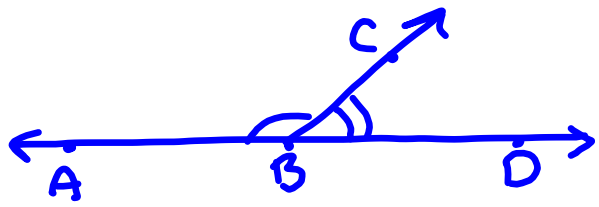
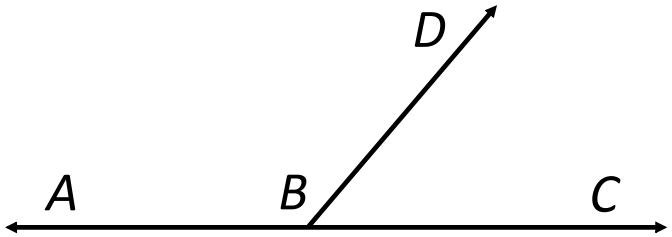
A LINEAR PAIR is formed by 2 adjacent angles whose noncommon sides form a straight angle



∠ABC and ∠CBD form a linear pair!

Linear Pair Postulate

If two angles form a linear pair, then they are supplementary

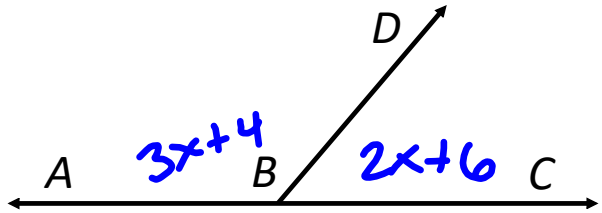


m∠ABD + m∠DBC = 180°

$m\angle ABD = (3x+4)^\circ$

$m\angle DBC = (2x+6)^\circ$

Find the value of x



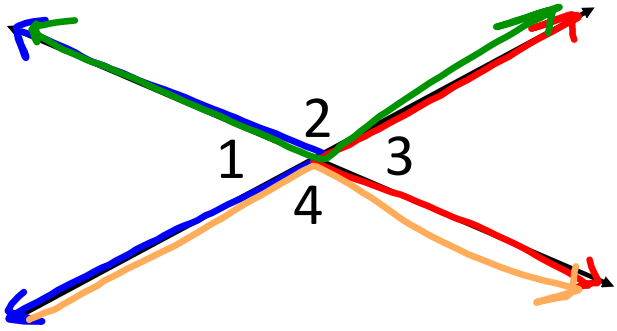
$(3x+4)+(2x+6)=180^\circ$

$5x+10=180$

$5x=170$

$\boxed{x=34}$

Two angles are VERTICAL ANGLES if the rays forming the sides of one and the rays forming the sides of the other are opposite rays

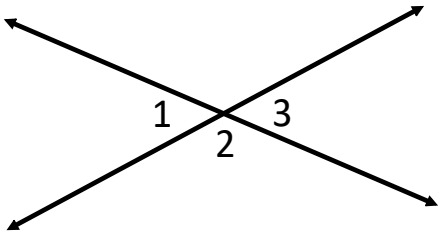


∠1 and ∠3 are vert. ∠'s!

∠2 and ∠4 are vert. ∠s!

