

$$\underline{4.3.2} \quad F' = \begin{cases} 1, & x \leq 1 \\ 2x-1, & x \geq 2 \end{cases} \quad \leftarrow F(x) = \begin{cases} x-1, & x \leq 1 \\ x^2-x, & x \geq 1 \end{cases}$$

$$\underline{4.3.5} \quad u = 1/v \Rightarrow du = -1/v^2 dv \Rightarrow \frac{du}{u} = -\frac{dv}{v}$$

$$\Rightarrow F(x) = \int_1^x \exp\left(\frac{u^2+1}{u}\right) \frac{du}{u} = -\int_1^{1/x} \exp\left(\frac{1/v^2+1}{1/v}\right) \frac{dv}{v}$$

$$= -\int_1^{1/x} \exp\left(\frac{1+v^2}{v}\right) \frac{dv}{v} = -F(1/x)$$

$$\underline{4.3.13} \quad \int_0^2 \dots = \iiint_D f = \int_0^2 dx \int_x^2 dz \int_1^{2-x/2} f dy = \int_1^2 dy \int_0^{4-2y} dx \int_x^2 f dz$$

where $D = \{(x, y, z) \mid 0 \leq x \leq 2, 1 \leq y \leq 2 - x/2, x \leq z \leq 2\}$
 $= \{(x, y, z) \mid 1 \leq y \leq 2, 0 \leq x \leq 4 - 2y, x \leq z \leq 2\}$

$$\underline{4.3.16} \text{ (a)} \quad \int_0^1 dy \int_y^1 e^{y/x} dx = \int_0^1 dx \int_0^x e^{y/x} dy$$

$$= \int_0^1 [x \cdot e^{y/x}]_0^x dx = (e-1) \int_0^1 x dx = \frac{e-1}{2}$$
