

### Math 265 Exam 4 Review

Evaluate

1.  $\int \frac{x^3 + x\sqrt{x} - 4}{x^2} dx$

4.  $\int \frac{3y}{\sqrt{4y^2 - 1}} dy$

2.  $\int x^2 (x^3 + 1)^7 dx$

5.  $\int \frac{\cos 3x}{\sqrt{\sin 3x + 1}} dx$

3.  $\int \csc^2 5t dt$

Evaluate the definite integral using the fundamental theorem of calculus.

6.  $\int_1^3 (2x^4 - 3x^2) dx$

7.  $\int_0^1 \frac{t^3}{\sqrt{1-t^4}} dt$

8.  $\int_1^5 |x - 2| dx$

9. Use the method of inscribed rectangles to find the exact area of the region in the first quadrant bounded by  $y = 6 - x^2$  and the  $x$ -axis. Include a sketch showing the region and the  $k^{\text{th}}$  rectangle.

10. Find a general solution of the differential equation

$$\frac{dy}{dx} = \frac{x^2 - x}{y}$$

11. The slope of the line tangent to a curve at the point  $(x, y)$  is given by

$$f'(x) = \frac{8}{x^3},$$

and the curve passes through  $(1, 5)$ . Find an equation of the curve in the form  $y = f(x)$ .

12. A company's marginal cost for producing  $x$  items is given by

$$C'(x) = 50x + 65.$$

If the actual cost of making 5 items is \$1000, find a function expressing cost of production  $C$  dollars in terms of  $x$ .

13. Given  $\int_1^6 (x^3 + 2) dx$ . Find an approximate value for this integral (to the nearest unit) by using the trapezoidal rule with  $n=5$ .

14. If an automobile starts from rest, what constant acceleration will enable it to travel 500 feet in 10 seconds?