CALCULUS I EXAM 4 A R^2 NAME _____
SHOW ALL WORK ON SEPARATE PAPER. Justify and circle all answers.
Where calculators are used, describe window, procedures, etc.

1. Evaluate the integral: $\int \frac{x^3+3}{x^2}\,dx$ 1

2. Find y = f(x) if f"(x) = x + 2, f'(0) = 3, f(0) = -1

3. Use the formulas to find $\lim_{n\to\infty}\sum_{i=1}^{n} (1+\frac{2i}{n})^2(\frac{2}{n})$ 2

4. Use a calculator method to find the area under the graph y=1- x^2 over [-1, 1]. Explain the method and the steps used to find area.

5a) Use a geometric formula to find the value of $\int_{-3}^{3} \sqrt{9-x^2}\,dx$ 3. Draw a figure, give exact value.

b) Use the "calc" function of the calculator to find the approximate area. (Use this as a check!)

6. Given $\int_0^{10} f(x)dx = 6$ 4, $\int_4^{10} f(x)dx = 3$ 5, and $\int_0^{10} g(x)dx = 7$ 6.

Find: a) $\int_0^4 f(x)dx$ 7 b) $\int_{10}^0 f(x)dx$ 8 c) $\int_0^{10}[2f(x)-g(x)]dx$ 9.

7. Evaluate the definite integral (by algebraic process):
$\int_4^9 \frac{x-2}{\sqrt{x}}dx$ 10. Check by calculator methods. Explain how.

8. Given $F(x)=\int_3^x \sqrt{t^2+4}dt$ 11, find F'(x).

9. Find the average value of f(x) = sin x on [0,π].
[Hint: Use $f(c)=\frac{1}{b-a}\int_a^b F(x)dx$ 12 unless you know a better way.]

10. Draw a sketch, use the calculator and find the area under the curve for $\int_0^4 x\sqrt{x^2+4}dx$ 13 using:

a) Left rectangles with n = 4

b) Right rectangles with n = 4

c) Trapezoidal Rule with n = 4

d) Simpson's Rule with n/2 = 4

e) Simpson's Rule with n = 4

f) Trapezoidal Rule with n = 20.

g) "Calc", "fnint" function of the calculator.

11. Find the exact area (in radical form) of $\int_0^4 x\sqrt{x^2+4}dx$ 14 by "algebraic integration."

In 12 - 14, evaluate the integrals.

12. $\int x^2\sqrt{4-x^3}dx$ 15

13. $\int sin^3 x\cos x dx$ 16

14. $\int \frac{(1+\sqrt{x})^3}{\sqrt{x}}dx$ 17