Homework for Math 152H-1 September 8

Homework: A reprieve from theory! Before doing these you should look at the reading for Monday. Additionally, you can look in sections 2.2, 2.4, and 2.5 for further examples and problems. $\lim\limits_{x \to a^-}$ means that we look at what happens as $x \to a$ but only for $x < a$ (from the left), whereas $\lim\limits_{x \to a^+}$ means that we look at what happens as $x \to a$ but only for $x > a$ (from the right). **If you get stuck try to factor, rationalize denominators or numerators, graph the situation, look back at the reading or in the book.**

Compute

(1) $\lim\limits_{x \to \frac{2}{3}} 3s(s-1)$

(2) $\lim\limits_{z \to 0} (2z-8)^{\frac{1}{3}}$

(3) $\lim\limits_{x \to 8} \dfrac{8-x}{3 - \sqrt{x+1}}$

(4) $\lim\limits_{h \to 2} \dfrac{\sqrt{h+2}-2}{h^2-4}$

(5) $\lim\limits_{y \to 0} \dfrac{5y^3 + 8y^2}{3y^4 - 16y^2}$

(6) $\lim\limits_{x \to -1} \dfrac{x^2 - x - 2}{x^2 + 4x + 3}$

(7) $\lim\limits_{x \to 2} \dfrac{x^2 - x - 2}{x^2 + 4x + 3}$

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

(9) $\lim\limits_{x \to 4} \dfrac{-1}{\sqrt{x} - 2}$

(10) $\lim\limits_{x \to 4^+} \dfrac{-1}{\sqrt{x} - 2}$

(11) $\lim\limits_{x \to 4^-} \dfrac{-1}{\sqrt{x} - 2}$

(12) $\lim\limits_{x \to 4} \dfrac{-1}{(\sqrt{x} - 2)^2}$

(13) $\lim\limits_{x \to 2^+} \dfrac{|x-2|}{x-2}$

(14) $\lim\limits_{x \to 2^-} \dfrac{|x-2|}{x-2}$

(15) $\lim\limits_{x \to \infty} \dfrac{1}{1 + \frac{2}{x}}$

(16) $\lim\limits_{y \to -\infty} \dfrac{2y^3}{y^3 + 2y^2}$

(17) $\lim\limits_{x \to \infty} \dfrac{2\sqrt{x} + x^{-1}}{3x - 7}$

(18) $\lim\limits_{x \to \infty} \dfrac{x^{-1} + x^{-4}}{x^{-2} - x^{-3}}$

(19) Suppose $\lim\limits_{x \to 4} F(x) = 3$ and $\lim\limits_{x \to 4} G(x) = -2$ compute $\lim\limits_{x \to 4} \dfrac{F(x) + 2}{1 + F(x)G(x)}$.

(20) Suppose $\lim\limits_{x \to 2} \dfrac{f(x) - 5}{x + 2} = 3$. What is $\lim\limits_{x \to 2} f(x)$?

(21) Suppose $\lim\limits_{x \to 2} \dfrac{f(x) - 5}{x - 2} = 3$. What is $\lim\limits_{x \to 2} f(x)$?

(22) What value must c have for $\lim\limits_{x \to 1} f(x)$ to exist when

$$f(x) = \begin{cases} x^2 + c & x \geq 1 \\ -2x - 1 & x < 1 \end{cases}$$

What is the value of the limit for that value of c?