Tutorial 4: Solutions

1. (a)

$$\mathbf{P}(X \le 1.5) = \Phi(1.5)$$
$$= 0.9332.$$

$$\mathbf{P}(X \le -1) = 1 - \mathbf{P}(X \le 1)$$
$$= 1 - \Phi(1)$$
$$= 1 - 0.8413$$
$$= 0.1587.$$

(b)

$$\mathbf{E}\left[\frac{Y-1}{2}\right] = \frac{1}{2}(\mathbf{E}[Y] - 1)$$
$$= 0.$$

$$\text{var}\left(\frac{Y-1}{2}\right) = \text{var}\left(\frac{Y}{2}\right)$$
$$= \frac{1}{4}\text{var}Y$$
$$= 1.$$

Thus, the distribution of $\frac{Y-1}{2}$ is $\mathcal{N}(0, 1)$.

(c)

$$\mathbf{P}(-1 \le Y \le 1) = \mathbf{P}(\frac{-1-1}{2} \le \frac{Y-1}{2} \le \frac{1-1}{2})$$
$$= \Phi(0) - \Phi(-1)$$
$$= \Phi(0) - (1 - \Phi(1))$$
$$= 0.3413.$$

2. Example 3.15, page 169 in text. See solutions in the text.

3. Problem 3.20, page 191 in text. See online solutions.

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