7.

Given: \( \overrightarrow{CD} \perp \overrightarrow{DE} \)

Prove: \( \angle CDF \) is complementary to \( \angle FDE \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \overrightarrow{CD} \perp \overrightarrow{DE} )</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( \angle CDE ) is a right ( \angle )</td>
<td>2. If 2 lines are ( \perp ), then they form right ( \angle )s.</td>
</tr>
<tr>
<td>3. ( m\angle CDE = 90^\circ )</td>
<td>3. If an ( \angle ) is a right ( \angle ), then it’s measure is ( 90^\circ )</td>
</tr>
<tr>
<td>4. ( m\angle CDF + m\angle FDE = m\angle CDE )</td>
<td>4. Assumed from diagram</td>
</tr>
<tr>
<td>5. ( m\angle CDF + m\angle FDE = 90^\circ )</td>
<td>5. Substitution Property of Equality ((3\rightarrow4))</td>
</tr>
<tr>
<td>6. ( \angle CDF ) is complementary to ( \angle FDE )</td>
<td>6. If the sum of 2 ( \angle )s is ( 90^\circ ), then they are complementary.</td>
</tr>
</tbody>
</table>

9.

Given: \( \angle MRO \) is compl. to \( \angle PRO \)

Prove: \( \angle MRP \) is a right \( \angle \)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( \angle MRO ) is compl. to ( \angle PRO )</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( m\angle MRO + m\angle PRO = 90^\circ )</td>
<td>2. If two ( \angle )s are complementary, then their measures sum to ( 90^\circ ).</td>
</tr>
<tr>
<td>3. ( m\angle MRP = m\angle MRO + m\angle PRO )</td>
<td>3. Assumed from diagram.</td>
</tr>
<tr>
<td>4. ( m\angle MRP = 90^\circ )</td>
<td>4. Substitution Property of Equality ((2\rightarrow3))</td>
</tr>
<tr>
<td>5. ( \angle MRP ) is a right ( \angle )</td>
<td>5. If an ( \angle )'s measure is ( 90^\circ ), then it is a right ( \angle )</td>
</tr>
</tbody>
</table>

11.

One of two supplementary angles is \( 70^\circ \) greater than the second. Find the measure of the larger angle.

Let \( x \) = the measure of one of the angles.

\[ \Rightarrow 180 - x \text{ is the measure of its supplement.} \]

Now, it follows that \( 180 - x = 70 + x \)

\[ \Rightarrow x = 55 \text{ and } 180 - x = 125 \]
12.

a. A point $P$ is reflected over the $y$-axis to point $A$. Find the coordinates of $A$.

b. Point $P$ is reflected over the origin to point $B$. Find the coordinates of $B$.

c. If $C$ is the midpoint of $PA$, find the coordinates of $C$.

18.

If the larger of two supplementary angles exceeds 7 times the smaller by $4^\circ$. Find the measure of the larger angle.

Let $x =$ the measure of one of the angles.

$\Rightarrow 180 - x$ is the measure of its supplement.

Now, it follows that $180 - x = 7x + 4$

$\Rightarrow x = 22$ and $180 - x = 158$
21. The supplement of an angle is four times the complement of the angle. Find the measure of the complement.

Let \( x \) = the measure of the angle.

\[ \Rightarrow 180 - x \text{ is the measure of its supplement and } 90 - x \text{ is the measure of its complement.} \]

Now, it follows that \((180 - x) = 4(90 - x)\)

\[ \Rightarrow x = 60 \text{ and } 90 - x = 30 \]

24. Arnex has a 30°, a 60°, a 150°, a 45°, and a 135° angle in his pocket. He takes out two of the five angles. Find the probability that:

a. The two angles are supplementary

\[
P = P(30° \text{ picked 1st AND } 150° \text{ picked 2nd}) \text{ OR } P(150° \text{ 1st AND } 30° \text{ 2nd}) \text{ OR } P(45° \text{ 1st AND } 135° \text{ 2nd}) \text{ OR } P(135° \text{ 1st AND } 45° \text{ 2nd})
\]

\[= \left(\frac{1}{5} \cdot \frac{1}{4}\right) + \left(\frac{1}{5} \cdot \frac{1}{4}\right) + \left(\frac{1}{5} \cdot \frac{1}{4}\right) + \left(\frac{1}{5} \cdot \frac{1}{4}\right)\]

\[= 4 \cdot \frac{1}{20} = \frac{4}{20} = \frac{1}{5}\]

b. The two angles are complementary

\[
P = P(30° \text{ picked 1st AND } 60° \text{ picked 2nd}) \text{ OR } P(60° \text{ 1st AND } 30° \text{ 2nd})
\]

\[= \left(\frac{1}{5} \cdot \frac{1}{4}\right) + \left(\frac{1}{5} \cdot \frac{1}{4}\right) = 2 \cdot \frac{1}{20} = \frac{2}{20} = \frac{1}{10}\]

25. The supplement of an angle is 60° less than twice the supplement of the complement of the angle. Find the measure of the complement.

Let \( x \) = the measure of the angle.

\[ \Rightarrow 180 - x \text{ is the measure of its supplement, } 90 - x \text{ is the measure of its complement, and } 180 - (90 - x) \text{ is the supplement of the complement.} \]

Now, it follows that \((180 - x) = 2[180 - (90 - x)] - 60\)

\[ \Rightarrow x = 20 \text{ and } 90 - x = 70 \]