

MA111 Pre-Calculus FINAL EXAM

Review

Spring '05

READ ALL DIRECTIONS CAREFULLY.

Answer the following questions in your blue book. SHOW ALL WORK. When you are finished turn in the test and booklet. Good luck! Thanks for being such a great class! Have a great holiday break!!!

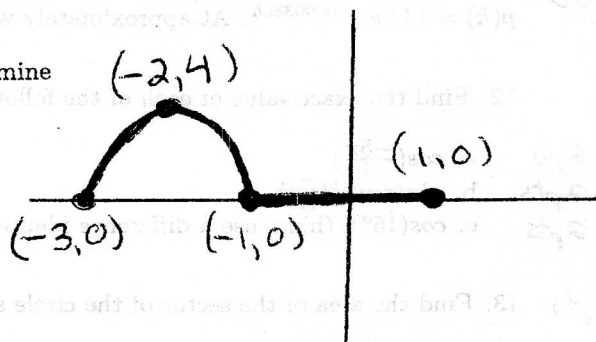
1. Given $f(x) = \frac{1}{x^2}$, $g(x) = \sqrt{x^2 - 8}$, $k(x) = \frac{x+2}{x-3}$

- 2pts a. Find the domain of $g(x)$.
- 2pts b. Find $(f \circ g)(x)$
- 2pts c. Find the domain of $(f \circ g)(x)$

5pts d. Simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

2. For the graph of the function f sketched below, determine

- 2pts a. The Domain
- 2pts b. The Range
- 1pt c. $f(1)$
- 1pt d. The interval(s) where $f(x)$ is increasing
- 5pts e. Sketch the graph of $y = -2f(x+1) - 3$



3. Let $f(x) = 2^x + 1$

- 2pts a. Sketch $f(x)$.
- 2pts b. Is $f(x)$ one-to-one? Explain.
- 2pts c. Find $f^{-1}(x)$.
- 1pt d. Sketch $f^{-1}(x)$.

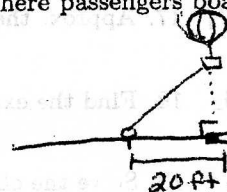
4. Several values of two functions f and g are listed in the following tables:

- 1pt. a. find $(f+g)(5)$
- 1pt b. find $g^{-1}(6)$
- 1pt. c. find $(f \circ g)(5)$

| | | | | |
|--------|---|---|---|---|
| x | 5 | 6 | 7 | 8 |
| $f(x)$ | 6 | 8 | 5 | 7 |

| | | | | |
|--------|---|---|---|---|
| x | 5 | 6 | 7 | 8 |
| $g(x)$ | 7 | 5 | 6 | 7 |

4pts 5. A hot-air balloon rises vertically from ground level as a rope attached to the base of the balloon is released at the rate of 5 ft/sec. The pulley that releases the rope is 20 feet from a platform where passengers board the balloon. Express the altitude h of the balloon as a function of time, t .



6. If $f(x) = \frac{3x^2 + x - 10}{x^2 + 2x}$

- 2pts a. Find the domain.
- 2pts b. Find the vertical and horizontal asymptotes.
- 2pts c. Is there a "hole" in the graph? If so, at which point(s)? Explain.
- 2pts d. Sketch the graph of $f(x)$ using a sign chart and the information from parts a - c. Label your graph carefully.

3pts 7. Find the oblique asymptote for $f(x) = \frac{x^4 - 16}{x^3}$