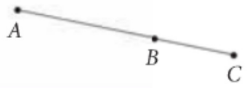
Summary — **Properties of Congruence**

Reflexive Property	$\overline{AB} \cong \overline{AB}$ $\angle A \cong \angle A$
Symmetric Property	If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$. If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
Transitive Property	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

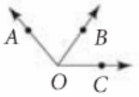
Postulate 1-6 **Segment Addition Postulate**

If three points A, B, and C are collinear and B is between A and C, then $AB + BC = AC$.

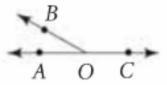


Postulate 1-8 **Angle Addition Postulate**

If point B is in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$.



If $\angle AOC$ is a straight angle, then $m\angle AOB + m\angle BOC = 180$.



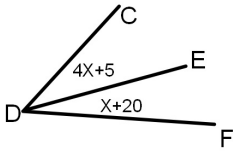
Postulate 1-8 **Angle Addition Postulate**

If point B is in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$.

If $\angle AOC$ is a straight angle, then $m\angle AOB + m\angle BOC = 180$.

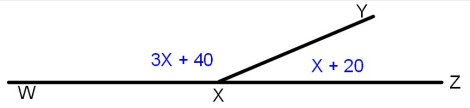
Solve for x.

Given: m∠CDF = 75°



Steps	Reasons
m∠CDF = 75°	Given
∠CDE + ∠EDF = ∠CDF	∠ add post.
4x+5 + x+20 = 75	Substitution
5x + 25 = 75	Comb. like terms
5x+25-25 = 75-25	Subtr prop =
5x = 50	Simpl.
5x/5 = 50/5	Div. prop =
x = 10	Simpl.

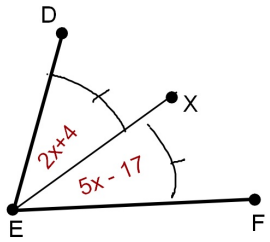
Solve for x.



Steps	Reasons
∠WXY + ∠YXZ = 180	∠ add post
3x+40 + x+20 = 180	Substitute
4x+60 = 180	combine like terms
4x+60-60 = 180-60	Subtract prop =
4x = 120	Simplify
4x/4 = 120/4	div prop =
x = 30	simplify

Given: $\overline{EX}$ bisects $\angle DEF$

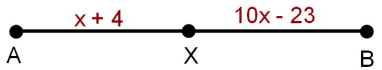
State the reasons that justify each step.



Step	Reason
$\overline{EX}$ bisects $\angle DEF$	Given
$m\angle DEX = m\angle XEF$	def of $\angle$ bisect
$2x + 4 = 5x - 17$	Subst
$2x + 4 - 2x = 5x - 17 - 2x$	Subtr prop =
$4 = 3x - 17$	Simplify
$4 + 17 = 3x - 17 + 17$	Add prop =
$21 = 3x$	Simplify
$21 \div 3 = 3x \div 3$	$\div$ prop =
$7 = x$	Simplify
$x = 7$	Symmetric prop

Given: X is the midpoint of $\overline{AB}$

Prove: $x = 3$



Step	Reason
X is the midpoint of $\overline{AB}$	Given
$AX = XB$	def of mdpt
$x+4 = 10x-23$	Subst.
$x+4-4 = 10x-23-4$	Subtr prop =
$x = 10x-27$	Simplify
$x-10x = 10x-27-10x$	Subtr prop =
$-9x = -27$	Simplify
$-9x/-9 = -27/-9$	div prop =
$x = 3$	Simplify