Proof by Cases for Problem 3:

CASE 1: $x-6 \geq 0$ aka $x \geq 6$:

1. Simplify absolute value:
   Since $x \geq 6$, $x-6 \geq 0$. Hence, $|x-6| = x-6$.

2. Plug this into the expression:

$$|x-6|+x = (x-6)+x = 2x-6$$

3. Check if it is greater than 3:
   We need $2x-6>3$.

$$\begin{array}{r} 2x-6 > 3 \\ +6 \quad +6 \\ \hline \frac{2}{2}x > \frac{9}{2} \end{array}$$

$$x > 4.5$$

Since $x \geq 6$ implies $x > 4.5$, it follows immediatly that $2x-6>3$

CONCLUSION for CASE 1:
Whenever $x \geq 6$, $|x-6|+x > 3$

CASE 2: $x-6 < 0$ aka $x < 6$:

1. Simplify the absolute value:
   Since $x < 6$, $x-6 < 0$. Hence, $|x-6| = -(x-6) = 6-x$

2. Plug into expression:

$$|x-6|+x = (6-x)+x = 6$$

3. Check if it is greater than 3:

   Clearly, $6 > 3$.

   CONCLUSION for CASE 2:
   Whenever $x < 6$, $|x-6|+x = 6 > 3$.