Calculus II. Review 1, answers.
Note: these answers are only for checking your work. An answer on the test must show all the steps for full credit, similar to the way I work them on the board in class!
Also study quizzes, homework, and examples from notes!
No calculators will be used for taking the test.
For each integration problem, you must show the set-up and all the steps.

1. Find the area between the curves $y = x^2 - 2x, y = x + 4$, and $x = 0$ for $x > 0$.

$$56/3$$

2. Find the area between $y = x^3, \quad y = e^x, \quad x = -1, \quad x = 0$.

$$\frac{5}{4} - \frac{1}{e}$$

3. Find the area between $y = x - 1$ and $y^2 = 2x + 6$.

$$18$$

4. (skipped)

5. Just set up the integral for the area between $y = \cos x$ and $y = \sin 2x$ for $0 \le x \le \pi/3$.

$$\int_0^{\pi/6} (\cos x - \sin 2x)dx + \int_{\pi/6}^{\pi/3} (\sin 2x - \cos x)dx$$

6. Find the volume of the region inside $x = 0, \quad y = 3x + 1, \quad x = 2, \quad x = y^2$ rotated around the x-axis.

$$\int_0^2 \pi((3x+1)^2 - x)dx = 36\pi$$

7. Find the volume of the region inside $x = 0, \quad x = 1, \quad y = 2x, \quad y = e^{x^2}$ rotated around the y-axis.

$$\int_0^1 2\pi x(e^{x^2} - 2x)dx = \pi(e - 7/3)$$

8. Just set up the integral for the volume of the region inside $x = 0, \quad x = 1, \quad y = 2x, \quad y = e^{x^2}$ rotated around the x-axis.

$$\int_0^1 \pi(e^{2x^2} - 4x^2)dx$$

9. Find the volume of the region inside $y = x^3, \quad y = 0, \quad x = 1$ rotated around the line $x = 2$.

$$\int_0^1 2\pi(2 - x)(x^3)dx = \frac{3\pi}{5}$$

10. Just set up the integral for the volume of the region bounded by:
$y = 0$, $y = 1$, $y = x$, $y = \sqrt{\ln(x)}$; rotated around the y−axis.

$$\int_0^1 \pi(e^{2y^2} - y^2)dy$$

11. Find the average value of the function $f(x) = \dfrac{x+7}{\sqrt{x}}$ on the interval $[0, 3]$.

$$\frac{16\sqrt{3}}{3}$$

12. Evaluate the definite integral. $\displaystyle\int_1^2 x^3 \ln(x)dx$

$$\ln(16) - 15/16$$

13. Find the indefinite integral. $\displaystyle\int e^x \sin(2x)dx$

$$\frac{1}{5}e^x(\sin(2x) - 2\cos(2x)) + c$$

14. Find the indefinite integral. $\displaystyle\int \sin^7 x \cos^6 x dx$

$$\frac{-\cos^7(x)}{7} + \frac{3\cos^9(x)}{9} - \frac{3\cos^{11}(x)}{11} + \frac{\cos^{13}(x)}{13} + c$$

15. Find the indefinite integral. $\displaystyle\int \sin^8 x \cos^5 x dx$

$$\frac{\sin^9(x)}{9} - \frac{2\sin^{11}(x)}{11} + \frac{\sin^{13}(x)}{13} + c$$

16. Find the indefinite integral. $\displaystyle\int x^2 e^x dx$

$$e^x(x^2 - 2x + 2) + c$$

17. Find the indefinite integral. $\displaystyle\int \sqrt{16 - x^2}dx$

$$\frac{x}{2}\sqrt{16 - x^2} + 8\sin^{-1}(x/4) + c$$

18. Find the indefinite integral. $\displaystyle\int \frac{1}{x^2\sqrt{x^2 - 16}}dx = \frac{\sqrt{x^2 - 16}}{16x} + c$