Math 161
Graphs, Functions and Models Worksheet

Determine if the relation is a function and what the domain and range are.

1. $\{(5, 0), (3, -1), (0, 0), (5, -1), (4, -2)\}$

2. $f(x) = \sqrt{7 - x}$

Given that $f(x) = \dfrac{x - 4}{2 + x}$, find the following:

3. $f(-3.25)$

Write the slope-intercept equation for the line:

4. $m = 3$, passing through $(1, -2)$

5. The line perpendicular to the line $4.2x + 2y = 7$ through $(4, 1)$

6. through points $(-1, -1)$ and $(5, 6)$

7. A math instructor asked his students to keep track of how much time each spent studying a chapter on functions in his class. She collected the information with the test scores from that chapter's test. The data are listed in the table below:

Study Time, x (in hours)	Test Grade, y (in percent)
23	81
15	85
17	80
9	75
21	86
13	80
16	85
11	93

a. Use regression to model the data with a linear function.
b. Predicts a students score if they studied for 24hrs, 6hrs, 18hrs.
c. What is the correlation coefficient? How confident are you about the regression as a predictor?

Graph the function and label all maxima and minima. Find the interval where the function is increasing and decreasing.

8. $0.3x^3 - 0.3x^2 - 5x - 4$

9. A rancher has 360yd of fencing with which to enclose two adjacent rectangular corrals, one for sheep and one for cattle. A river forms one side of the corrals. Suppose the width of each corral is x yards. Below is a figure

River ->
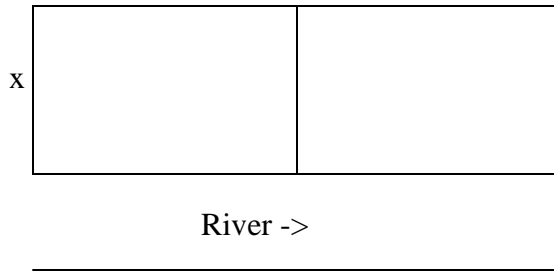
a. Express the total area of the two corrals as a function of x.
b. Find the domain of the function.
c. Graph the function.
d. What dimensions yield the maximum area?

Given that $f(x) = x^2 - 2$ and $g(x) = 3x + 1$, find each of the following:

10. $(f + g)(5)$

11. $(f \circ g)(x)$

12. $(g \circ f)(x)$

Determine if the function is even or odd:

13. $f(x) = x + {}^1/_x$

14. $\sqrt{-x} + 5$

15. The number of representatives N that each state has varies directly as the number of people P living in the state. If New Jersey, with 13,003,521 residents, has 28 representatives, how many representatives does Washington state have with a population of 3,784,713 people?

Write a function for the following:

16. Y varies jointly as x and z and inversely as w. $Y = {}^4/_3$ when x = 2, z = 9, and w = 4.

17. Find the distance from (-3, 7) to (3, 6).

18. Find the equation for a circle with a center point of (4, 2) with radius of ${}^4/_3$.