	2. Same side Int.
3. $\angle 9 \cong \angle 13$	3. Correspond.
4. $\angle 2 + \angle 13 = 180^\circ$	4. By substituta.

Statement	Reason.
1. $r \parallel s$ and $t \parallel u$	1. Given
2. $\angle 1 \cong \angle 8$	2. Alt Exterior Angles
3. $\angle 8 \cong \angle 16$	3. Corresponding
4. $\angle 1 \cong \angle 16$	4. By substitution.