

# Compound Inequalities

## Algebra 2

### ORAL PRACTICE

Tell whether or not the graph is correct. If not, tell *why* not.

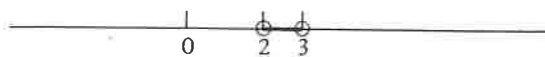
A.  $2 < x < 5$



B.  $3 \leq x \leq 7$



C.  $-2 < x < 3$



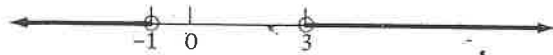
D.  $x > 5$  or  $x < 2$



E.  $x < 5$  and  $x > 2$



F.  $x > 3$  or  $x < -1$



G.  $4 \leq x \leq 6$



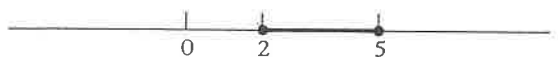
H.  $x \leq 4$  and  $x \geq 6$



I.  $x \leq 4$  or  $x \geq 6$



J.  $x$  is between 2 and 5.



K.  $x$  is between 2 and 5, inclusive.



L.  $9 < x < 10$  (Think!)



M.  $3 > x > 5$



N.  $x < 5$  or  $x > 3$



O.  $x < 3$  and  $x > 5$

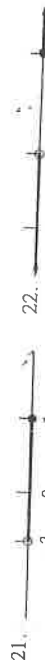


### EXERCISE 13-3

For Problems 1 through 20, transform the inequality (if necessary) and sketch the graph.

1.  $x \geq 5$  and  $x < 9$
2.  $x < -2$  and  $x \geq -6$
3.  $x < -2$  or  $x \geq 6$
4.  $x \geq 8$  or  $x < 1$
5.  $-7 \leq x \leq 2$
6.  $-4 < x < 7$
7.  $3x + 5 < 20$  or  $2x - 1 > 13$
8.  $3x - 4 \geq 17$  or  $4x + 7 \leq 19$
9.  $4 - 5x > -13$  and  $3 - x \leq 10$
10.  $7 - 2x > 15$  and  $5 - x \leq 16$
11.  $6x + 7 \leq 1$  or  $6x + 7 > 28$
12.  $3x + 5 < -13$  or  $3x + 5 \geq 2$
13.  $5 < x - 7 < 9$
14.  $2 < x + 3 \leq 7$
15.  $-3 \leq 2x + 11 \leq 9$
16.  $-8 \leq 5x + 7 \leq 25$
17.  $15 < 6 - 10x \leq 37$
18.  $6 < 10 - 2x < 14$
19.  $x + 5 > 19$  or  $x + 5 < 24$
20.  $x - 3 < 7$  and  $x - 3 > 13$

For Problems 21 through 32, write a compound inequality for the graph shown.



For Problems 33 through 40, write an inequality and draw the graph.

33.  $x$  is between 3 and 7.

34.  $x$  is between  $-8$  and  $5$ .

35.  $x$  is between  $-1$  and  $3$ , inclusive.

36.  $x$  is between  $4$  and  $9$ , inclusive.

37.  $x$  is at least  $3$  or  $x$  is less than  $1$ .

38.  $x$  is at least  $4$  or  $x$  is less than  $-3$ .

39.  $x$  is more than  $-2$  and  $x$  is at most  $7$ .

40.  $x$  is more than  $1$  and  $x$  is at most  $8$ .

41. For the linear expression  $5x - 7$ :

- a. evaluate it if  $x$  is  $4$ ;
- b. find  $x$  if the expression is:
  - i. equal to  $8$ ;
  - ii. between  $-2$  and  $13$  (draw the graph);
  - iii. at least  $3$  or at most  $-12$  (draw the graph).

42. For the linear expression  $3 - 4x$ :

- a. evaluate it if  $x$  is  $-9$ ;
- b. find  $x$  if the expression is:
  - i. equal to  $31$ ;
  - ii. between  $-5$  and  $23$ , inclusive (draw the graph);
  - iii. more than  $3$  or less than  $-3$  (draw the graph).

43. **Baby's Weight Problem** Suppose that a baby weighs  $7$  pounds at birth, and gains  $0.3$  pound a week thereafter.

- a. Define a variable for the number of weeks and write an expression for the baby's weight.
- b. For what range of weeks will the baby be between  $19$  and  $28$  pounds?
- c. The family's baby scale goes up to  $25$  pounds. For what range of weeks will they be able to use this scale?