3-1 Write and Graph Inequalities

Name _____ Date _____

Sometimes to represent a verbal situation as an algebraic sentence, you must translate the words into an inequality.

The number of pages Tanya has read *is* *at least* 16.

↓

If p = the number of pages, then $p \geq 16$.

An inequality can also be expressed in set-builder notation, interval notation, or be graphed on a number line.

Remember:
less than $<$
greater than $>$
less than *or* equal to $\leq$
at most $\leq$
greater than *or* equal to $\geq$
at least $\geq$
not equal to $\neq$

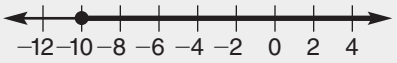
Set-builder Notation
$\{x \mid x \geq -10\}$

Read as: The set of all real numbers x, such that x-values are greater than or equal to -10.

Interval Notation
$[-10, \infty)$

The interval has no greatest number. -10 is the least number included.

Graph



The dot shows that -10 is part of the solution set.

Define a variable, and write an inequality for each word sentence.

1. Sunil's daily exercise time is at most 52 minutes. **$t \leq 52$**

2. The height of the tree is no more than 38 inches. _____

3. Carla's test score is more than 83%. _____

4. The number of fish in the aquarium is less than 43. _____

5. The number of flies caught in the flytrap is no less than 5. _____

6. The temperature on the mountain's trail was at least -10 degrees. _____

7. The amount of miles Nancy ran is not equal to 4.8. _____

Express each inequality in both set-builder and interval notation.

8. $t < -21$ **$\{t \mid t < -21\}$; $(-\infty, -21)$**

9. $d < 15$ _____

10. $h > 29$ _____

11. $r > -73$ _____

12. $-267 \geq g$ _____

13. $527 \geq k$ _____

14. $92 \leq w$ _____

15. $73 \leq y$ _____

16. $p > 125.4$ _____

17. $n > -304.7$ _____

18. $54.7 \geq m$ _____

19. $-298.1 \geq q$ _____

20. $-16.3 \leq v$ _____

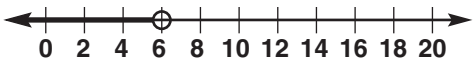
21. $91.4 \leq z$ _____

22. $y < 3254$ _____

23. $7102 > g$ _____

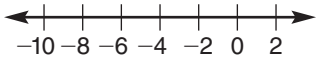
Graph each solution set on a number line. Then describe a verbal situation the inequality could represent.

24. $c < 6$

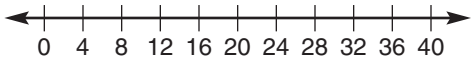


The number of red cars, *c*, in the parking lot is less than 6.

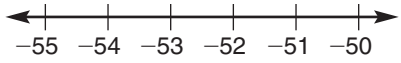
25. $b > -8$



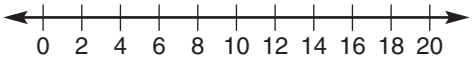
26. $f \geq 24$



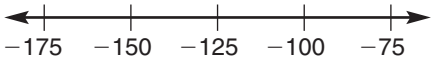
27. $g \geq -52$



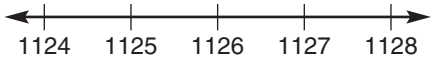
28. $\{r \mid r \leq 16\}$



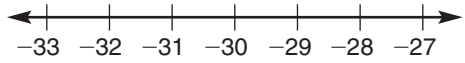
29. $\{a \mid a < -125\}$



30. $[1125, \infty)$



31. $(-\infty, -28)$



Problem Solving

32. Measurement A city's record high temperature is 112° F and record low temperature is −15° F. What is the range of the city's temperatures, expressed in interval notation?

33. Probability The probability of an event is at most 1 and at least 0. What is the range of possible probabilities, expressed in interval notation?

CRITICAL THINKING

34. Grace collected at least 340 cans to recycle. Juanita collected fewer than 340 cans to recycle. Who collected more cans? Explain.