Solve the absolute value problems for x.

1. $|2x - 9| = 17$

   Solution:

$$\begin{aligned} |2x-9| = 17 \quad &\Longrightarrow \quad 2x - 9 = \pm 17 \\ &\Longrightarrow \quad 2x = 26 \quad \text{or} \quad 2x = -8 \\ &\Longrightarrow \quad x = 13 \quad \text{or} \quad x = -4 \\ &\Longrightarrow \quad \boxed{x = -4, 13} \end{aligned}$$

2. $|5x - 1| = 3x$

   Solution:

$$\begin{aligned} |5x-1| = 3x \quad &\Longrightarrow \quad 5x - 1 = \pm 3x \\ &\Longrightarrow \quad 5x - 1 = 3x \quad \text{or} \quad 5x - 1 = -3x \\ &\Longrightarrow \quad \boxed{x = \frac{1}{2}, \frac{1}{8}} \end{aligned}$$

3. $|3x| = |6 - x|$

   Solution:

$$\begin{aligned} |3x| = |6-x| \quad &\Longrightarrow \quad \left|\frac{3x}{6-x}\right| = 1 \implies \frac{3x}{6-x} = \pm 1 \\ &\Longrightarrow \quad 3x = 6 - x \quad \text{or} \quad 3x = -(6-x) \\ &\Longrightarrow \quad \boxed{x = \frac{3}{2}, -3} \end{aligned}$$

4. $x^2 = x\sqrt{u^2}$

   Solution:

$$\begin{aligned} x^2 = x\sqrt{u^2} \quad &\Longrightarrow \quad x^2 - x\sqrt{u^2} = 0 \\ &\Longrightarrow \quad x(x - |u|) = 0 \\ &\Longrightarrow \quad \boxed{x = 0, |u|} \end{aligned}$$