Constructing Parallel Lines

Construct the line parallel to line $m$ that goes through point $P$.

1) Draw a line through point $P$ that intersects line $m$. Label the intersection $A$.

2) Copy angle $A$ onto point $P$.
   - Put compass point at $A$ and draw an arc through the angle.
   - Use same setting to draw an arc from point $P$.
   - Use the compass to measure the arc on angle $A$. Copy to the new angle. Label new point $B$.
   - Connect $P$ to $B$.

3) Line $PB \parallel$ line $m$
Converse of Parallel Lines Rules

We know...

IF ll lines THEN alt. int $\angle$s $\cong$
IF ll lines THEN alt. ext $\angle$s $\cong$
IF ll lines THEN corr. $\angle$s $\cong$
IF ll lines THEN same side int. $\angle$s supp

We now know...

IF alt. int $\angle$s $\cong$ THEN lines are ll.
IF alt. ext $\angle$s $\cong$ THEN lines are ll.
IF corr. $\angle$s $\cong$ THEN lines are ll.
IF same side int. $\angle$s supp THEN lines are ll.

3) Assume you do NOT know the lines are parallel. Using the given information, decide which pair of lines, if any, would be parallel and explain why.

a) $\angle 1 \cong \angle 9$
   \[ \text{Sllt, corr. } \angle \text{s } \cong \rightarrow \text{ ll lines} \]

b) $\angle 1 \cong \angle 3$
   \[ \text{all b, corr } \angle \text{s } \cong \rightarrow \text{ ll lines} \]

c) $\angle 4 \cong \angle 14$
   \[ \text{Sllt, alt. ext } \angle \text{s } \cong \rightarrow \text{ ll lines} \]

d) $\angle 6 \cong \angle 12$
   \[ \text{Sllt, alt. int. } \angle \text{s } \cong \rightarrow \text{ ll lines} \]

e) $\angle 11 \cong \angle 13$
   \[ \text{None} \]

f) $\angle 8 + \angle 9 = 180^\circ$
   \[ \text{Sllt; same side int. } \angle \text{s supp } \rightarrow \text{ ll lines} \]

g) $\angle 16 + \angle 13 = 180^\circ$
   \[ \text{all b; same side ext } \angle \text{s supp } \rightarrow \text{ ll lines} \]