Given: $\angle 1$ and $\angle 3$ are Vertical Angles

Prove: $\angle 1 \cong \angle 3$

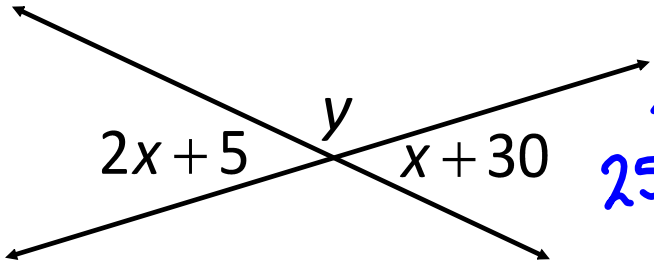


Statements	Reasons
1. $\angle 1$ and $\angle 3$ are vert. $\angle$'s	1. Given
2. $\angle 1$ and $\angle 2$ are a lin. pair	2. Assume from diagram.
3. $m\angle 1 + m\angle 2 = 180°$	3. Linear Pair Post.
4. $\angle 3$ and $\angle 2$ are a lin. pair	4. Assume From diagram.
5. $m\angle 3 + m\angle 2 = 180°$	5. Linear Pair Post.
6. $\angle 1 \cong \angle 3$	6. $\cong$ Supp. theo.

Vertical Angles Theorem

Vertical Angles are always congruent

Find *x* and *y*



$2x + 5 = x + 30$

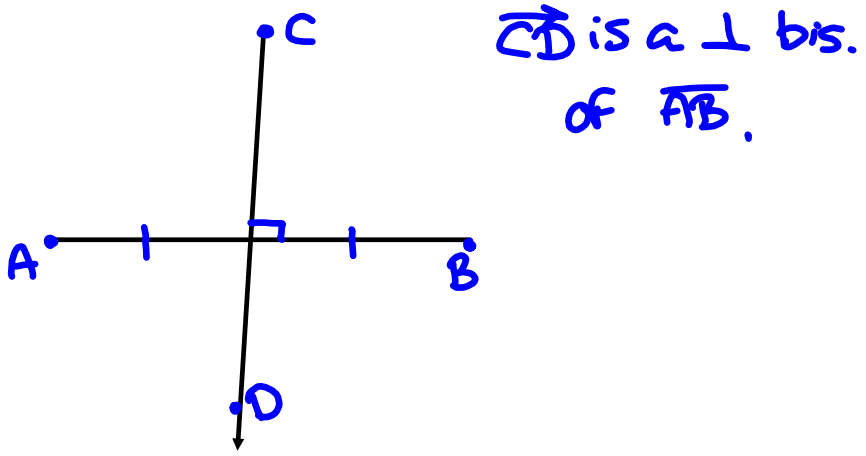
$\boxed{x = 25}$

$x + 30 + y = 180$

$25 + 30 + y = 180$

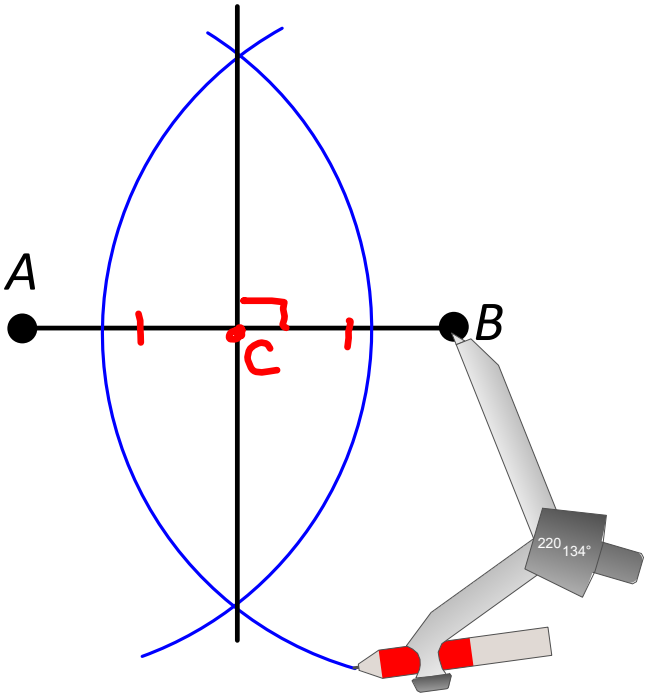
$\boxed{y = 125}$

A PERPENDICULAR BISECTOR is a line that is perpendicular to a segment at its midpoint



