

Name:

Math 10a
September 11, 2014
Quiz #1

1. The force between two electrons a distance d apart is

$$F(d) = \frac{C}{d^2}$$

for $d > 0$ and some positive constant C .

- (a) In terms of C , what is the distance as a function of the force?

- (b) If the electrons are moving and the scientist measures the force between them going to 0, what can you say about the distance between them?

2. Let $f(x) = 10x$, $g(x) = 2^x$.

(a) What is $(g \circ g \circ g \circ f)(.1)$?

(b) Suppose a population of rabbits doubles every x days. Initially (at 0 days) there are 100 rabbits. Write down an expression for the number of rabbits after x days in terms of composing f and g (you may use f and g more than once).

(c) Same setup as in (b). How many days until there are at least 3000 rabbits?

3. For the following, give the limit or state if it doesn't exist:

(a) $\lim_{x \rightarrow 0} \frac{1}{x^2}$

(b) $\lim_{x \rightarrow 5} \frac{x^2 - 6x + 5}{x - 5}$.

(c) $\lim_{x \rightarrow 0} \frac{1}{1 - 2^x}$.

4. Let

$$A = \text{range of the function } f(x) = 1 + e^x$$

$$B = \text{range of the function } g(x) = 4 - x^2.$$

What is

(a) $A \cap B$?

(b) $A \cup B$?