Lots of Limits

1. Algebraically determine each of the following limits. Use good form and show sufficient work. Simplify your answers if necessary (including reducing fractions and rationalizing the denominator in the final answer if necessary)

a) $\lim\limits_{x\to8} \frac{2x^2-16x}{x-8}$

b) $\lim\limits_{x\to-3} \frac{4x^2+28x+48}{2x+6}$

c) $\lim\limits_{x\to5} \frac{3x+1}{2x-10}$

d) $\lim\limits_{x\to\frac{1}{3}} \frac{6x^2+7x-3}{9x^2-15x+4}$

e) $\lim\limits_{x\to\frac{2}{5}} \frac{5x^2+18x-8}{15x^2-x-2}$

f) $\lim\limits_{x\to-3} \frac{x^3+4x^2+10x+21}{x^4+2x^3-4x^2-7x-12}$

g) $\lim\limits_{x\to\frac{2}{3}} \frac{3x^3+4x^2+11x-10}{3x^4-2x^3+6x-4}$

h) $\lim\limits_{x\to-2} \frac{3x^4+3x^3-24x^2-36x}{x^3+3x^2-4}$

i) $\lim\limits_{x\to-2} \frac{16x-x^5}{2x^3+16}$

j) $\lim\limits_{x\to-2} \frac{x^3+8}{x^2-4}$

k) $\lim\limits_{x\to2} \frac{x^7-128}{x^2+2x-8}$

l) $\lim\limits_{x\to-3} \frac{x^5+243}{3x^2+14x+15}$

m) $\lim\limits_{x\to9} \frac{\sqrt{x}-3}{2x-18}$

n) $\lim\limits_{x\to27} \frac{3x-81}{\sqrt[3]{x}-3}$

o) $\lim\limits_{x\to12} \frac{x^2-13x+12}{\sqrt{2x+1}-5}$

p) $\lim\limits_{x\to-10} \frac{\sqrt[3]{6x-4}+4}{x^2+7x-30}$

q) $\lim\limits_{x\to41} \frac{\sqrt[7]{3x+5}-2}{\sqrt{2x-1}-9}$

r) $\lim\limits_{x\to-50} \frac{\sqrt[5]{5x+7}+3}{\sqrt[3]{x+51}-1}$

s) $\lim\limits_{x\to5} \frac{1}{x-5}\left(\frac{2}{x+3}-\frac{1}{x-1}\right)$

t) $\lim\limits_{x\to5} \left(\frac{4x-4}{x-5}-\frac{64}{x^2-6x+5}\right)$

u) $\lim\limits_{x\to11} \frac{\frac{1}{x-1}-\frac{2}{x+9}}{2x-22}$

v) $\lim\limits_{x\to\infty} \frac{4x^3-x+1}{2x^3+5x^2-3}$

w) $\lim\limits_{x\to-\infty} \frac{5x^4+x+3}{2x^3-2x^2-8x+9}$

x) $\lim\limits_{x\to-\infty} \frac{4x^2-8x+11}{5x^3+9x^2+10x-1}$

y) $\lim\limits_{x\to\infty} \frac{\sqrt{x^2+x+3}}{4x-3}$

z) $\lim\limits_{x\to-\infty} \frac{2x+5}{\sqrt{3x^2-8x+3}}$

aa) $\lim\limits_{x\to-\infty} \frac{\sqrt{25x^4+3x^3+9x-2}}{3x^2+2x-9}$