

Mathematics 112

EXAM II

Name: _____

Instructor: _____

Date: APR 5, 2005

1. There are 10 pages(counting this page).
2. No graphing or programmable calculators are allowed. Scientific calculators are allowed but are not needed.
3. Give exact answers (fractions, square roots, etc.). Decimal approximations may not receive full credit.
4. No notes or books are allowed.
5. Use only the scratch paper provided.
6. In Part II show your work and make your methods clear. Unjustified answers will receive no credit.

| Problems | possible scores | your score |
|--------------|-----------------|------------|
| 1 | 11 | |
| 2 | 16 | |
| 3 | 10 | |
| 4 | 12 | |
| 5 | 10 | |
| 6 | 8 | |
| 7 | 10 | |
| 8 | 11 | |
| 9 | 12 | |
| TOTAL | 100 | |

1. Answer the following question about f and g.

$$f(x) = \frac{1}{x^2} \qquad g(x) = \sqrt{x+1}$$

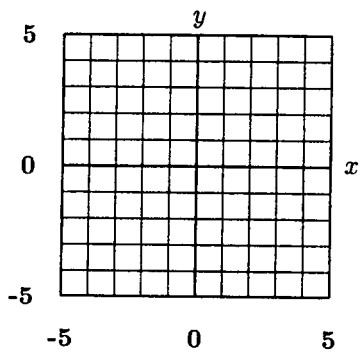
a) (3pts) Compute $(f \circ g)(x)$.

Answer:

b) (3pts) What is the domain of $(f \circ g)(x)$.

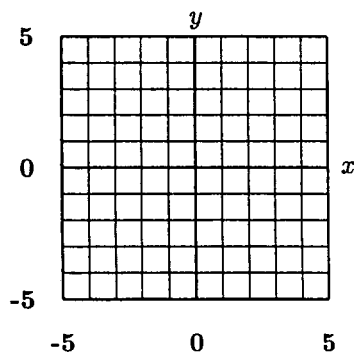
Answer:

a) (5pts) Graph $y = (f \circ g)(x)$.



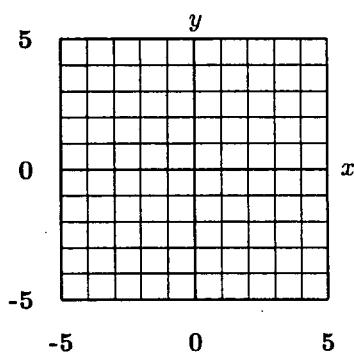
2 a) (5pts) Graph the following function. Carefully plot any endpoints.

$$f(x) = \begin{cases} -|x| & \text{if } -2 \leq x < 1 \\ x^2 & \text{if } 1 \leq x \leq 2. \end{cases}$$



b) (5pts) Graph the following function. Carefully plot any endpoints.

$$g(x) = -\sqrt{x+1} + 1$$



c) (2pts) What is the range of $f(x)$?

Answer:

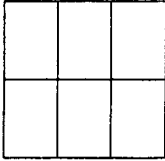
d) (2pts) What is the maximum value of $g(x)$?

Answer:

e) (2pts) Compute $f(g(3))$.

Answer:

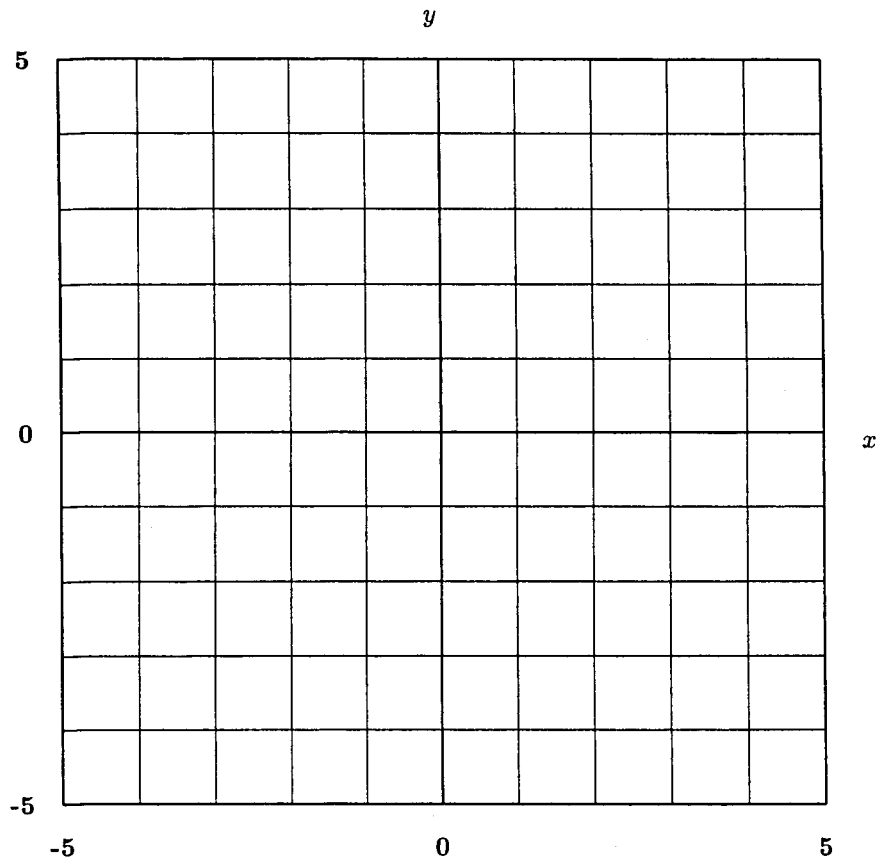
3) (10pts) A farmer has 1000ft of fencing to enclose 6 rectangular pastures as pictured. What dimensions maximize the total area of the 6 pastures.



