Calculus II. Review 1.
Also study quizzes, homework, and examples from notes!
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 $x = 0$.

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

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

4. (skipped)

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

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

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

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

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

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.

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

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

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

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

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

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

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

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

19. Show the correct form for a partial fraction decomposition of these functions. Don't actually solve for the variables.

a) $\dfrac{x^2 + 1}{x^2(x + 2)}$ 　　　　　 b) $\dfrac{x + 3}{x^2 - 4}$ 　　　　　 c) $\dfrac{5x + 1}{x^3 - 3x - 2}$ 　 Note that x=2 makes the denominator $= 0$.

20. Decompose the function into its partial fractions. (Actually solve for the variables.)

a) $\dfrac{7x}{(x - 1)(x^2 + 3)}$ 　　　　　 b) $\dfrac{x + 3}{(x - 2)(x + 3)^2} = \dfrac{A}{x - 2} + \dfrac{B}{(x + 3)^2} + \dfrac{C}{x + 3}$

21. Find the indefinite integrals:

a) $\displaystyle\int \dfrac{x^2 + 2x + 3}{x(x + 1)}\,dx$ 　　　　　 b) $\displaystyle\int \dfrac{5x + 1}{x^3 - 3x - 2}\,dx$