MATH 102, Spring 2023 **Name:** ____________________

In class work 4 **Row and Seat:** ____________________

In class work 4 has questions 1 through 2 with a total of 6 points. This assignment is due at the end of the class period (9:55 AM).

1. The domain of a function W is the closed interval $[-2,5]$ and its graph is shown below. Several dots on the graph are labeled for you.

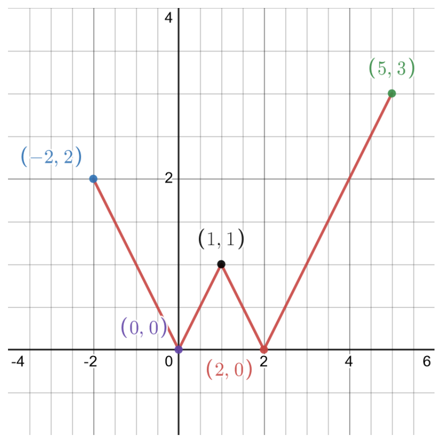

Figure 1: Graph of the function W.

$\boxed{1}$ (a) Use the graph to determine the *numerical value* of $W(1)$.

Solution: Since the point $(x = 1, y = 1)$ is on the graph, we have $W(1) = 1$.

$\boxed{1}$ (b) Find the *range* of W. Remember that the range of a function is the set of all outputs. You need to collect all the y coordinates that are on the graph.

Solution: We need to collect all y coordinates that are on the graph. The graph shows that the y coordinates extend from 0 to 3, inclusive. So the range is $[0,3]$.

$\boxed{1}$ (c) Find the interval(s) on which W is *decreasing*.

Solution: For inputs from -2 to 0 the graph is falling; and for inputs from 1 to 2 the graph is again falling; thus W is decreasing on $[-2,0]$ and on $[1,2]$.

$\boxed{1}$ (d) Find the interval(s) on which W is *increasing*.

Solution: For inputs from 0 to 1 the graph is rising; for inputs from 2 to 5 the graph is again rising; thus W is increasing on $[0,1]$ and on $[2,5]$.

2. The formula for a function Q is $Q(x) = \max(1, x^2)$ and the domain of Q is $[-3, 3]$. A graph of Q is shown below.

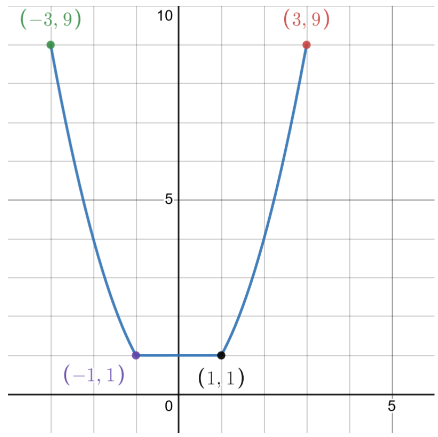

Figure 2: Graph of the function W.

$\boxed{1}$ (a) Find the interval on which Q is a *constant*.

Solution: For inputs from -1 to 1, the output is constant; thus Q is constant on $[-1, 1]$

$\boxed{1}$ (b) Find the average rate of change of Q on the interval $[-1, 3]$.

Solution:

$$\frac{Q(3) - Q(-1)}{3 - (-1)} = \frac{\max(1, 3^2) - \max(1, (-1)^2)}{3 + 1} = \frac{9 - 1}{4} = 2.$$