Answer:

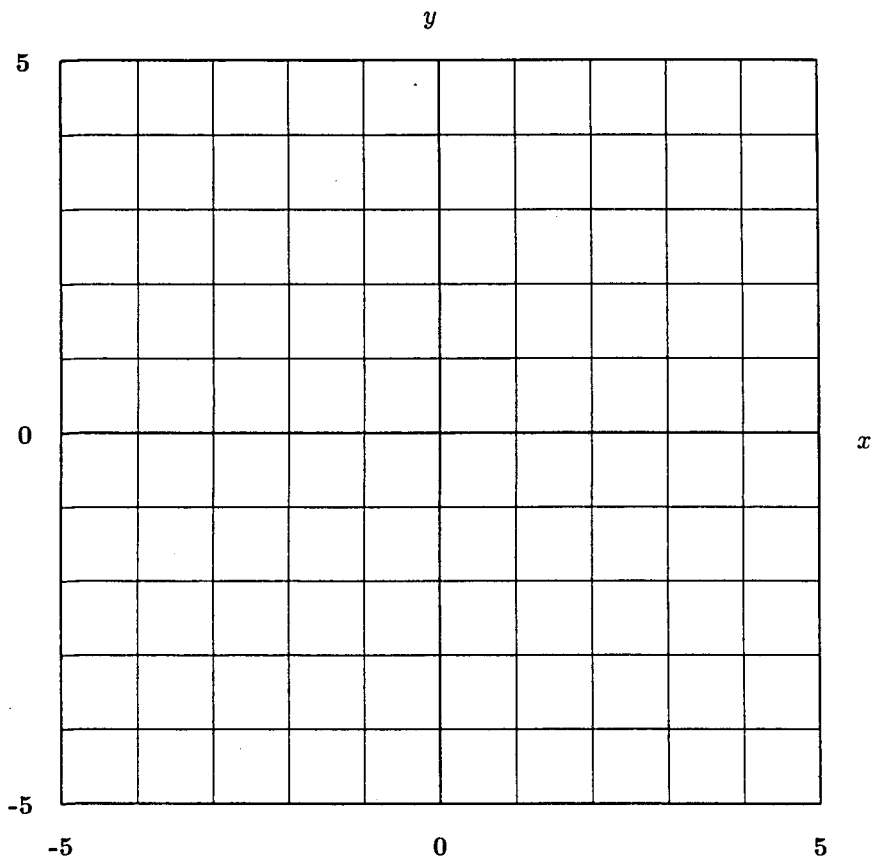
4) (12pts) Graph the following function. Under the graph, write down the x-intercepts, y-intercepts, and the equations of any asymptotes.

$$y = \frac{2(x+2)(x-1)}{x(x-2)}$$



5) (10pts) Graph the following function. Under the graph, write down the x-intercepts, y-intercepts, and the equations of any asymptotes.

$$y = x^2(x - 1)(x + 1)^3$$



6) (8pts) Determine if the function has an inverse. If it does not have an inverse, state the reason. If it does have an inverse, compute the inverse function.

a) $f(x) = (x - 1)^2 + 2$

Answer:

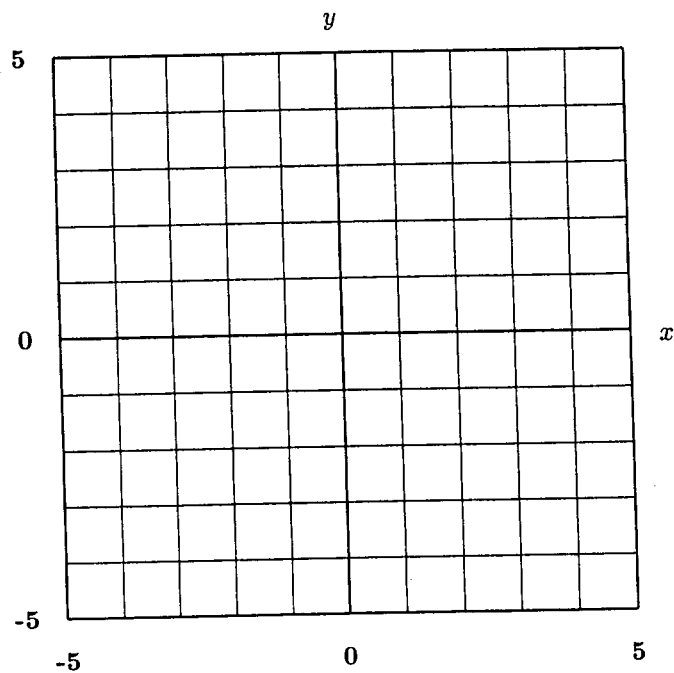
b) $g(x) = (x + 2)^3 - 1$

Answer:

7) (10pts) Compute the average rate of change of $f(x) = 1 + \frac{1}{x}$ on the interval $[x, x+h]$. Simplify your answer.

Answer:

8) a) (6pts) Graph $y = e^{x-1} - e$. Next to the graph, write down the x-intercepts, y-intercepts, and the equations of any asymptotes.



b) (5pts) Solve for x.

$$2^x 8^{2x+1} = 4^8$$

Answer:

9) Simplify the following as much as possible.

a) (4pts) $\sqrt{\frac{16x^3y^2 + 8xy^4}{2x^3}}$

Answer:

a) (4pts) $\frac{1}{x^2 - 1} - \frac{1}{x - 1}$

Answer:

a) (4pts) $\left(\frac{1}{2} - \frac{1}{a}\right)^{-1}$

Answer:

SCRATCH PAPER

SCRATCH PAPER