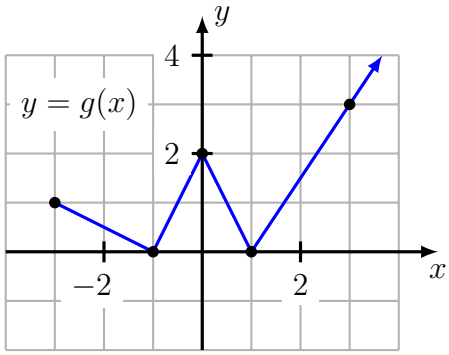
MATH 120
FALL 2021
EXAM 2

NAME:

1. [10 pts.] Given $f(x) = x^2 - 3x + 8$, find and simplify $f(-1)$, $f(-x)$, and $f(x+3)$.

2. [10 pts. each] The graph of function $y = g(x)$ is below.
   (a) Find $g(-1)$, $g(0)$, and $g(3)$.
   (b) Find the domain and range of g.



3. [5 pts. each]
   (a) Is the graph of $x^2y^2 + 5xy = 2$ symmetric with respect to the x-axis, the y-axis, the origin, more than one of these, or none of these?
   (b) Is the function $h(x) = x^2 + x$ even, odd, or neither?

4. [10 pts. each] Define

$$p(x) = \begin{cases} -\frac{1}{2}x^2, & \text{if } x < 1 \\ 2x + 1, & \text{if } x > 1 \end{cases}$$

   (a) Graph $y = p(x)$.
   (b) What is the domain and range of p?

5. [10 pts.] Write the equation of the line passing through $(-3, -2)$ and $(3, -7)$ in slope-intercept form.

6. [10 pts.] Write the equation of the line passing through $(-3, -2)$ and $(-3, -7)$.

7. [10 pts.] If one point on a line is $(2, -6)$ and the line's slope is $-\frac{3}{2}$, what is the y-intercept?

8. [10 pts.] A line L passes through $(-1, 2)$ and is perpendicular to the line $y - 2x + 5 = 0$. Find the equation for L in slope-intercept form.

9. [10 pts. each] Find the domain of each function in interval notation.

   (a) $f(x) = \dfrac{42}{x-3}$

   (b) $r(x) = \dfrac{1}{\dfrac{12}{x} - 4}$

10. [10 pts. each] Let $F(x) = \sqrt{x+8}$ and $G(x) = \sqrt{10-x}$. For what follows find all domains in interval notation.

    (a) Find the domain of F and G separately.

    (b) Find $F - G$ and its domain.

    (c) Find F/G and its domain. (F/G is the same as $\frac{F}{G}$, of course.)

11. Let $f(x) = \dfrac{5}{x+4}$ and $g(x) = \dfrac{1}{x}$.

    (a) [5 pts.] Find $(f \circ g)(x)$. No need to simplify.

    (b) [10 pts.] Find the domain of $f \circ g$ in interval notation.

12. [10 pts. each] The function $f(x) = x^2 - 1$, $x \leq 0$, is one-to-one.

    (a) Find an equation for $f^{-1}(x)$.

    (b) Use interval notation to give the domain and range of f and f^{-1}.