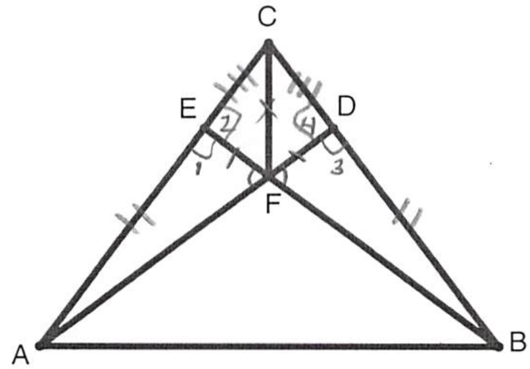
Given: $\overline{BE} \perp \overline{AC}$ $\overline{AD} \perp \overline{BC}$

$\overline{EF} \cong \overline{DF}$

Prove: $\triangle ACB$ is isos.



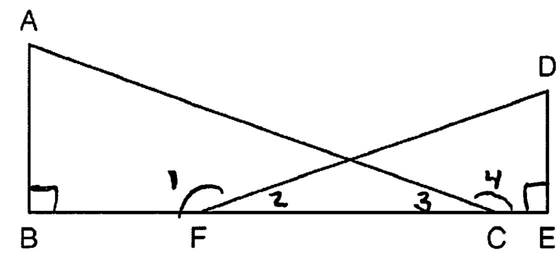
Statements	Reasons
1. $BE \perp AC$ $AD \perp BC$ $\overline{EF} \cong \overline{EF}$	1. Given
2. $\angle 1 \cong \angle 3$, $\angle 2 \cong \angle 4$	2. If seg $\perp$ then $\cong$ 90° $\angle$'s formed
3. $\angle AFE \cong \angle BFD$	3. Vertical $\angle$'s are $\cong$
4. $\triangle AFE \cong \triangle BFD$	4. ASA
5. $CF \cong CF$	5. Reflexive Prop
6. $\triangle CEF \cong \triangle CDF$	6. HL
7. $\overline{AE} \cong \overline{BD}$, $\overline{EC} \cong \overline{DC}$	7. CPCTC
8. $\underbrace{\overline{AE} + \overline{EC}} = \underbrace{\overline{BD} + \overline{DC}}$	8. Addition Prop of Equality
9. $\overline{AC} \cong \overline{BC}$	9. Segment Addition Postulate
10. $\triangle ACB$ is isosceles	10. If 2 sides of a $\triangle$ are $\cong$ then the $\triangle$ is isosceles

Congruent Triangles Proof

Given: $\overline{BFCE}$ $\overline{AB} \perp \overline{BE}$

$\overline{DE} \perp \overline{BE}$ $\angle BFD \cong \angle ECA$

Prove: $(AB)(EF) = (BC)(DE)$



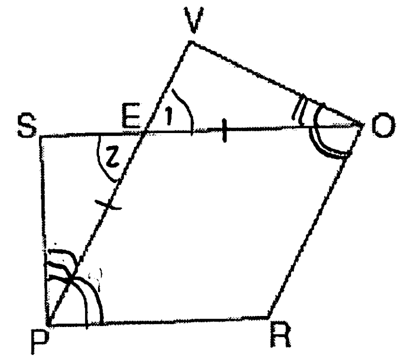
Statements	Reasons
① $\overline{BFCE}$ $\overline{AB} \perp \overline{BE}$ $\overline{DE} \perp \overline{BE}$ $\angle BFD \cong \angle ECA$	① Given
② $\angle B \cong \angle E$	② If 2 seg $\perp$ then $\cong$ 90° $\angle$'s formed
③ $\angle 1$ and $\angle 2$ are supp. $\angle 3$ and $\angle 4$ are supp.	③ Linear Pairs are supplementary
④ $\angle 2 \cong \angle 3$	④ If 2 $\angle$'s are supp to $\cong$ $\angle$'s then those $\angle$'s are $\cong$
⑤ $\triangle ABC \sim \triangle DEF$	⑤ AA~
⑥ $\dfrac{AB}{BC} = \dfrac{DE}{EF}$	⑥ Sides of ~ $\triangle$'s are in proportion
⑦ $(AB)(EF) = (BC)(DE)$	⑦ Product Means = Product Extremes

