

Questions

Write each result in both interval and set notation.

1. Reduce $|x| \leq 8$.
2. Reduce $|x| < 6$.
3. Reduce $|2x - 5| \leq 7$.
4. Reduce $|\frac{3}{5}(1 - 7x)| < 6$.
5. Reduce $|2 - 9x| > 20$.
6. For which values of x is $\sqrt{|x| - 3}$ a real number?

Solutions

1. Reduce $|x| \leq 8$.

Interval notation: $-8 \leq x \leq 8$

Set notation: $x \in [-8, 8]$



2. Reduce $|x| < 6$.

Interval notation: $-6 < x < 6$

Set notation: $x \in (-6, 6)$



3. Reduce $|2x - 5| \leq 7$.

$$-7 \leq 2x - 5 \leq 7$$

$$-2 \leq 2x \leq 12$$

$$-1 \leq x \leq 6$$

Interval notation: $-1 \leq x \leq 6$

Set notation: $x \in [-1, 6]$



4. Reduce $|\frac{3}{5}(1 - 7x)| < 6$. In this problem we have to remember to change direction of inequality when multiplying by negative!

$$-10 < \frac{3}{5}(1 - 7x) < 10$$

$$-10 < 1 - 7x < 10$$

$$-11 < -7x < 9$$

$$\frac{11}{7} > x > \frac{9}{7}$$

Interval notation: $\frac{9}{7} < x < \frac{11}{7}$

Set notation: $x \in \left(\frac{9}{7}, \frac{11}{7}\right)$



5. Reduce $|2 - 9x| > 20$. In this problem we have to remember to change direction of inequality when multiplying by negative!

$$2 - 9x < -20$$

or

$$2 - 9x > 20$$

$$-9x < -22$$

or

$$-9x > 18$$

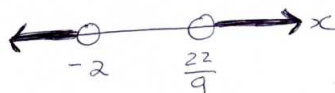
$$x > \frac{22}{9}$$

or

$$x < -2$$

Interval notation: $x > \frac{22}{9}$ or $x < -2$

Set notation: $x \in (-\infty, -2) \cup \left(\frac{22}{9}, \infty\right)$



6. For which values of x is $\sqrt{|x| - 3}$ a real number?

For the square root to be a real number, we require $|x| - 3 \geq 0$.

$$|x| - 3 \geq 0$$

$$|x| \geq 3$$

$$x \leq -3 \text{ or } x \geq 3$$

In interval notation this would be $(-\infty, -3] \cup [3, \infty)$.