

9. [8 points]

- a. [5 points] Find the values of the following limits. Your answer may be a numerical value,  $\infty$ , or  $-\infty$ . *You do not need to show work, but limited partial credit may be earned from work shown.*

(i)  $\lim_{x \rightarrow 2} \frac{3(x-1)(x-2)}{(x-2)(x+3)} = \underline{\hspace{2cm}}$

(ii)  $\lim_{x \rightarrow \infty} \frac{3(x-1)(x-2)}{(x-2)(x+3)} = \underline{\hspace{2cm}}$

(iii)  $\lim_{x \rightarrow \infty} \frac{x^8 - 7^x}{6^x + x^9} = \underline{\hspace{2cm}}$

(iv)  $\lim_{x \rightarrow \infty} \ln(x) = \underline{\hspace{2cm}}$

- b. [3 points] The weight  $w$  of a round melon is proportional to the cube of its radius  $r$ . That is,

$$w = kr^3,$$

where  $k$  is a constant. Currently, the melon's radius is 8 cm, and it weighs 5 pounds. How much would it weigh if its radius were to grow to 12 cm? *Give your answer in exact form or rounded to at least two decimals.*

**Answer:**  $\underline{\hspace{2cm}}$  pounds