Similar Triangles Proof

Given: PROE is a rhombus

$\angle SPR \cong \angle VOR$

Prove: $\overline{SE} \cong \overline{EV}$



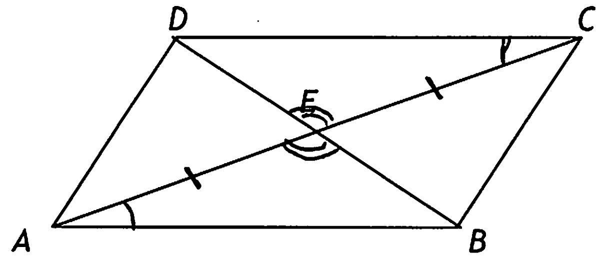
Statements	Reasons
① PROE is a rhombus $\angle SPR \cong \angle VOR$	① Given
② $\overline{EP} \cong \overline{EO}$	② If rhombus then opp sides $\cong$
③ $\angle 1 \cong \angle 2$	③ Vertical $\angle$'s are $\cong$
④ $\angle EPR \cong \angle EOR$	④ If rhombus then opp $\angle$'s $\cong$
⑤ $\angle SPR - \angle EPR = \angle VOR - \angle EOR$	⑤ Subtraction Prop of Equality
⑥ $\angle SPE \cong \angle VOE$	⑥ Angle Subtraction Postulate
⑦ $\triangle SPE \cong \triangle VOE$	⑦ ASA
⑧ $\overline{SE} \cong \overline{EV}$	⑧ CPCTC

Quadrilateral Proof – Congruent Triangles

Given: $\overline{DB}$ bisects $\overline{AC}$

$\angle CAB \cong \angle ACD$

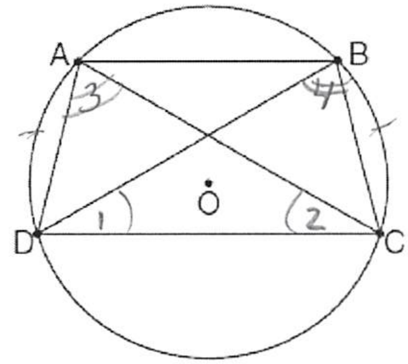
Prove: ABCD is llogram



Statements	Reasons
① $\overline{DB}$ bisects $\overline{AC}$ $\angle CAB \cong \angle ACD$	① Given
② $\overline{AE} \cong \overline{CE}$	② If seg is bisected then 2 $\cong$ segs formed
③ $\angle DEC \cong \angle BEA$	③ Vertical $\angle$'s are $\cong$
④ $\triangle DEC \cong \triangle BEA$	④ ASA
⑤ $\overline{DC} \cong \overline{AB}$	⑤ CPCTC
⑥ $\overline{DC} \parallel \overline{AB}$	⑥ If 2 lines are cut by a transversal and alt int $\angle$'s $\cong$ then the lines are $\parallel$.
⑦ ABCD is parallelogram	⑦ If quad has 1 pair opposite sides $\cong$ and $\parallel$ then its llogram

Quadrilateral Proof

Given: $\overline{AB} \parallel \overline{DC}$



Prove: $\triangle ACD \cong \triangle BDC$

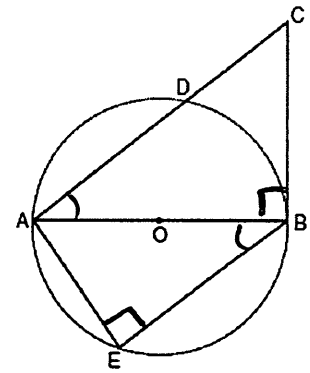
Statements	Reasons
(1) $\overline{AB} \parallel \overline{DC}$	(1) Given
(2) $\widehat{AD} \cong \widehat{BC}$	(2) If chords $\parallel$ then the arcs they intercept are $\cong$
(3) $\overline{DC} \cong \overline{DC}$	(3) Reflexive Prop
(4) $\angle 1 \cong \angle 2$	(4) If 2 inscribed $\angle$'s intercept $\cong$ arcs then they are $\cong$
(5) $\angle 3 \cong \angle 4$	(5) If 2 inscribed $\angle$'s intercept the same arc then they are $\cong$
(6) $\triangle ACD \cong \triangle BDC$	(6) AAS

