

## Math 180 - Test #3 Review Exercise Answers

1. Absolute max: 1, Absolute min:  $2 - 2 \ln 2$
2. Absolute max:  $\frac{1}{2e}$ , Absolute min:  $-2e^4$
3.  $2\sqrt{3}$  by 6
4.  $2ab$
5. Volume:  $4565.18 \text{ in}^3$ ; Dimensions:  $13\frac{1}{6} \text{ in.}$  by  $13\frac{1}{6} \text{ in.}$  by  $26\frac{1}{3} \text{ in.}$
6.  $\frac{4}{27}\pi r^2 h$
7.  $\frac{32\pi}{3}$
8. 2 ft by 2 ft by  $1\frac{2}{3} \text{ ft}$
9.
  - a)  $6x^{4/3} - 2 \ln|x| + \frac{x^{10000}}{10000} - 20\sqrt{x} - \frac{1}{2x^2} + \frac{2}{5}x^{5/2} + C$
  - b)  $-\frac{1}{3}\cos 3x + 2 \sec x + e^{-x} + \frac{3^x}{\ln 3} + 19x + C$
  - c)  $2 \tan^{-1} x - 3 \sin^{-1} x + \cot x + C$
10.  $s(t) = -3 \cos t + 2 \sin t + 2t + 3$
11.  $s(t) = \frac{t^4}{12} - \frac{2}{3}t^3 + 3t^2 + \frac{211}{12}t$
12.  $f(x) = 2e^x - 3 \sin x - \frac{2e^\pi - 2}{\pi}x - 2$
13.
  - a)  $1 + \sqrt{2} + \sqrt{3} \approx 4.146$
  - b)  $1 + \sqrt{2} + \sqrt{3} + 2 \approx 6.146$
  - c)  $\sqrt{\frac{1}{2}} + \sqrt{\frac{3}{2}} + \sqrt{\frac{5}{2}} + \sqrt{\frac{7}{2}} \approx 5.384$
14.
  - a) 3.812
  - b) 4.987
  - c) 4.326
15.
  - a) 660 miles
  - b) 680 miles
16.
  - a) 18
  - b)  $-\frac{8}{3}$

17.

- a) 6
- b) 11
- c) -8

18.

- a) 2
- b)  $6\frac{1}{2}$  (or  $\frac{13}{2}$ )
- c) 2
- d) 0
- e) -3
- f)  $9\frac{1}{2}$  (or  $\frac{19}{2}$ )

19.

- a)  $19\frac{1}{2}$  (or  $\frac{39}{2}$ )
- b)  $\pi + 6$

20.

- a)  $-\frac{\sin^5(1/x)}{x^2}$
- b)  $-(x^2 - 5)^{10}$
- c)  $2 \tan^{-1} 2x - \frac{\tan^{-1} \sqrt{x}}{2\sqrt{x}}$

21.

- a)  $\frac{769}{5}$  (or 153.8)
- b)  $\frac{2-\sqrt{2}}{4}$
- c)  $\sqrt{3}$
- d)  $\frac{5\pi}{4}$
- e)  $\frac{\pi^2}{9} - 1$
- f)  $-\frac{1}{2} \ln \frac{1}{2}$  (or  $\frac{1}{2} \ln 2$ )
- g)  $\frac{e^3 - 1}{3}$
- h)  $\frac{9}{2}$  (or 4.5)
- i)  $-\frac{2}{9(2x^3 + 3x)^3} + C$
- j)  $-\frac{1}{2} e^{2 \cos x} + C$
- k)  $\frac{3}{2} e^{x^2 + 2} + C$
- l)  $-\frac{1}{2} x^2 e^{-2x} - \frac{1}{2} x e^{-2x} - \frac{1}{4} e^{-2x} + C$
- m)  $\frac{x^3}{3} \ln x - \frac{x^3}{9} + C$
- n)  $\frac{e^{2x} \sin x + 2e^{2x} \cos x}{5} + C$
- o)  $\frac{1}{3} x(2x + 1)^{3/2} - \frac{1}{15} (2x + 1)^{5/2} + C$  (or  $\frac{1}{10} (2x + 1)^{5/2} - \frac{1}{6} (2x + 1)^{3/2} + C$ )
- p)  $\frac{15}{8}$
- q)  $\frac{6}{\ln 7}$
- r)  $\frac{\pi}{4} - \frac{\ln 2}{2}$
- s) 0 (the integrand is an odd function)

22. 26 m