Q1
Given X, Y as follows:

$$X = [7, 4], Y = \left(\tfrac{-14}{8}, 8\right)$$

These are the answers:
(a) $X \cup Y = (-7, 8]$
(b) $Y \cap X = \left(-\frac{14}{5}, 4\right]$
(c)

$$\begin{aligned} Y^c &= \left(-\infty, -\tfrac{14}{5}\right] \cup [8, \infty) \\ X &= [-7, 4] \\ Y^c \cup X &= \left[-7, -\tfrac{14}{5}\right] \cup [4, 8] \end{aligned}$$

(d)

$$\begin{aligned} X^c &= (-\infty, -7) \cup (4, \infty) \\ Y &= \left(-\tfrac{14}{5}, 8\right) \\ X^c \cup Y &= \left(-\infty, -\tfrac{14}{5}\right] \cup [4, \infty) \end{aligned}$$

(e) $Y \setminus X = (4, 8)$
(f)

$$\begin{aligned} X^c &= (-\infty, 7) \cup (4, \infty) \\ Y \cap X^c &= \left(-\tfrac{14}{5}, 8\right) \\ (Y \cap X^c) \cap \mathbb{Z} &= \{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7\} \end{aligned}$$

(g)

$$\begin{aligned} \mathbb{Z}^c &= \{x \in \mathbb{R} : x \notin \mathbb{Z}\} = \mathbb{R} \setminus \mathbb{Z} \\ (Y \cap X) \cup \mathbb{Z}^c &= (4, 5) \cup (5, 6) \cup (6, 7) \cup (7, 8) \end{aligned}$$