Name: Key Date:

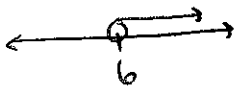
Algebra 1 Band:

Unit 3: Solving Inequalities Study Guide

LT#1: Write, graph, and identify solutions of inequalities.

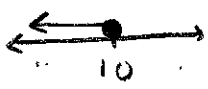
Graph each inequality.

1. $x > 6$

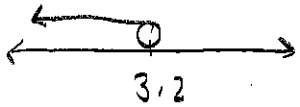


2. $h \leq -1$

3. $10 \geq p$ $p \leq 10$

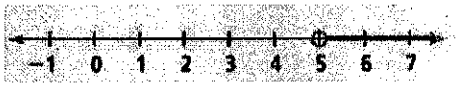


4. $r < 3.2$



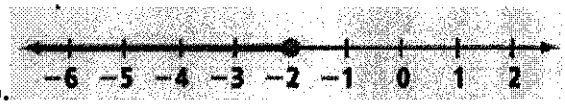
Write an inequality for each graph.

5.



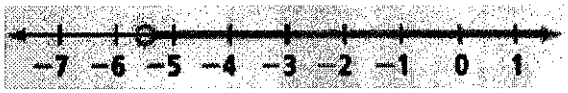
$x > 5$

6.



$x \leq -2$

7.



$x > -5.5$

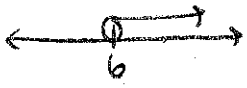
LT#2: Use addition and subtraction to solve inequalities.

Solve each inequality. Graph your solutions.

8. $w + 3 > 9$

$-3 \quad -3$

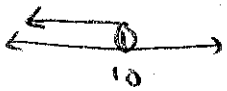
$w > 6$



9. $v - 6 < 4$

$+6 \quad +6$

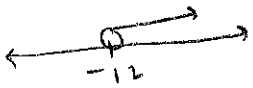
$v < 10$



10. $-4 < t + 8$

$-8 \quad -8$

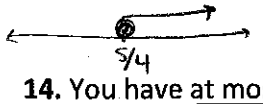
$-12 < t$ $\quad t > -12$



11. $n - \frac{1}{2} \geq \frac{3}{4}$

$+\frac{1}{2} \quad +\frac{2}{4}$

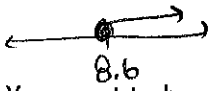
$n \geq \frac{5}{4}$



12. $22.3 \leq 13.7 + h$

$-13.7 \quad -13.7$

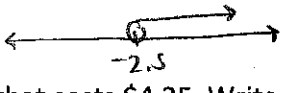
$8.6 \leq h$ $\quad h \geq 8.6$



13. $q + 0.5 > -2$

$-0.5 \quad -0.5$

$q > -2.5$



14. You have at most $15.00 to spend. You want to buy a used CD that costs $4.25. Write and solve an inequalities to find the possible additional amounts you can spend.

m = possible amounts to spend

$4.25 + m \leq 15$

$-4.25 \quad -4.25$

$m \leq 10.75$

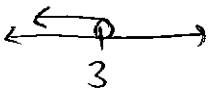
LT#3: Use multiplication or division to solve inequalities.

Solve each inequality. Graph you solutions.

15. $5x < 15$

$\frac{5}{5} \quad \frac{5}{5}$

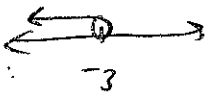
$x < 3$



16. $-6t > 18$

$\frac{-6}{-6} \quad \frac{-6}{-6}$

$t < -3$

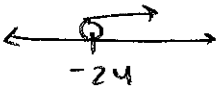


17. $\frac{y}{3} \leq 2 \cdot 3$

$y \leq 6$

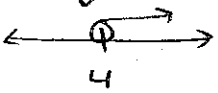
18. $-\frac{h}{4} < 6 \cdot -4$

$h > -24$



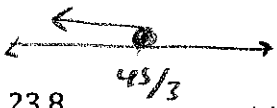
19. $\frac{25.5g}{25.5} > \frac{102}{25.5}$

$g > 4$



20. $-\frac{3}{5}n \geq -9 \cdot -\frac{5}{3}$

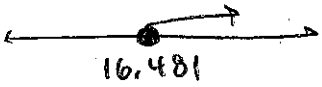
$n \leq \frac{45}{3}$



21. $44.5 \leq 2.7d$

$\frac{44.5}{2.7} \quad \frac{2.7d}{2.7}$

$16.\overline{481} \leq d \qquad d \geq 16.\overline{481}$

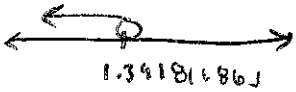


22. $-17.1m > 23.8$

$\frac{-17.1m}{-17.1} \quad \frac{23.8}{-17.1}$

$m < 1.391812865$

will not happen on assessments



23. You earn \$7.25 per hour baby-sitting. Write an solve an inequality to find how many full hours you must work to earn at least \$200.

h = # hours

at least 28 hours

$\frac{7.25h}{7.25} \geq \frac{200}{7.25}$

$h \geq 27.586\,2069$

LT#4: Solve multi-step inequalities.

Solve each inequality.

