

MATHEMATICS 112 EXAM II November 9, 2004

Name: _____

Instructor and section: _____

1. There are 9 problems on 9 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 will not receive full credit.
4. Do not simplify your answers unless specifically told to. Answers such as $x = \frac{3^2\sqrt{25} + 6}{12}$ are perfectly okay.
Answers such as $3x + 4 = 7x - 2$ require more simplification.
5. No notes or books are allowed.
6. Use only the scratch paper provided.
7. Show your work and make your methods clear. Unjustified answers will receive no credit.
8. Put your final answer in the box.

problem	possible score	your score
1	10	
2	15	
3	12	
4	7	
5	10	
6	12	
7	12	
8	12	
9	10	
TOTAL	100	

1. Answer the following questions about $f(x)$ and $g(x)$.

$$f(x) = \frac{1}{x} \qquad g(x) = \sqrt{x^2 - 4}$$

- a) (2 pts) Compute $f(A+B)$.

Answer:

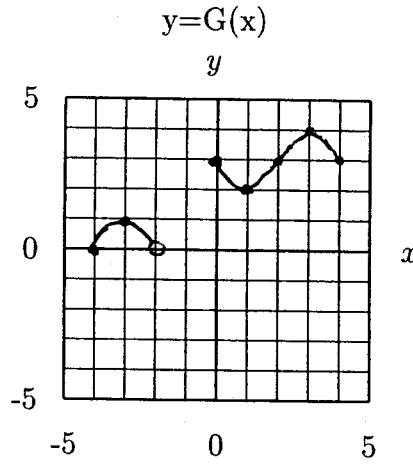
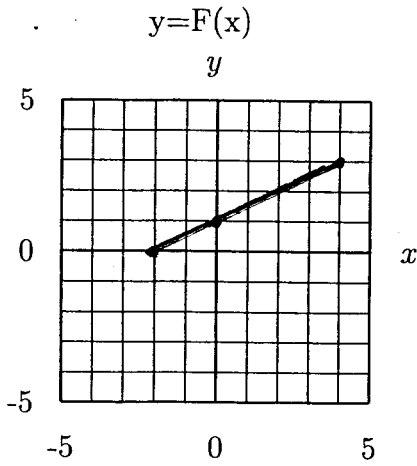
- b) (2 pts) Compute $g(f(x))$.

Answer:

- c) (6 pts) What is the domain of $g(x)$?

Answer:

2. Answer the following questions about $F(x)$ and $G(x)$.



a) (3 pts) Compute $F(G(-4))$.

Answer:

b) (3 pts) For what value(s) of x if $G(x)=3$?

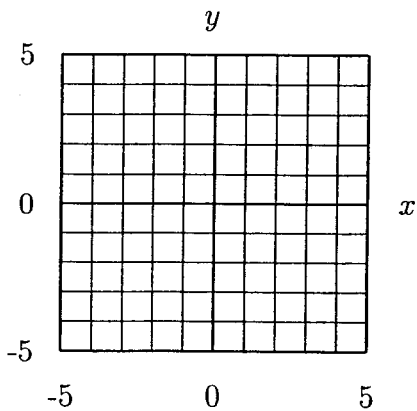
Answer:

c) (3 pts) What is the range and domain of $G(x)$?

Range:

Domain:

d) (6 pts) Graph $y = F^{-1}(x)$. Write the coordinates of the x and y intercepts next to the graph.



3. (12 points) Solve. Put your answer in interval notation.

$$\frac{9}{x^2 + 2x - 8} \leq -1$$

Answer:

4. (7 pts) Let $f(x) = \sqrt[3]{x^5 + 8}$. Compute $f^{-1}(x)$.

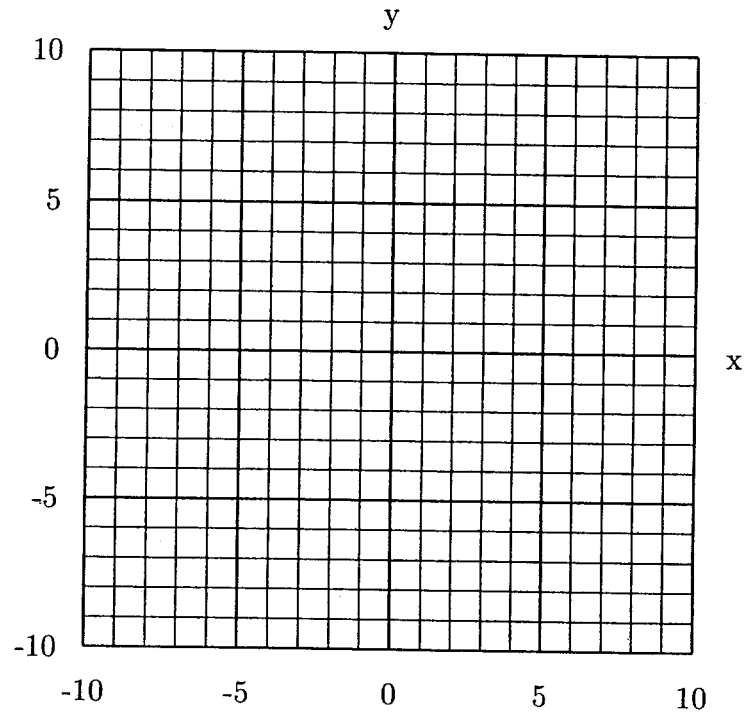
Answer:

