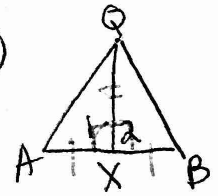
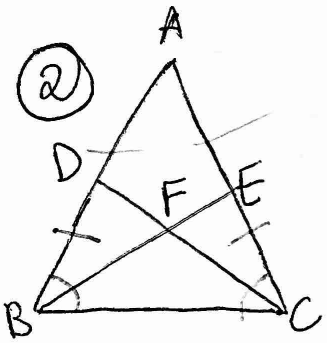
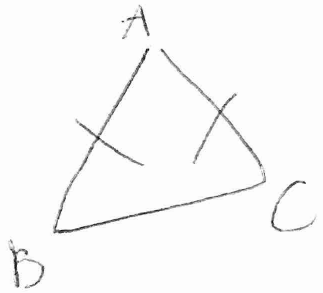
Honors Math 3 - Triangle Congruence Proofs

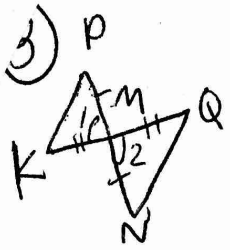
① 

① $\overline{QX} \perp \overline{AB}$	① given
② $\angle 1$ & $\angle 4$ are right angles	② definition of $\perp$ [1]
③ $\angle 1 \cong \angle 2$	③ right angle thm [2]
④ X is mdpt of $\overline{AB}$	④ given
⑤ $\overline{AX} \cong \overline{XB}$	⑤ definiton of midpoint [4]
⑥ $\overline{QX} \cong \overline{QX}$	⑥ reflexive property
⑦ $\triangle AXQ \cong \triangle BXQ$	⑦ SAS [3, 5, 6]

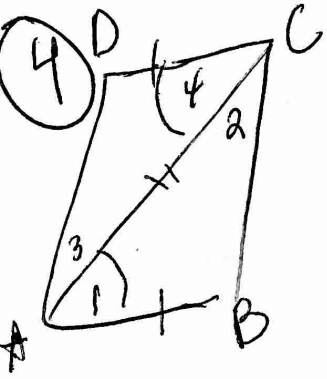
② 

① $\overline{AB} \cong \overline{AC}$	① Given
② $\angle DBC \cong \angle ECB$	② isosceles $\triangle$ thm [1]
③ $\overline{DB} \cong \overline{EC}$	③ given
④ $\overline{BC} \cong \overline{BC}$	④ reflexive property
⑤ $\triangle CBD \cong \triangle BCE$	⑤ SAS [2, 3, 4]



3) 

① M is midpoint of $\overline{KQ}$ & $\overline{PN}$	① given
② $\overline{KM} \cong \overline{MQ}$, $\overline{PM} \cong \overline{MN}$	② definition of midpoint [1]
③ $\angle 1 \cong \angle 2$	③ vertical angle thm
④ $\triangle PMK \cong \triangle NMQ$	④ SAS [2, 3]

4) 

① $\overline{AB} \parallel \overline{DC}$	① given
② $\angle 1 \cong \angle 4$	② parallel lines → alt. int. $\angle$'s are $\cong$ [1]
③ $\overline{AB} \cong \overline{CD}$	③ given
④ $\overline{AC} \cong \overline{AC}$	④ reflexive property
⑤ $\triangle ADC \cong \triangle CBA$	⑤ SAS [2, 3, 4]
⑥ $\angle 2 \cong \angle 3$	⑥ CPCTC [5]

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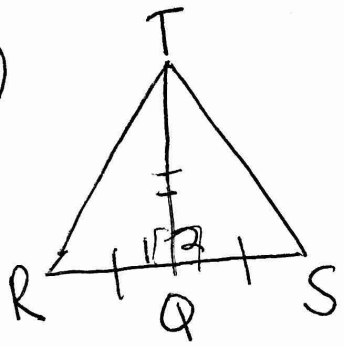

① $\overline{TQ}$ is ⊥ bisector of $\overline{RS}$	① given
② ∠1 & ∠2 are right angles	② definition of perpendicular bisector [1]
③ ∠1 ≅ ∠2	③ Right ∠ Theorem [2]
④ Q is the midpt. of $\overline{RS}$	④ definition of a bisector [1]
⑤ $\overline{RQ} \cong \overline{RS}$	⑤ definition of a midpoint [4]
⑥ $\overline{QT} \cong \overline{QT}$	⑥ reflexive property
⑦ $\triangle TRQ \cong \triangle TSQ$	⑦ SAS [3, 5, 6]
⑧ ∠R ≅ ∠S	⑧ CPCTC [7]