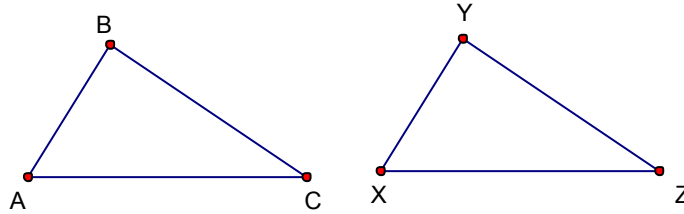


4-4 Congruent Triangles

Congruent figures: When two figures are congruent their corresponding angles and corresponding sides are congruent.

In the figures below $\triangle ABC \cong \triangle XYZ$ which is read, "Triangle ABC is congruent to triangle XYZ ." The order in which the triangle is named is important; the corresponding parts (angles and sides) must match up.

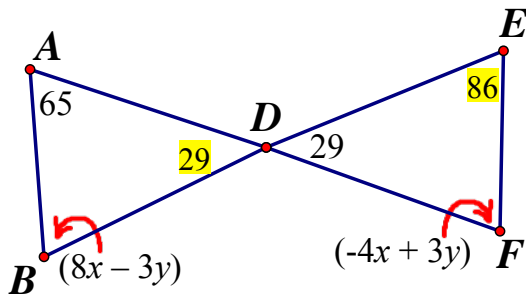


EX 1) Identify the congruent corresponding parts in the triangles above.

$\angle A \cong \angle X$	$\overline{AB} \cong \overline{XY}$
$\angle B \cong \angle Y$	$\overline{BC} \cong \overline{YZ}$
$\angle C \cong \angle Z$	$\overline{CA} \cong \overline{ZX}$

Recall: Third Angles Theorem	
<p>If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.</p>	<p style="text-align: center;">If $\angle A \cong \angle D$ and $\angle B \cong \angle E$, then $\angle C \cong \angle F$.</p>

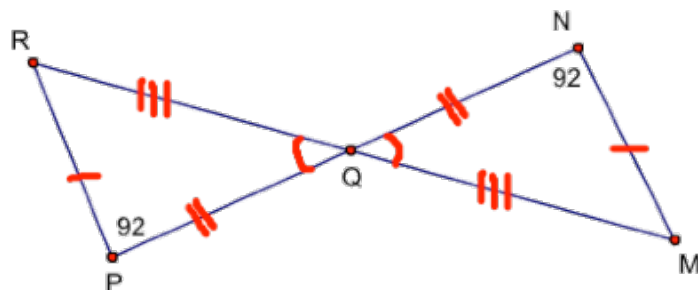
EX 2) Given that $\triangle ABD \cong \triangle FED$, solve for x and y .



$-4x + 3y = 65$
$8x - 3y = 86$ (by Third Angles Theorem)
$4x = 151$
$x = 37.75$
$8(37.75) - 3y = 65$
$y = 72$

4-4 Congruent Triangles

EX 3) Determine whether the triangles are congruent. Given Q is the midpoint of both \overline{RM} and \overline{PN} , and $\overline{RP} \cong \overline{NM}$. Justify your reasoning.



$\triangle PRQ \cong \triangle NMQ$. It is given that Q is the midpoint of \overline{RM} and \overline{PN} , so $\overline{RQ} \cong \overline{MQ}$ and $\overline{PQ} \cong \overline{NQ}$ by the definition of a midpoint. It is also given that $\overline{RP} \cong \overline{NM}$.

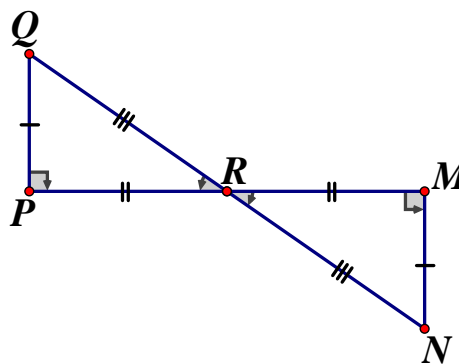
The figure is labeled with $m\angle P = 92$ and $m\angle N = 92$, so $\angle P \cong \angle N$ by the definition of congruent angles. $\angle PQR \cong \angle NQM$ by the Vertical Angles Theorem, therefore $\angle R \cong \angle M$ by the Third Angles Theorem.

$\triangle PRQ \cong \triangle NMQ$ because the corresponding parts (sides and angles) of the triangles are congruent.

EX 4) **Given:** $\angle P$ and $\angle M$ are right angles

R is the midpoint of \overline{PM}
 $\overline{MN} \cong \overline{PQ}$, $\overline{QR} \cong \overline{NR}$

Prove: $\triangle PQR \cong \triangle MNR$

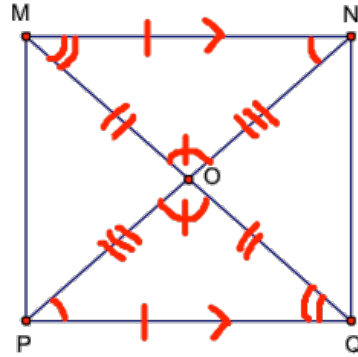


Statement	Reason
1. $\angle P$ and $\angle M$ are right angles	1. Given
2. $\angle P \cong \angle M$	2. Right \angle Congruence Theorem
3. R is the midpoint of \overline{PM}	3. Given
4. $\overline{PR} \cong \overline{MR}$	4. Definition of midpoint
5. $\overline{MN} \cong \overline{PQ}$, $\overline{QR} \cong \overline{NR}$	5. Given
6. $\angle PRQ \cong \angle MRN$	6. Vertical \angle s Theorem
7. $\angle Q \cong \angle N$	7. Third \angle s Theorem
8. $\triangle PQR \cong \triangle MNR$	8. Definition of \cong \triangle s

4-4 Congruent Triangles

EX 5) **Given:** $\overline{MN} \cong \overline{QP}$, $\overline{MN} \parallel \overline{QP}$,
 O is the midpoint of \overline{MQ} and \overline{PN}

Prove: $\triangle MNO \cong \triangle QPO$



Statement	Reason
1. $\overline{MN} \cong \overline{QP}$	1. Given
2. $\overline{MN} \parallel \overline{QP}$	2. Given
3. $\angle MNP \cong \angle QPN$, $\angle NMQ \cong \angle PQM$	3. Alternate Interior \angle s Theorem
4. $\angle MON \cong \angle QOP$	4. Vertical \angle s Theorem
5. O is the midpoint of \overline{MQ} and \overline{PN}	5. Given
6. $\overline{MO} \cong \overline{QO}$, $\overline{PO} \cong \overline{NO}$	6. Definition of midpoint
7. $\triangle MNO \cong \triangle QPO$	7. Definition of $\cong \triangle$ s