

Due by 9am on November 3. Please upload your solutions to Canvas as one PDF file. Do not forget to attach the honor code. You must show all your work for full credit. Each problem is worth 10 points.

(1) Evaluate the integrals.

(a)  $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}$

(b)  $\int \sqrt{16 - 5x^2} dx$

(2) Evaluate  $\int \frac{dx}{(x^2 - 6x + 11)^2}$

(3) Evaluate  $\int_{1/2}^1 \frac{dx}{x^2 \sqrt{x^2 + 4}}$

(4) Evaluate  $\int \frac{x^2}{\sqrt{9 - x^2}} dx$

(5) Evaluate  $\int \frac{x^3 + 1}{x^2 - 4} dx$

(6) Evaluate the integrals.

(a)  $\int \frac{dx}{x^2 - 7x + 10}$

(b)  $\int \frac{3x - 9}{(x - 1)(x + 2)^2} dx$

(7) Evaluate the integrals.

(a)  $\int \frac{18}{(x + 3)(x^2 + 9)} dx$

(b)  $\int \frac{4 - x}{x(x^2 + 2)^2} dx$

(8) (a) Find the area of the region between the graphs of the functions

$$f(x) = x^2 - 4x + 10, \quad g(x) = 4x - x^2, \quad 1 \leq x \leq 3$$

(b) Find the area between the graphs of  $f(x) = x^2 - 5x - 7$  and  $g(x) = x - 12$  over  $[-2, 5]$ .

(9) (a) Find the area of the region bounded by the graphs of  $y = 8/x^2$ ,  $y = 8x$ , and  $y = x$ .

(b) Set up (but do not evaluate) an integral that expresses the area between the circles  $x^2 + y^2 = 2$  and  $x^2 + (y - 1)^2 = 1$ .

(10) (a) Calculate the area enclosed by the graphs of  $h(y) = y^2 - 1$  and  $g(y) = y^2 - \frac{1}{8}y^4 + 1$ .

(b) Find the area of the region bounded by the graphs of  $x = y^2 + 4y - 22$  and  $x = 3y + 8$ .