

Exam 1

Name _____.

1. (12 points) Find the functions $f(x)$ and $g(x)$ that fit the following data:

a.

x	1	2	3	4
f(x)	4.9	8.1	11.3	14.5

b.

x	2	4	6	8
g(x)	9.3	5.95	3.81	2.48

2. (12 points)

- a. Find the growth rate and the doubling time of a population given by

$$P(t) = 2000(1.4)^t.$$

- b. Find the decay rate and the half-life of a radioactive substance whose amount at time t is given by

$$Q(t) = 300(.7)^t.$$

3. (13 points) How much money would you have after 20 years if you initially invest \$400 in a bank that has an annual interest rate of 6 percent and interest is compounded five times a year? If, instead, interest is compounded continuously, how much money would you have?

4. (12 points)

a. Below is the graph of a function $f(x)$. In the same xy -plane, graph the inverse function $f^{-1}(x)$.

b. Given $g(x) = 4x + 9$, find the inverse function $g^{-1}(x)$.

5. (12 points) a. Given the function $f(x) = x^3 + x - 3$, find $f^{-1}(20)$.

b. Find an equation of the line that passes through the points $(1,4)$, $(5,-3)$.

6. (18 points) Find a possible formula for each of the following functions $f(x)$, $g(x)$, and $h(x)$:

7. (21 points) a. If a bank has an annual interest rate of 5 percent and interest is compounded monthly, what is the effective interest rate?

b. Let $f(t)$ represent the distance Mary is from home at time t . Assume at time $t=0$ she leaves home for school. Mary stops at a friend's house which is on the way to school and is half way to school. Mary talks to her friend for a good amount of time. She then notices that she forgot her books so she returns home to get her books and immediately walks to school. Draw a possible graph of $f(t)$ up to the time she arrives at school.

c. Find the values of $\ln(1)$, $\log(100)$, and $\ln(\sqrt{e})$.

d. Find the length of the arc of a circle of radius 5 if the central angle determined by the arc is 3 radians.