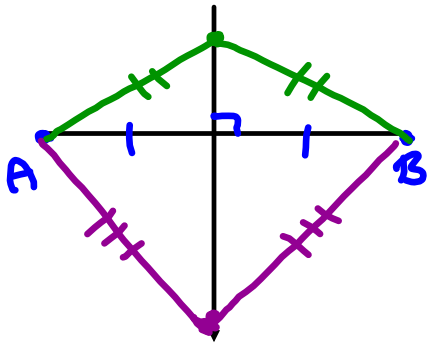
Constructing a Perpendicular Bisector

1. Set the point of the compass onto one of the endpoints of the line segment
2. Adjust the compass's width to approx 2/3 of the length of the entire segment
3. Without changing the width, draw an arc above the line, and another below the line
4. Set the point of the compass onto the other endpoint of the line segment
5. Draw arcs above and below the line so that they intersect the first two arcs
6. Use a straightedge to connect the arc intersection points

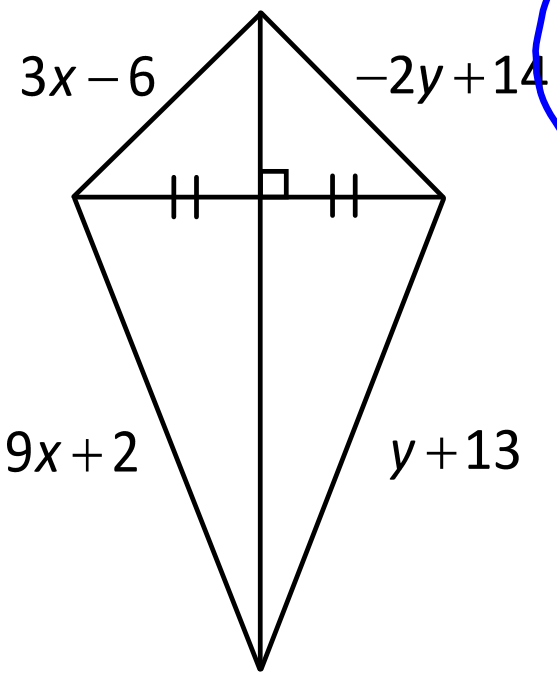


Perpendicular Bisector Theorem (PBT)

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.



Find *x* and *y*



$3x-6=-2y+14$

$9x+2=y+13$

$y=9x-11$

$3x-6=-2(9x-11)+14$

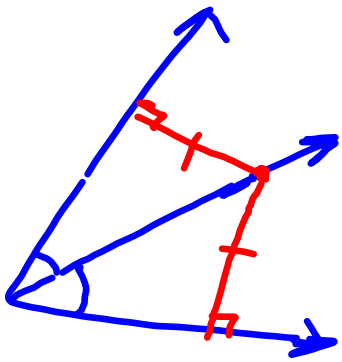
$3x-6=-18x+22+14$

$21x=42$

$x=2$ $y=7$

Angle Bisector Theorem (ABT)

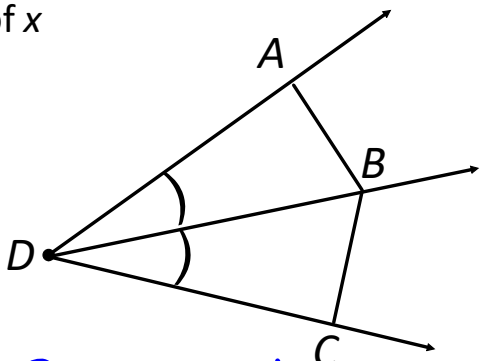
If a point is on the bisector of an angle, then that point is equidistant from the sides of the angle.



Find the value of x

$AB = 2x + 33$

$BC = 8x - 12$



The value of x cannot be determined.

However, if $\overline{DA} \perp \overline{BA}$ and $\overline{DC} \perp \overline{BC}$, then ABT!

$2x + 33 = 8x - 12$

$45 = 6x$

$x = \frac{45}{6}$

$\boxed{x = \frac{15}{2}}$