HOMEWORK DAY 29 – *Fundamental Theorem, Part I §4.3*

1. §4.3: 4

2. Find $g'(x)$ where

   (a) $g(x) = \int_1^x \cos(t^2)\,dt$

   (b) $g(x) = \int_x^3 t^3 \sin t\,dt$

(c) $g(x) = \displaystyle\int_{-1}^{x^2} e^{t^2}\, dt$

(d) $g(x) = \displaystyle\int_{-1/x}^{x} \sqrt{1+t}\, dt$

(e) $g(x) = \displaystyle\int_{0}^{\sin x} \sqrt{1+t^2}\, dt$

3. Evaluate the following definite integrals.

(a) $\displaystyle\int_1^3 (9x^2 + 2x - 4)\,dx$

(b) $\displaystyle\int_0^4 (t^2 + t^{3/2})\,dt$

(c) $\displaystyle\int_1^4 \frac{x-1}{\sqrt{x}}\,dx$

(d) $\displaystyle\int_0^2 (y-1)(2y+1)\,dy$

(e) $\displaystyle\int_1^2 \frac{s^4+1}{s^2}\,ds$

(f) $\displaystyle\int_1^9 \sqrt{3x}\,dx$

(g) $\displaystyle\int_0^{\pi/2} \sin(2x)\,dx$

(h) $\displaystyle\int_{\pi/3}^{\pi/2} \cos(x/2)\,dx$

(i) $\displaystyle\int_{-2}^{2} x^2 \sin(x)\,dx$

(j) $\displaystyle\int_0^{\pi/8} \sec^2(2\theta)\, d\theta$

(k) $\displaystyle\int_{-2}^{2} f(x)\, dx$ where $f(x) = \begin{cases} 2 & \text{if } -2 \le x \le 0 \\ 4 - x^2 & \text{if } 0 < x \le 2 \end{cases}$

(l) $\displaystyle\int_0^{\pi} f(x)\, dx$ where $f(x) = \begin{cases} \cos x & \text{if } 0 \le x \le \pi/2 \\ \sin x & \text{if } \pi/2 < x \le \pi \end{cases}$

HOMEWORK DAY 31 – *Indefinite integrals. Net change §4.4*

4. §4.4: 13

5. §4.4: 15

6. §4.4: 32

7. §4.4: 18

8. §4.4: 43

9. §4.4: 44

10. §4.4: 46

11. §4.4: 51

12. §4.4: 52

13. §4.4: 53

14. §4.4: 54

15. §4.4: 55

16. §4.4: 56

17. §4.4: 57

18. §4.4: 58

19. §4.4: 59

20. §4.4: 60