5.2

(4) Calculate the Riemann sum $\sum_{i=1}^{n} f(\bar{x}_i)\,\Delta x_i$ for the given data.

$$f(x) = \frac{-x}{2} + 3 \qquad P: -3 < \underbrace{}_{\Delta x_1} -1.3 < \underbrace{}_{\Delta x_2} 0 < \underbrace{}_{\Delta x_3} 0.9 < \underbrace{}_{\Delta x_4} 2$$

$\bar{X}_1 = -2 \quad \bar{X}_2 = -0.5 \quad \bar{X}_3 = 0 \quad \bar{X}_4 = 2$

$f(\bar{x}_1) = f(-2) = \frac{-(-2)}{2} + 3 = 4$

$f(\bar{x}_2) = f(-0.5) = \frac{-(-1/2)}{2} + 3 = 3.25$

$f(\bar{x}_3) = f(0) = 3$

$f(\bar{x}_4) = f(2) = \frac{-2}{2} + 3 = 2$

$\Delta x_1 = -1.3 - (-3) = -1.3 + 3 = 1.7$

$\Delta x_2 = 0 - (-1.3) = 1.3$

$\Delta x_3 = 0.9 - 0 = 0.9$

$\Delta x_4 = 2 - 0.9 = 1.1$

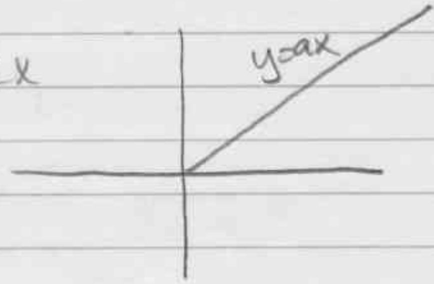
$$\sum_{i=1}^{4} f(\bar{x}_i)\Delta x_i = f(\bar{x}_1)\Delta x_1 + f(\bar{x}_2)\Delta x_2 + f(\bar{x}_3)\Delta x_3 + f(\bar{x}_4)\Delta x_4$$

$$= 4(1.7) + 3.25(1.3) + 3(0.9) + 2(1.1)$$

$$= \boxed{15.925}$$

5.3

(2) $A(x) = ax$



(18) Find $G'(x)$

$$G(x) = \int_x^1 2t\,dt = -\int_1^x 2t\,dt$$

$$G'(x) = D_x\left[-\int_1^x 2t\,dt\right] = \boxed{-2x}$$

(24) $G(x) = \int_1^{x^2+x} \sqrt{2z+\sin z}\,dz$

let $u = x^2 + x$

$\frac{du}{dx} = (2x+1) \qquad = D_x u$

$$G(x) = \int_1^u \sqrt{2z+\sin z}\,dz$$

$$G'(x) = D_u\left[\int_1^u \sqrt{2z+\sin z}\,dz\right] D_x u$$

$$= \sqrt{2u+\sin u}\,(2x+1)$$

$$= \sqrt{2(x^2+x)+\sin(x^2+x)}\,(2x+1)$$

$$= \boxed{(2x+1)\sqrt{2(x^2+x)+\sin(x^2+x}}$$