

Name Solutions

1. There are no notes or calculators allowed on this test.
2. All students will be expected to adhere to the academic code of conduct. It is always a violation of the university honor code to, in any way, assist another person in the completion of this exam or to copy answers from another student. Please keep your eyes on your own work and keep your own work covered up as much as possible during the exam so that others will not be tempted or distracted. Thank you for your cooperation.
3. Please mute/turn off all cell phones or pagers
4. Show all work for full credit. Box your final answers.
5. You do not need to do the problems in the order that they appear.
6. There are 100 possible points on the exam.

Good Luck!

1. (14 points) Find the inverse of the function

$$f(x) = \frac{2x+2}{x}$$

$$y = \frac{2x+2}{x}$$

change x and y $x = \frac{2y+2}{y}$

$$xy = 2y+2$$

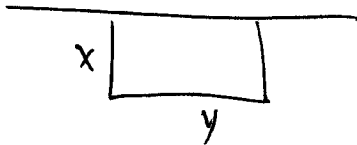
$$xy - 2y = 2$$

$$y(x-2) = 2$$

$$y = \frac{2}{x-2}$$

$$f^{-1}(x) = \frac{2}{x-2}$$

2. (20 points) A gardener has 16 feet of fencing to enclose a rectangular garden area alongside a garage. (So only three sides require fencing, the third side is the garage.) What is the maximum possible area for the garden?



$$A = x \cdot y$$

$$2x + y = 16$$

$$y = 16 - 2x$$

$$\text{OR. } x = \frac{16-y}{2}$$

$$A = x(16-2x) = 16x - 2x^2$$

maximize

$$\text{max } x = \frac{-16}{2(-2)} = 4$$

OR

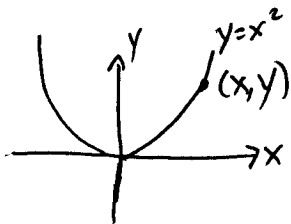
$$A = \left(\frac{16-y}{2}\right)y$$

$$A = 4(16 - 2 \cdot 4)$$

$$= 4(8) = 32 \text{ ft}^2$$

Max Area.

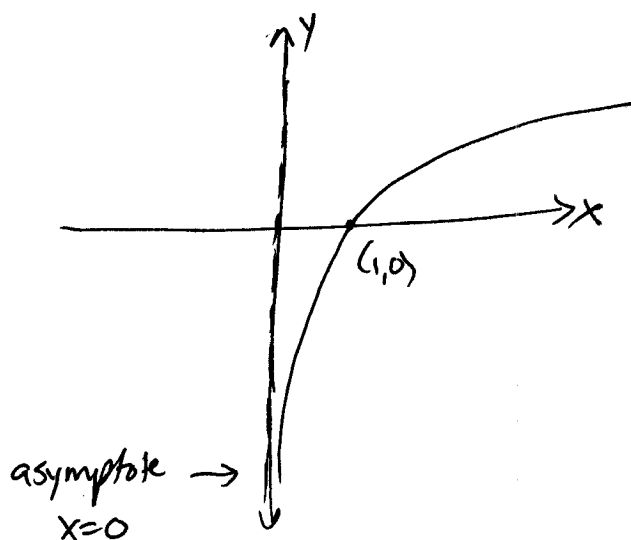
3. (14 points) A point (x, y) lies on the graph of $y = x^2$. Write an equation expressing the distance between the point (x, y) and $(1, -1)$ in terms of x . (DO NOT SIMPLIFY)



$$d = \sqrt{(x-1)^2 + (y-(-1))^2}$$

$$d = \sqrt{(x-1)^2 + (x^2+1)^2}$$

4. (10 points) Sketch a graph of $y = \log_{10} x$. Label any intercepts and asymptotes.



4

5. (20 points) Graph the function $y = \frac{x+6}{x^2-1} = \frac{x+6}{(x+1)(x-1)}$
 Specify the domain, x and y intercepts, vertical asymptotes and horizontal asymptotes.

