1. Consider the function \( y = f(x) \) graphed below.

(a) (4pts) What is the domain of \( f \)? Write your answer in interval notation.

(b) (4pts) What is the range of \( f \)? Write your answer in interval notation.

(c) (3pts) Does \( f \) have an inverse? Why or why not?

2. (4pts) A linear best fit line is drawn through six data points below.

Based on the graph, which of the following is the most reasonable value for the correlation coefficient?

(a) 0.985
(b) -0.985
(c) 0.015
(d) -0.015
3. Consider the function \( y = g(x) \) graphed below.

(a) (5pts) What is the average rate of change of \( g \) on the interval \([-2, 3]\)?

(b) (2pts) Is \( g \) increasing, decreasing, or neither on the interval \([-2, 3]\)?

(c) (7pts) Find the equation of the line that goes through the point \((1, 1)\) and whose slope is the same as the average rate of change of \( g \) on the interval \([-2, 3]\). Then draw that line on the graph at the top of the page.

4. (7pts) Two lines are perpendicular and intersect at their \( y \)-intercept. If one of those lines is \( y = \frac{1}{3}x - 2 \), find the other.

5. (7pts) If \( a, b, \) and \( c \) are real numbers such that \( a \neq 0 \), write down the formula for the solutions to

\[
ax^2 + bx + c = 0.
\]
6. (7pts) Given the function \( f(t) = \sqrt{2t + 1} \) find a value for \( t \) such that \( f(t) = 3 \) if such a value exists.

7. (7pts) Find the domain of \( h(t) = \frac{t}{t^2 + t - 2} \). Write your answer in interval notation.

8. (7pts) Find \( p(10) \) where \( p(x) = \begin{cases} 3x + 4 & \text{if } x < 10 \\ 3x - 4 & \text{if } x \geq 10 \end{cases} \)

9. (12pts) Find the inverse of the function \( f(x) = -3x + 1 \) if an inverse exists. Use composition to check your answer.
10. Vandelay Industries sells latex tubing. Yesterday their manufacturing plant was up and running for 8 hours and produced 14,000 feet of latex tubing. For each additional hour that they keep the plant open they can manufacture an additional 2,000 feet of tubing. Let $T(h)$ be the length of tubing they can produce in a given day if they keep the plant open for $h$ hours that day.

(a) (4pts) Art Vandelay, the owner of Vandelay Industries, can keep the plant open around the clock if he needs or he can shut it down completely. What is a reasonable domain for the function $T$?

(b) (8pts) If $T$ is a linear function, find an equation for $T(h)$.

11. (12pts) Regina Phalange needs to walk 4 miles to the grocery store but there is a hill between her house and the store. For the first two miles she has to walk up the hill and can go at a rate of 3mph. After the first two miles she starts going down the hill and can go 6mph for the last two miles. Let $D(t)$ be the distance she is from her house after $t$ hours. Write a piecewise function that describes $D(t)$. Hint: First calculate how long it took her to get to the top of the hill.

12. (Bonus - 3pts) What is the name of Dan’s favorite pizza place in Ohio?

13. (Bonus - 3pts) Vandelay Industries and Regina Phalange are references to two different 90’s sitcoms. What is one of the two?