Proving Lines Parallel

Overview of problems

Example Set: A

Determine if any segments are parallel. Justify your conclusion by a postulate or theorem.
Example Set: B

Find the values of the variables that make the bold lines parallel
Find the values of the variables.

\[ 4x^2 \]

\[ y \]

\[ w \]

\[ 64 \]

\[ t \]

\[ a \]

\[ b \]

\[ 120 \]

\[ (x + y) \]

\[ 60 \]

\[ (x - y) \]
Write a two column proof for the following:

**Given**: \( \angle 1 \cong \angle 3 \)

**Prove that**: \( l \parallel m \)
Example Set: A

Determine if any segments are parallel. Justify your conclusion by a postulate or theorem.

\( \overline{BC} \parallel \overline{AD} \)

Same-side interior angles are supplementary.

\( \overline{GF} \parallel \overline{HJ} \)
\( \overline{GH} \parallel \overline{FJ} \)

If alternate-interior angles are congruent, the lines are parallel.
Example Set: B

Find the values of the variables that make the bold lines parallel

\[ l \parallel m \]

corresponding angles are \( \cong \), therefore the lines are \( \parallel \).

\[ x = 40 \]
\[ y = 80 \]
\[ z = 100 \]
Find the values of the variables

\[ x = 4 \]
\[ y = 116 \]
\[ w = 116 \]

\[ x = 90 \]
\[ y = 30 \]
Write a two column proof for the following

Given $\angle 1 \cong \angle 3$  Prove that $l \parallel m$

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\angle 1 \cong \angle 3$</td>
<td>Given</td>
</tr>
<tr>
<td>$\angle 3 \cong \angle 2$</td>
<td>Vertical $\angle$s are $\cong$</td>
</tr>
<tr>
<td>$\angle 1 \cong \angle 2$</td>
<td>Trans. Property</td>
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<tr>
<td>$l \parallel m$</td>
<td>if two lines cut by a transversal and</td>
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<tr>
<td></td>
<td>corresponding angles are congruent - then</td>
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<td></td>
<td>the lines are $\parallel$.</td>
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