

AB-0303

BC-0301

Lesson 1-B HW Solutions

5.3: # 21 $\int_0^1 e^x dx = [e^x]_0^1 = \boxed{e-1}$

25 $\int_{-2}^6 5 dx = 5x \Big|_{-2}^6 = 30 - (-10) = \boxed{40}$

23 $\int_1^4 2x dx = [x^2]_1^4 = 16 - 1 = \boxed{15}$

27 $\int_{-1}^1 \frac{dx}{1+x^2} = [\tan^{-1} x]_{-1}^1 = \tan^{-1}(1) - \tan^{-1}(-1) = \boxed{\frac{\pi}{2}}$

5.4: # 27 $\int_{1/2}^3 (2 - \frac{1}{x}) dx = [2x - \ln|x|]_{1/2}^3 = (6 - \ln(3)) - (1 - \ln(1/2))$

$\frac{1}{2} = 5 - \ln(3) - \ln(2)$

$= 5 - (\ln(3) + \ln(2)) = \boxed{5 - \ln(6)}$

$= 5 - \ln(3) + \ln(1/2)$

29 $\int_0^1 (x^2 + \sqrt{x}) dx = [\frac{x^3}{3} + \frac{2}{3} x^{3/2}]_0^1 = (\frac{1}{3} + \frac{2}{3}) - (0+0) = \boxed{1}$

31 $\int_{32}^{32} x^{-6/5} dx = [-5x^{-1/5}]_{32}^{32} = -5(32)^{-1/5} + 5 = -\frac{5}{2} + 5 = \boxed{\frac{5}{2}}$

33 $\int_0^{\pi} \sin x dx = [-\cos x]_0^{\pi} = -\cos \pi + \cos(0) = \boxed{2}$

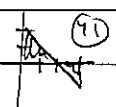
35 $2 \int_0^{\pi/3} \sec^2 \theta d\theta = 2 \tan \theta \Big|_0^{\pi/3} = 2 \tan(\pi/3) - 2 \tan(0) = \boxed{2\sqrt{3}}$

37 $\int_{\pi/4}^{3\pi/4} \csc x \cot x dx = [-\csc x]_{\pi/4}^{3\pi/4} = -\csc(3\pi/4) + \csc(\pi/4) = -\frac{2}{\sqrt{2}} + \frac{2}{\sqrt{2}} = \boxed{0}$

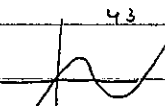
5.4: # 49 By Calculator $\boxed{3.802}$

50 By Calculator $\boxed{1.427}$

5.4 # 41 $A = \int_0^2 (2-x) dx - \int_2^3 (2-x) dx = \boxed{\frac{5}{2}}$



43 $A = \int_0^1 (x^3 - 3x^2 + 2x) dx - \int_1^3 (x^3 - 3x^2 + 2x) dx = \boxed{\frac{1}{2}}$



45 $A = \int_0^1 x^2 dx + \int_1^2 (2-x) dx = \boxed{\frac{5}{6}}$

47 $A = 2 \cdot \pi - \int_0^{\pi} (1 + \cos x) dx = \boxed{\pi}$

5.3 # 15 (Geometry)

$A_{v} f(x) = \frac{\int_{-4}^6 f(x) dx}{2 - (-4)} = \frac{\frac{1}{2}(6 \cdot 3)}{6} = \boxed{\frac{3}{2}}$

16 (Geom) $A_{v} f(t) = \frac{\int_{-1}^1 1 - \sqrt{1-t^2} dt}{1 - (-1)} = \frac{2 \cdot 1 - \frac{\pi(1)^2}{2}}{2} = \boxed{\frac{4 - \pi}{4}}$

$$5.3 \# 32. \text{ Av } f(x) = \frac{\int_e^{2e} \frac{1}{x} dx}{2e - e} = \frac{\ln|x|}{e} = \frac{\ln(2e) - \ln(e)}{e} = \frac{\ln(2)}{e}$$

$$\# 34. \text{ Av } f(x) = \frac{\int_0^1 \frac{dx}{1+x^2}}{1-0} = \frac{\tan^{-1}(1) - \tan^{-1}(0)}{1} = \boxed{\frac{\pi}{4}}$$

$$\# 35. \text{ Av } f(x) = \frac{\int_{-1}^2 3x^2 + 2x dx}{2 - (-1)} = \frac{[x^3 + x^2]}{3} = \frac{(8+4) - (-1+1)}{3} = \boxed{4}$$

$$5.3 \# 11 \quad \frac{\int_0^{\sqrt{3}} (x^2 - 1) dx}{\sqrt{3} - 0} = \boxed{0} \leftarrow \text{calculator}$$

$$\# 13 \quad \frac{\int_0^1 (3x^2 - 1) dx}{1 - 0} = \boxed{-2} \leftarrow \text{calculator}$$

FTC 2 - UB

$$1. \int_{3\pi/4}^{5\pi/4} \cos(2x) dx = \frac{1}{2} \int_{3\pi/2}^{\pi} \cos(u) du = \frac{1}{2} \sin u \Big|_{3\pi/2}^{\pi} = \frac{1}{2} \sin \pi - \frac{1}{2} \sin 3\pi/2$$

$$x = 3\pi/4 \rightarrow u = 3\pi/2$$

$$x = 5\pi/4 \rightarrow u = \pi$$

$$= 0 - \frac{1}{2}(-1) = \boxed{1/2}$$

$$2. \int_1^2 (2x-1)^7 dx = \frac{1}{2} \int_1^3 u^7 du = \frac{u^8}{16} \Big|_1^3 = \frac{3^8}{16} - \frac{1}{16} = \frac{6560}{16} = \boxed{410}$$

$$x=1 \quad u=1$$

$$x=2 \quad u=3$$

FTC 2 - ID

$$1. \int_{-1}^4 f'(x) dx = f(4) - f(-1)$$

$$24.071 = f(4) - 5$$

$$\boxed{f(4) = 29.071}$$

$$2. \int_{0.5}^2 f'(x) dx = f(2) - f(0.5)$$

$$4.785 = 5 - f(0.5)$$

$$\boxed{f(0.5) = 0.215}$$