5a. $5n^3 + 2n^2 + 3n = \Theta(n^3)$

$5n^3 + 2n^2 + 3n \leq 5n^3 + 2n^2 + 3n^2 \leq 5n^3 + 2n^3 + 3n^3 = 10n^3$

$5n^3 \leq 5n^3 + 2n^2 + 3n \leq 10n^3 = c_1 n^3$

therefore, $5n^3 + 2n^2 + 3n = \Theta(n^3)$

5b. $\sqrt{7n^2 + 2n - 8} = \Theta(n)$

Let $c = 7$ and $k = 14$, then for any $n > k$, we have

$2n - 8 \leq n^2$, so:

$7n^2 + 2n - 8 \leq 7n^2 \leq 14n^2$

Taking the square root of both sides gives us:

$\left|\sqrt{7n^2 + 2n - 8}\right| \leq c|n|$ for all $n > k$

Therefore, $\sqrt{7n^2 + 2n - 8} = \Theta(n)$