5. (10 pts) Let $g(x) = x^2 - 2x$. Compute the average rate of change of $g(x)$ on the interval $[x, x + h]$. **Simplify your answer.**

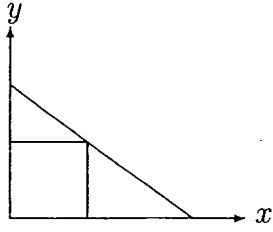
Answer:

6. (12 pts) Graph the following function. Next to the graph, write the coordinates of the x and y intercepts and the equations of any asymptotes.

a) $y = \frac{x^2 - x - 6}{x^2 - x - 2}$



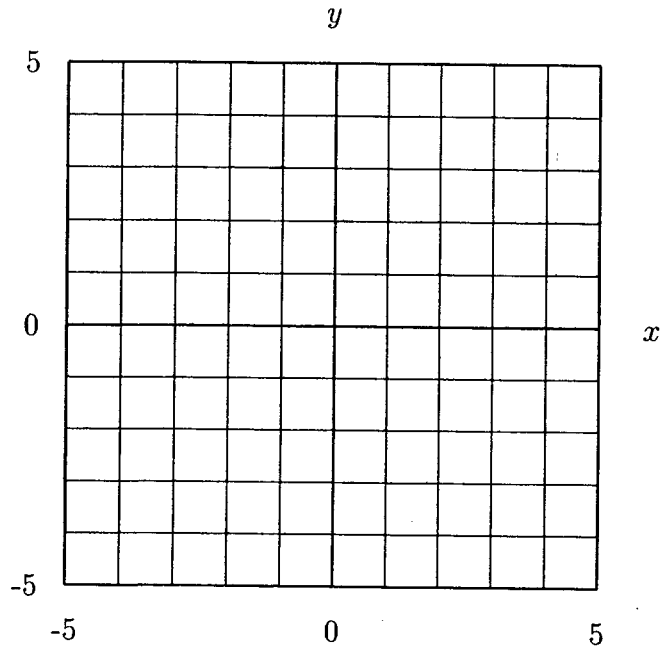
7. (12 pts) A point P lies in the first quadrant on the graph of line $y = 7 - \frac{3}{4}x$. From the point P perpendicular lines are drawn to both the x-axis and y-axis forming a rectangle. What is the largest possible area for this rectangle?



Answer:

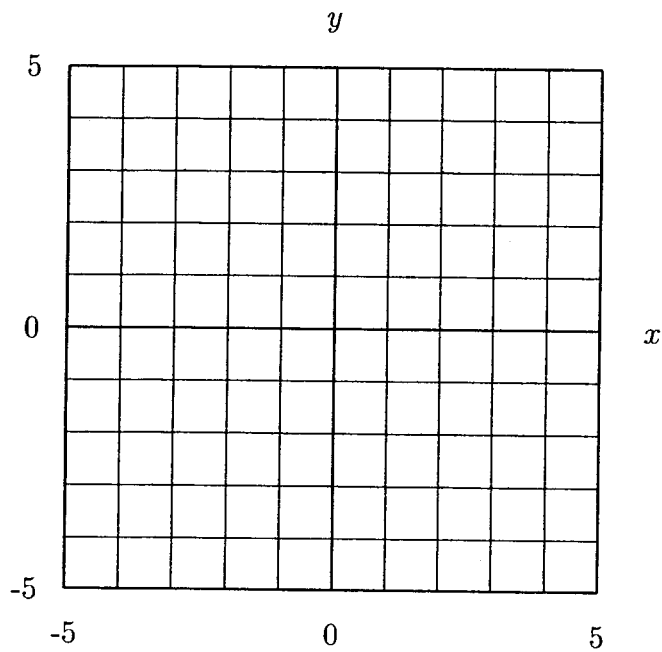
8. a) (6 pts) Carefully graph

$$F(x) = \begin{cases} x^2 & x \leq -1 \\ \sqrt{1-x^2} & -1 < x \leq 1 \\ \frac{1}{x} & x > 1 \end{cases}$$



b) (6 pts) Carefully graph

$$y = |3 - x| + 1$$



9. (5 points each) Simplify the following as much as possible:

a) $\sqrt{4A^4B^2 + 8A^4B^3}$

Answer:

b) $\frac{a^2b + b^2a}{a^2b^2}$

Answer:

Scratch Paper

Scratch Paper

