

1. First express each equation or inequality geometrically. Then solve each equation or inequality. Express your answer using set notation.

*Example:* Solve  $|x - 1| = 5$ . Geometrically, we are being asked to find all numbers  $x$  whose distance from the number 1 is equal to 5.

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|---------------------|---------------------|----------------------|---------------------|
| a. $ x  < 4$        | b. $ x  > 4$        | c. $ x  > -4$        | d. $ x  < -4$       |
| e. $ x - 1  = 5$    | f. $ x + 2  = 5$    | g. $ x - 3  = -5$    | h. $ x - 3  = 0$    |
| i. $ x - 1  \leq 5$ | j. $ x - 1  \geq 5$ | k. $ x - 3  \leq -5$ | l. $ x - 3  \geq 0$ |

2. Let  $f(x) = 3 + |x + 4|$ .

- Compute  $f(5)$ .
- Solve the equation  $f(x) = 8$ .
- Solve the equation  $f(x) = f(8)$ .

3. The distance (in kilometers) between two cars  $h$  hours after 3:00 PM is given by the function

$$D(h) = |140 - 150h|, \quad 0 \leq h \leq 3$$

- Find the distance between the cars at 3:50PM.
- When are the cars 20 km apart?
- When is the distance between the cars less than 100 km?
- When is the distance between the cars greater than 40 km?
- Find all times when the cars are getting closer together.
- When is the distance between the cars the same as it is at 4:00pm?

4. The distance between a Corvette and Seattle  $t$  hours after 2:00 PM is given by the function

$$C(t) = |50 - 60t|, \quad 0 \leq t \leq 3$$

and the distance between a Honda and Seattle  $t$  hours after 2:00 PM is given by the function

$$H(t) = |10 + 50t|, \quad 0 \leq t \leq 3.$$

Both cars are traveling on I-5.

- Find all time intervals when the Corvette is within 50 miles of Seattle and the Honda is at least 50 miles from Seattle.
- Find all time intervals when the Corvette is within 50 miles of Seattle or the Honda is at least 50 miles from Seattle.
- Find all possible distances between the cars at 4:00 PM.