Circle Proof – Congruent Triangles

Given: Diameter $\overline{AOB}$ drawn to tangent $\overline{CB}$ at B

$\overline{BE} \parallel \overline{ADC}$

Prove: $\triangle ABE \sim \triangle CAB$

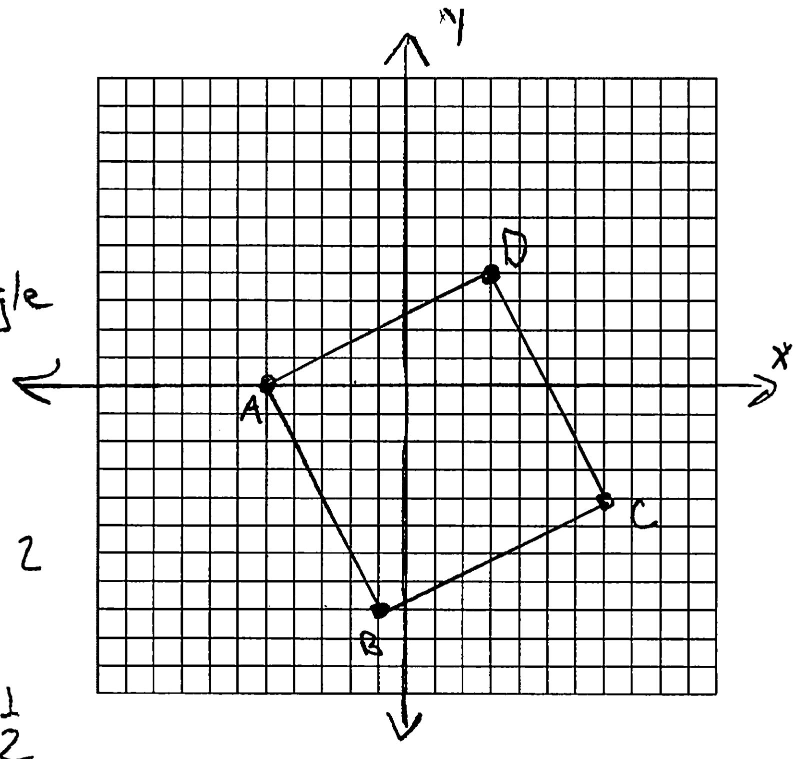


Statements	Reasons
1. Diameter $\overline{AOB}$ drawn to tangent $\overline{CB}$ at B, $\overline{BE} \parallel \overline{ADC}$	1. Given
2. $\angle ABC$ is a right $\angle$	2. If diameter drawn to tangent at point of tangency then a right $\angle$ is formed.
3. $\angle AEB$ is a right $\angle$	3. If an inscribed $\angle$ intercepts a semi-circle then its a right $\angle$
4. $\angle CAB \cong \angle EBA$	4. If $\parallel$ lines are cut by transversal then alt. int $\angle$'s are $\cong$
5. $\triangle ABC \sim \triangle BEA$	5. AA $\sim$

Circle Proof – Similar Triangles

Given: A(-5,0) B(-1,-8)
C(7,-4) D(3,4)

Prove: ABCD is a rectangle



Prove opposite sides ∥

$m_{AB} = \frac{-8}{4} = -2$ $m_{DC} = \frac{-8}{4} = -2$

$m_{AD} = \frac{4}{8} = \frac{1}{2}$ $m_{BC} = \frac{4}{8} = \frac{1}{2}$

AB ∥ DC AD ∥ BC because they have the same slope.

ABCD is a parallelogram because both pair of opposite sides are ∥.

AB ⊥ AD because slopes are negative reciprocals

Parallelogram ABCD is a rectangle because the parallelogram contains a right angle.

Quadrilateral Coordinate Proof