24. $4k - 1 \geq -3$

$+1 \quad +1$

$\frac{4k}{4} \geq \frac{-2}{4}$

$k \geq -\frac{1}{2}$

25. $6(c - 1) < -18$

$6c - 6 < -18$

$+6 \quad +6$

$\frac{6c}{6} < \frac{-12}{6}$

$c < -2$

26. $3t > 5t + 12$

$-5t \quad -5t$

$\frac{-2t}{-2} > \frac{12}{-2}$

$t > -6$

27. $-\frac{6}{7}y - 6 \geq 42$

$+6 \quad +6$

$-\frac{7}{6} \cdot \frac{6}{7}y \geq 48 \cdot -\frac{7}{6}$

$\boxed{y \leq -56}$

28. $\left(4 + \frac{x}{2} > 2x\right)2$

$8 + x > 4x$

$-x \quad -x$

$\frac{8}{3} > \frac{3x}{3}$

$\boxed{\frac{8}{3} > x}$

29. $3x + 5 \leq 2x - 8$

$-2x \quad -2x$

$x + 5 \leq 8$

$-5 \quad -5$

$\boxed{x \leq 3}$

30. $13.5a + 7.4 \leq 85.7$

$-7.4 \quad -7.4$

$\frac{13.5a}{13.5} \leq \frac{78.3}{13.5}$

$\boxed{a \leq 5.8}$

31. $42w > 2(w + 7)$

$42w > 2w + 14$

$-2w \quad -2w$

$40w > 14$

$\frac{40w}{40} > \frac{14}{40}$

$\boxed{w > 0.35}$

32. A salesperson earns $200 per week plus a commission equal to 4% of her sales. This week her goal is to earn no less than $450. Write and solve an inequality to find the amount of sales she must have to reach her goal.

S = amount of sales

$200 + .04S \geq 450$

$-200 \quad -200$

$.04S \geq 250$

$\frac{.04S}{.04} \geq \frac{250}{.04}$

$\boxed{S \geq \$6250}$

LT#5: Solve and graph inequalities containing the word *and*.
LT#6: Solve and graph inequalities containing the word *or*.

Solve each compound inequality.

33. $-2 \leq d + \frac{1}{2} < 4\frac{1}{2}$

$-\frac{1}{2} \quad -\frac{1}{2} \quad -\frac{1}{2}$

$\boxed{-2\frac{1}{2} \leq d < 4}$

34. $0 < -8b \leq 12$

$\frac{}{-8} \quad \frac{}{-8} \quad \frac{}{-8}$

$\boxed{0 > b \geq -1.5}$

35. $2t \leq -4$ or $7t \geq 49$

$\frac{2t}{2} \leq \frac{-4}{2}$ or $\frac{7t}{7} \geq \frac{49}{7}$

$\boxed{t \leq -2 \text{ or } t \geq 7}$

36. $5m < -10$ or $3m > 9$

$\frac{5m}{5} < \frac{-10}{5}$ or $\frac{3m}{3} > \frac{9}{3}$

$\boxed{m < -2 \text{ or } m > 3}$

37. $-1 \leq a - 3 \leq 2$

$+3 \quad +3 \quad +3$

$\boxed{2 \leq a \leq 5}$

38. $9.1 > 1.4p \geq -6.3$

$\frac{9.1}{1.4} > \frac{1.4p}{1.4} \geq \frac{-6.3}{1.4}$

$\boxed{6.5 > p \geq -4.5}$

39. A town's high temperature for a given month is 88°F and the low temperature is 65°F. Write a compound inequality to represent the range of temperatures for the given month.

t = temperature

$$65°F \leq t \leq 88°F$$

LT#7: Solve equations and inequalities using absolute value.

Solve each equation or inequality. If there is no solution, write *no solution*.

40. $|y| = 3$

$y = -3$ or $y = 3$

41. $|n + 2| = 4$

$n+2 = -4$ or $n+2 = 4$

$-2 \quad -2 \qquad -2 \quad -2$

$n = -6$ or $n = 2$

42. $4 + |r + 2| = 7$

$-4 \qquad -4$

$|r+2| = 3$

$r+2 = -3$ or $r+2 = 3$

$-2 \quad -2 \qquad -2 \quad -2$

$r = -5$ or $r = 1$

43. $|x + 3| = -2$

no solution

44. $|5x| \leq 15$

$-15 \leq 5x \leq 15$

$\frac{}{5} \quad \frac{}{5} \quad \frac{}{5}$

$-3 \leq x \leq 5$

45. $|3d + 5| < -2$

no solution

46. $|2x - 7| - 1 > 0$

$+1 \quad +1$

$|2x-7| > 1$

$2x-7 > 1$ or $2x-7 < -1$

$+7 \quad +7 \qquad +7 \quad +7$

$\frac{2x}{2} > \frac{8}{2} \qquad \frac{2x}{2} < \frac{6}{2}$

$x > 4$ or $x < 3$

47. $4|k + 5| > 8$

$\frac{}{4} \quad \frac{}{4}$

$|k+5| > 2$

$k+5 > 2$ or $k+5 < -2$

$-5 \quad -5 \qquad -5 \quad -5$

$k > -3$ or $k < -7$

48. The ideal length of a certain nail is 20 mm. The actual length can vary from the ideal by at most 0.4mm. Find the range of acceptable lengths of the nail.

l = length

$$|l - 20| \leq 0.4$$

$$-0.4 \leq l - 20 \leq 0.4$$

$+20 \qquad +20 \qquad +20$

$$19.6 \leq l \leq 20.4$$