Calculus II Spring 2017 Final Exam Answers

1a. 6

1b. $\frac{1}{4036}\sin^{2018}(2x) - \frac{1}{4040}\sin^{2020}(2x) + C$

1c. $\frac{1}{4}x^4\ln(x) - \frac{1}{16}x^4 + C$

1d. $\ln\left|\frac{\sqrt{9+x^2}}{3} + \frac{x}{3}\right| + C$

1e. $\frac{2}{7}\ln|x+6| + \frac{5}{7}\ln|x-1| + C$

1f. $\frac{\pi}{4}$

2a. $V = \int_0^1 2\pi y\left(2\sqrt{y} - y\right)dy$ or $V = \int_0^1 \pi\left(x^2 - \left(\frac{x^2}{4}\right)^2\right)dx + \int_1^2 \pi\left(1^2 - \left(\frac{x^2}{4}\right)^2\right)dx$

2b. $P = \int_0^1 \sqrt{1+1^2}\,dx + \int_1^2 \sqrt{1+0^2}\,dx + \int_0^2 \sqrt{1+\left(\frac{x}{2}\right)^2}\,dx = \sqrt{2} + 1 + \int_0^2 \sqrt{1+\frac{1}{4}x^2}\,dx$

3a. diverges

3b. converges

3c. diverges

3d. converges

4. $-\frac{1}{3}, \frac{1}{3}, \left[-\frac{2}{3}, 0\right)$

5. $21 - 36(x+2) + 25(x+2)^2 - 8(x+2)^3 + (x+2)^4$

6. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}9^n}{n} \cdot x^{2n},\ |x| \le \frac{1}{3}$

7.