

Math1071Q Fall 2015

Final exam review sheet

Note: This review packet covers sections 6.1 through 6.6. The exam will be cumulative. You should work through the review packet for Exams 1 and 2 to remind yourself of earlier material. You can get even more practice by solving the review exercises at the end of each chapter of the textbook. This review packet is not intended to be exhaustive.

1. Evaluate the following indefinite integrals.

(a) $\int 5 \, dx$

(b) $\int x^{99} \, dx$

(c) $\int x^{-99} \, dx$

(d) $\int \frac{5}{y^3} \, dy$

(e) $\int \frac{y^{\frac{3}{2}}}{\sqrt{2}} \, dy$

(f) $\int \sqrt[3]{u^2} \, du$

(g) $\int (6x^2 + 4x) \, dx$

(h) $\int \left(\frac{3}{t^2} - 6t^2 \right) \, dt$

(i) $\int \left(x + \frac{1}{x} \right) \, dx$

(j) $\int \left(\pi + \frac{1}{x} \right) \, dx$

(k) $\int \frac{t+1}{\sqrt{t}} \, dt$

(l) $\int \left(e^x - \frac{1}{x} \right) \, dx$

2. Evaluate the following indefinite integrals.

(a) $\int 6(3x + 1)^{10} \, dx$

(b) $\int x(3 - x^2)^7 \, dx$

(c) $\int (x^3 + 2)(x^4 + 8x + 3)^{\frac{1}{3}} \, dx$

(d) $\int 2\sqrt{x+1} \, dx$

(e) $\int \sqrt[3]{x+1} \, dx$

(f) $\int \frac{\ln 2x}{x} \, dx$

(g) $\int \frac{1}{2x+1} dx$

(h) $\int \frac{e^{-x}}{e^{-x}+1} dx$

(i) $\int \frac{1}{x \ln x} dx$

(j) $\int \frac{1}{x \ln x^2} dx$

3. Evaluate the following definite integrals.

(a) $\int_1^2 4x^3 dx$

(b) $\int_{-2}^{-1} 3x^4 dx$

(c) $\int_{-1}^0 (9x^2 - 1) dx$

(d) $\int_1^2 (x^{-2} + 3x^{-4}) dx$

(e) $\int_{-1}^0 e^{-x} dx$

(f) $\int_{-2}^{-1} e^{2x} dx$

(g) $\int_2^4 \frac{3}{x} dx$

(h) $\int_{-1}^0 (1 + 2x)^5 dx$

(i) $\int_{-1}^1 xe^{x^2+1} dx$

(j) $\int_1^2 \frac{1}{2x+1} dx$

(k) $\int_{-2}^0 \frac{x}{x^2+1} dx$

4. Find the average value of the given function of the given interval.

(a) $f(x) = x$ on $[0, 10]$

(b) $f(x) = x^3$ on $[-1, 1]$

(c) $f(x) = e^x$ on $[0, \ln 2]$

(d) $f(x) = ex(x - 1)$ on $[0, 2]$

5. Find the area of the region enclosed by the given curves.

(a) $y = x^3, y = 0, x = 1, x = 2$

(b) $y = e^{-x}, y = 3, x = -1, x = 0$

(c) $y = \sqrt{x}, y = x, x = 0, x = 1$

(d) $y = x^2 - 2x + 1, y = x + 1$

(e) $y = x^2, y = 8 - x^2$

(f) $y = e^{2x}, y = 3^{-2x}, x = -1, x = 2$

(g) $y = x^3 - 3x, y = 2x^2$

(h) $y = \sqrt[3]{x}, y = x, x = -8, x = 1$