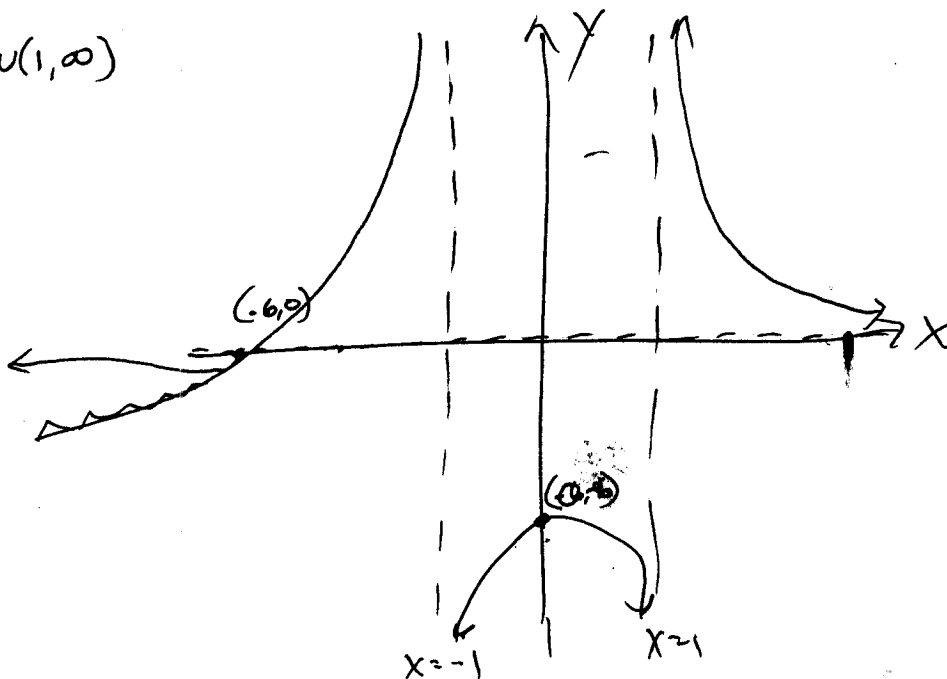
Domain: $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

x-int: $(-6, 0)$

y-int: $(0, -6)$

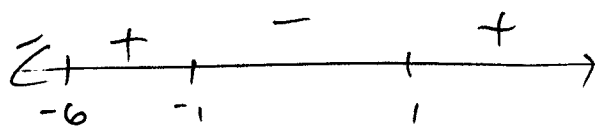
V.A.: $x = -1, x = 1$

H.A.: $y = 0$



x-int: $0 = x + 6$
 $x = -6$

y-int: $\frac{0+6}{(0+1)(0-1)} = \frac{6}{-1} = -6$



6. (10 points) Find the domain of the function. Write your answer in interval notation.

$$y = \log_{10}(3 - 4x)$$

Domain: ~~1/4~~
 $(-\infty, 3/4)$

$$3 - 4x > 0$$

$$3 > 4x$$

$$3/4 > x$$

7. (12 points) Solve for z.

$$8^{z+1} = 32$$

$$(2^3)^{z+1} = 2^5$$

$$2^{3z+3} = 2^5$$

$$3z+3 = 5$$

$$3z = 2$$

$$z = \frac{2}{3}$$

OR

$$\log_{10} 8^{z+1} = \log_{10} 32$$

$$(z+1) \log_{10} 8 = \log_{10} 32$$

$$z+1 = \frac{\log_{10} 32}{\log_{10} 8}$$

$$z = \frac{\log_{10} 32}{\log_{10} 8} - 1$$

Extra Credit (2 points) Circle the appropriate response. I want an honest response, any answer will get you credit!

I (did / did not) do the homework due today.

I (did / did not) do the practice midterm.

I spent about hour(s) studying for this midterm.