

College of the Holy Cross, Fall 2019
Math 135, Section 1, Midterm 1
Friday, September 27

Your Name: _____

Instructions: You must show all work to justify your answers. Enter answers in the boxes when they are provided. Use the back of the preceding page if you need more space for scratch work. The numbers next to each part of the questions are their point values.

Please do not write in the space below

Problem	Points/Poss
I	/ 25
II	/ 25
III	/ 20
IV	/ 30
Total	/100

I. The following table contains values for three different functions: $f(x), g(x), h(x)$.

x	2.5	3.4	4.3	5.2	6.1
$f(x)$	3	9	27	81	243
$g(x)$	12.1	13.2	14.3	15.4	16.5
$h(x)$	5.4	3.6	1.3	5.3	7.9

A) (15) One of these is a linear function. Explain how you can tell which one it is, and give a formula for it.

B) (10) One of these functions is *neither linear nor exponential*. Explain which one that is and why.

II.

- A) (10) Simplify using properties of logarithms and exponents. (No credit will be given for only an approximate calculator value.)

$$\log_3 \left(\frac{\sqrt{3}}{\sqrt[4]{27}} \right)$$

Simplified form:

- B) (15) The population of a city (in millions) at time t (years) is $P(t) = 3.7e^{0.04t}$. When will the population reach 6.3 million?

Time:

III. Given $f(x) = \frac{1}{x^2 - 6x + 8}$ and $g(x) = \tan(x)$, but defined *only for x in the interval $-3 \leq x \leq 3$* . Answer the following questions.

A) (10) Which x between -3 and 3 must be removed to obtain

the domain of f :

the domain of g :

B) (10) Using the Limit Laws, determine $\lim_{x \rightarrow 1} f(x)g(x)$.

limit:

IV. (Make sure your calculator is set in radian mode for this problem.)

A) (20) Let $f(x) = \frac{\sin(5x)}{8x}$. Compute the values at $x = \pm\pi/10$, $x = \pm\pi/100$, $x = \pm\pi/1000$ accurate to three decimal places and fill in the table below:

x	$-\pi/10$	$-\pi/100$	$-\pi/1000$	$\pi/1000$	$\pi/100$	$\pi/10$
$f(x)$						

B) (10) What's your estimate of the value of the limit $\lim_{x \rightarrow 0} \frac{\sin(5x)}{8x}$ based on this numerical information?

limit: