1.32 Using 1.27,

$$p(\mathbf{y}) = p(\mathbf{x})\left|\frac{d\mathbf{x}}{d\mathbf{y}}\right|$$

$$= p(\mathbf{x})\left|\frac{d(\mathbf{x})}{d(\mathbf{A}\mathbf{x})}\right|$$

$$= p(\mathbf{x})\left|\frac{1}{\mathbf{A}}\right|$$

$$= |\mathbf{A}|^{-1}p(\mathbf{x})$$

Entropy of $\mathbf{y}$ is given by:

$$\mathbf{H}[\mathbf{y}] = -\int p(\mathbf{y}) \ln p(\mathbf{y})\, d\mathbf{y}$$

Since $p(\mathbf{y})\, d\mathbf{y} = p(\mathbf{x})\, d\mathbf{x}$, this becomes:

$$= -\int p(\mathbf{x}) \ln \left(|\mathbf{A}|^{-1}p(\mathbf{x})\right)\, d\mathbf{x}$$

$$= -\int p(\mathbf{x}) \ln(|\mathbf{A}|^{-1})\, d\mathbf{x} - \int p(\mathbf{x}) \ln p(\mathbf{x})\, d\mathbf{x}$$

$$= \int p(\mathbf{x}) \ln |\mathbf{A}|\, d\mathbf{x} + \mathbf{H}[\mathbf{x}]$$

$$= \ln |\mathbf{A}| \int p(\mathbf{x})\, d\mathbf{x} + \mathbf{H}[\mathbf{x}]$$

$$= \ln |\mathbf{A}|(1) + \mathbf{H}[\mathbf{x}]$$

$$= \mathbf{H}[\mathbf{x}] + \ln |\mathbf{A}|$$