Exercise 36

For the following exercises, solve each inequality and write the solution in interval notation.

$$\left|\frac{3}{4}x - 5\right| + 1 \leq 16$$

Solution

Isolate the absolute value term. Subtract 1 from both sides.

$$\left|\frac{3}{4}x - 5\right| \leq 15$$

Remove the absolute value sign by breaking up the inequality into two; using the logical operators, "and" or "or," if you have $<$ or $>$, respectively; and solving for x.

$$\left|\frac{3}{4}x - 5\right| \leq 15$$

$$\frac{3}{4}x - 5 \leq 15 \quad \text{and} \quad \frac{3}{4}x - 5 \geq -15$$

$$-15 \leq \frac{3}{4}x - 5 \leq 15$$

Add 5 to all sides.

$$-10 \leq \frac{3}{4}x \leq 20$$

Multiply all sides by 4.

$$-40 \leq 3x \leq 80$$

Divide all sides by 3.

$$-\frac{40}{3} \leq x \leq \frac{80}{3}$$

Therefore,

$$x \in \left[-\frac{40}{3}, \frac{80}{3}\right].$$