

## 8 Inequalities Worksheet: Solutions

### Concepts:

- Equivalent Inequalities
- Linear Inequalities
- Absolute Value Inequalities
- Solving Polynomial and Rational Inequalities Algebraically
- Approximating Solutions to Inequalities Graphically

(Sections 4.6 and 1.1)

1. If it is possible to solve the inequality algebraically, do so and give exact solutions. If it is not possible to solve it algebraically, find an approximate solution graphically. Be sure to sketch the graph and label it.

(a)  $7x - 3 < 10x + 2$       **Solution set:**  $(-\frac{5}{3}, \infty)$

(b)  $x^2 + 7x \geq -10$       **Solution set:**  $(-\infty, -5] \cup [-2, \infty)$

(c)  $(x - 2)(x - 3)^2 > 0$       **Solution set:**  $(2, 3) \cup (3, \infty)$

(d)  $(2 - x)(x - 3)^2 > 0$       **Solution set:**  $(-\infty, 2)$

(e)  $|x + 5| > 2$       **Solution set:**  $(-\infty, -7) \cup (-3, \infty)$

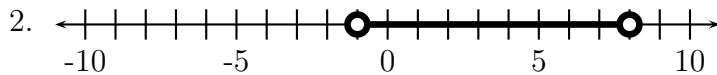
(f)  $\frac{2}{x + 3} \leq \frac{1}{x - 1}$       **Solution set:**  $(-\infty, -3) \cup (1, 5]$

(g)  $|4 - x| \leq 6$       **Solution set:**  $[-2, 10]$

(h)  $|5x + 7| + 4 > 10$       **Solution set:**  $(-\infty, -\frac{13}{5}) \cup (-\frac{1}{5}, \infty)$

(i)  $x^3 - 9x \geq 0$       **Solution set:**  $[-3, 0] \cup [3, \infty)$

(j)  $\frac{1}{x - 2} \geq -1$       **Solution set:**  $(-\infty, 1] \cup (2, \infty)$

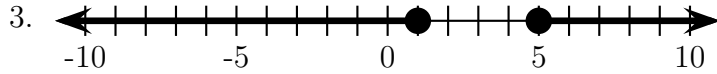


(a) Write a distance sentence that corresponds to this number line.

**The distance from  $x$  to 3.5 is less than 4.5.**

(b) Write an algebraic equation or inequality that corresponds to this number line.

$$|x - 3.5| < 4.5$$



(a) Write a distance sentence that corresponds to this number line.

**The distance from  $x$  to 3 is greater than or equal to 2.**

(b) Write an algebraic equation or inequality that corresponds to this number line.

$$|x - 3| \geq 2$$

4. (Number 60 in Section 4.6 in your textbook) The length of a rectangle is 6 inches longer than its width. What are the possible widths if the area of the rectangle is at least 667 square inches?

**The width must be at least 23 inches.**

5. (Number 55 in Section 4.6 in your textbook) A sales agent is given a choice of two different compensation plans. The first plan has no salary, but a 10% commission on total sales. The second plan has a salary of \$3000 per month, plus a 2% commission on total sales. What range of monthly sales will make the first plan a better choice for the sales agent?

**The first plan is a better choice for the sales agent if there is more than \$37,500 in monthly sales. That is, the solution set is  $(37500, \infty)$ .**