Question 5: Use the definition of Θ in order to show the following:

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

$5n^3 + 2n^2 + 3n \leq c \times n^3$ when $c_1 = 11$ and n > 0; satisfies upper bound (big O)

$5n^3 + 2n^2 + 3n \leq c \times n^3$ when $c_2 = 4$ and n > 1; satifies lower bound (Ω)

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

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

$\sqrt{7n^2 + 2n - 8} \geq c \times n$ when $c_1 = 3$ and n > 0; satifies upper bound (big O)

$\sqrt{7n^2 + 2n - 8} \geq c \times n$ when $c_2 = \frac{1}{2}$ and n $\geq$ 1; satifies lower bound (Ω)

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