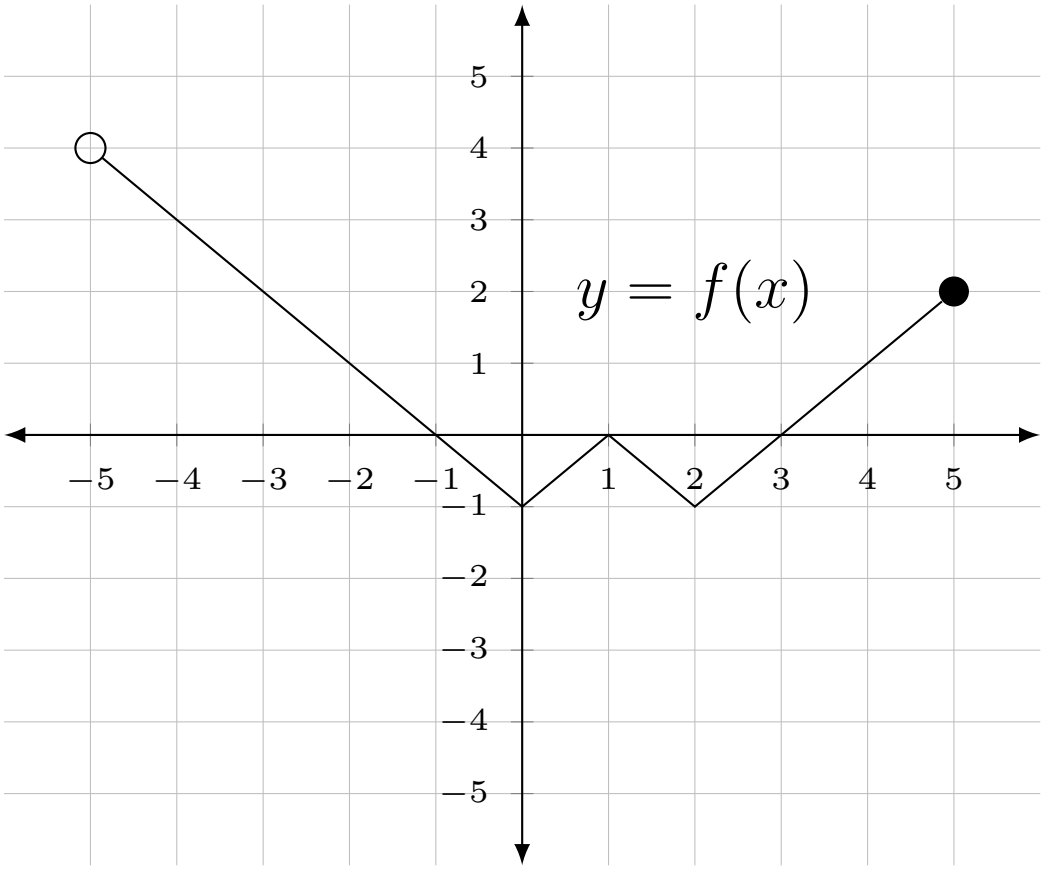
Math-19 Section 1

Homework #4 Solutions

Problems

1. Use the graph of $y = f(x)$ to answer the following questions:



(a) What is $f(2)$?

$f(2) = -1$

(b) What is the y-intercept?

$(0, -1)$

(c) For what values of x is $f(x) = 0$?

$x = -1, 1, 3$

(d) What is the domain of f, in interval notation?

$(-5, 5]$

(e) What is the range of f, in interval notation?

$[-1, 4)$

(f) On what intervals is f increasing?

$[0, 1]$ and $[2, 5]$

(g) On what intervals is f decreasing?

$(-5, 0]$ and $[1, 2]$

(h) What are the local minima (if any)?

$(0, -1)$ and $(2, -1)$

(i) What are the local maxima (if any)?

$(1, 0)$ and $(5, 2)$

(j) What is the absolute maximum (if any)?

none

2. Consider the function: $y = -2|x - 2| + 3$

(a) List the starting standard function and the four transformation steps in the order that they should be applied.

i. Basic: $y = |x|$

ii. Right 2

iii. Vert Scale 2

iv. Vert Reflect

v. Up 3

(b) What are the x-intercepts (if any)?

$$0 = -2|x-2| + 3$$
$$2|x-2| = 3$$
$$|x-2| = \frac{3}{2}$$
$$x - 2 = \pm\frac{3}{2}$$
$$x = \pm\frac{3}{2} + 2$$
$$x = \frac{1}{2}, \frac{7}{2}$$

$\left(\frac{1}{2}, 0\right)$ and $\left(\frac{7}{2}, 0\right)$

(c) What are the y-intercepts (if any)?

$$y = -2|0-2| + 3 = -2(2) + 3 = -1$$

$(0, -1)$

(d) What are the local maxima (if any)?

$(2, 3)$

(e) What are the local minima (if any)?

none

(f) What is the domain?

$\mathbb{R}$

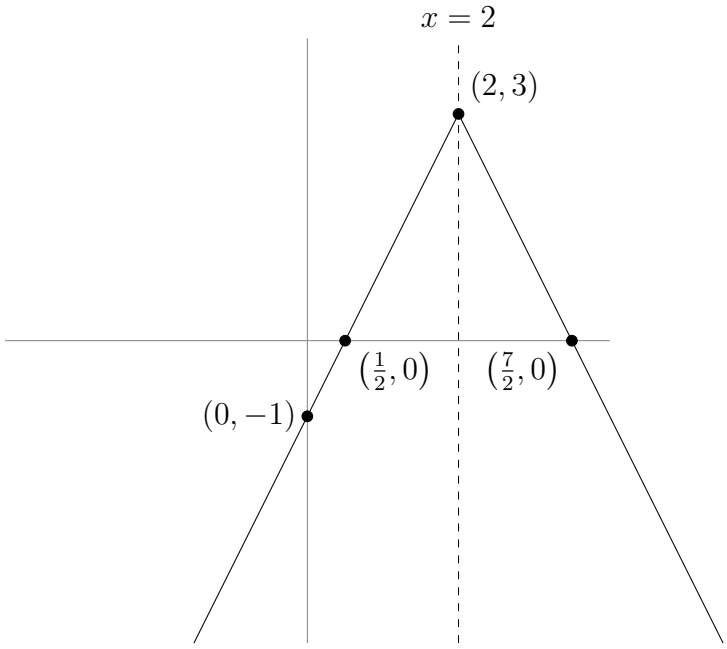
(g) What is the range?

$(-\infty, 3]$

(h) What is the axis of symmetry?

$x = 2$

(i) Sketch the graph of the function. Be sure to label all important points.


$x = 2$
$(2, 3)$
$\left(\frac{1}{2}, 0\right)$
$\left(\frac{7}{2}, 0\right)$
$(0, -1)$