MATH 115 **Name:** _____

In class work 3, Fall 2022 **Row and Seat**: _____

In class work 3 has questions 1 through 2 with a total of 10 points. Turn in your work at the end of class *on paper*. This assignment is due *Wednesday 7 September 13:15* P M.

1. Find each of the following limits. Justify each of your steps by referencing one of our rules numbered zero through seven.

2 (a) $\lim_{x\to\pi}\left(x^3+x\right)$

2 (b) $\lim_{x\to\sqrt{2}}\sqrt{x+1}$

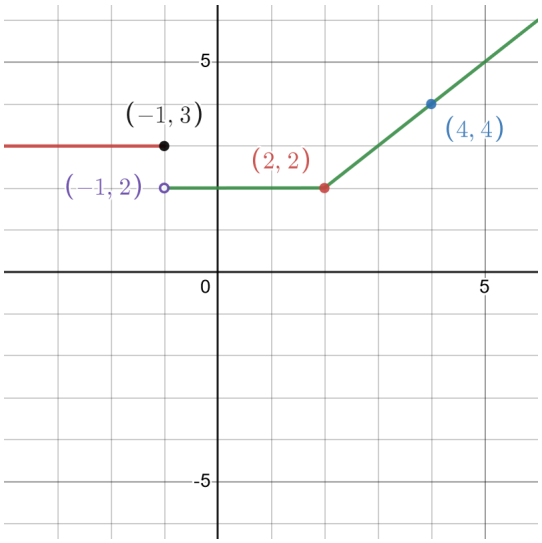
2 (c) $\lim_{x\to\sqrt{2}}\dfrac{x+1}{x-1}$

2 (d) $\lim_{x\to 35}\sqrt{12-2\sqrt{x}}$

2. A graph of a function Q is shown. Using the graph, as best you can find the numerical value of each limit.

1 (a) $\lim_{x \to 2} Q(x)$

1 (b) $\lim_{x \to -1^{(+)}} Q(x)$



Suppose functions F and G have limits toward c and suppose $a, b \in \mathbf{R}$ and n is a positive integer. Then

Rule #0 (constant) $\lim_{x\to c}(a) = a$.

Rule #1 (linearity) $\lim_{x\to c}(aF(x) + bG(x)) = a\lim_{x\to c}(F(x)) + b\lim_{x\to c}(G(x))$.

Rule #2 (product) $\lim_{x\to c}(F(x)G(x)) = \lim_{x\to c}(F(x)) \times \lim_{x\to c}(G(x))$.

Rule #3 (quotient) Provided $\lim_{x\to c}(G(x)) \neq 0$, we have $\lim_{x\to c}\dfrac{F(x)}{G(x)} = \dfrac{\lim_{x\to c}(F(x))}{\lim_{x\to c}(G(x))}$.

Rule #4 (power) $\lim_{x\to c}F(x)^n = \left(\lim_{x\to c}F(x)\right)^n$.

Rule #5 (root) Provided $\left(\lim_{x\to c}F(x)\right)^{1/n}$ is real, $\lim_{x\to c}F(x)^{1/n} = \left(\lim_{x\to c}F(x)\right)^{1/n}$.

Rule #6 (polynomial) Provided F is a polynomial, we have $\lim_{x\to c}F(x) = F(c)$

Rule #7 (rational) Provided F is a rational function and $c \in \mathrm{dom}(F)$, we have $\lim_{x\to c}F(x) = F(c)$.