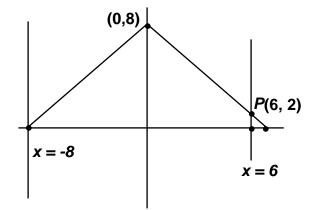**Round 5**

A) $x^2 + 10x \le 24 \Leftrightarrow x^2 + 10x - 24 \le 0 \Leftrightarrow (x + 12)(x - 2) \le 0$. The critical values are -12, $+2$, which divide the number line into three regions. We require a negative or zero product. Testing a value in each region, only the region between -12 and 2 inclusive satisfies the required condition $\Rightarrow \underline{\mathbf{-12 \le x \le 2}}$.

B) $-2x - 1 < 3x - 11 < 2x + 1 \Rightarrow -2x - 1 < 3x - 11 \ \underline{and} \ 3x - 11 < 2x + 1$
$\Rightarrow 10 < 5x$ and $x < 12 \Rightarrow \underline{\mathbf{2 < x < 12}}$.

C) $y + |x| > 8 \Rightarrow y < 8 - |x| \Rightarrow \begin{cases} y = x + 8 \\ y = -x + 8 \end{cases}$

$|x + 1| < 7 \Rightarrow -7 < x + 1 < 7 \Rightarrow -8 < x < 6$

$y \ge 0$ restricts us to above the y-axis.
Examining the graphs of the related equations, we see the
required region is the interior of a polygon, comprised of a
triangle in quadrant 2 and a trapezoid in quadrant 1
between the y-axis and the vertical line $x = 6$.

Since $y = -x + 8$ and $x = 6$ intersect at $(6, 2)$, we have the

necessary dimensions to find the area of each region.

$\dfrac{1}{2} \cdot 8 \cdot 8 + \dfrac{1}{2} \cdot 6 \cdot (2 + 8) = 32 + 30 = \underline{\mathbf{62}}$

(0,8)

P(6, 2)

x = -8

x = 6