U1 L8 Writing Compound Inequalities Name: KEY HR:_____

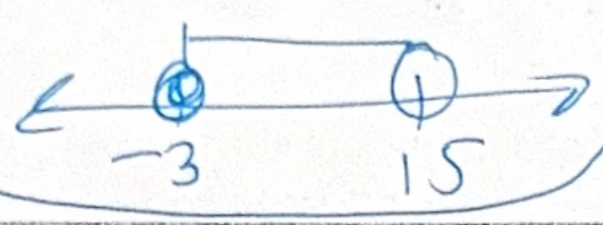
Solve the following inequalities. Circle a final graph and final solution. Show all work;

1. $-8 \le 3x + 1 < 16$

$-1 \quad -1 \quad -1$

$\frac{-9}{3} \le \frac{3x}{3} < \frac{15}{3}$

$-3 \le x < 15$

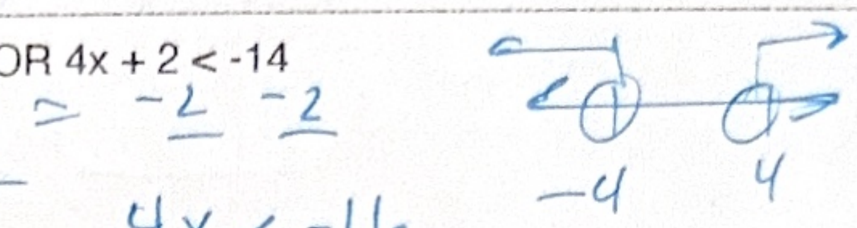


2. $2x - 5 > 3$ OR $4x + 2 < -14$

$+5 \quad +5 \quad -2 \quad -2$

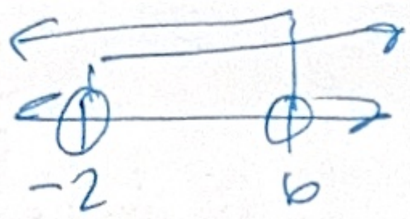
$\frac{2x}{2} > \frac{8}{2} \qquad \frac{4x}{4} < \frac{-16}{4}$

$x > 4$ OR $x < -4$



3. $x - 4 < 2$ OR $x + 3 > 1$

$+4 \quad +4 \qquad -3 \quad -3$



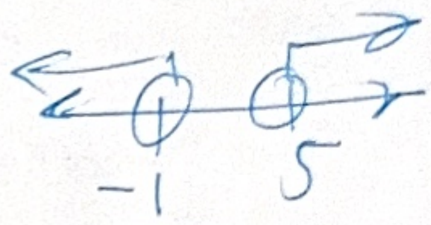
$x < 6$ OR $x > -2$

ALL Real Numbers

4. $3x + 5 < 2$ AND $x - 1 > 4$

$-5 \quad -5 \qquad +1 \quad +1$

$x > 5$



$\frac{3x}{3} < \frac{-3}{3}$

$x < -1$

No Solutions

5. $-3(x + 2) \le 15$ AND $2x + 4 < 14$

$-4 \quad -4$

$-3x - 6 \le 15 \qquad \frac{2x}{2} < \frac{10}{2}$

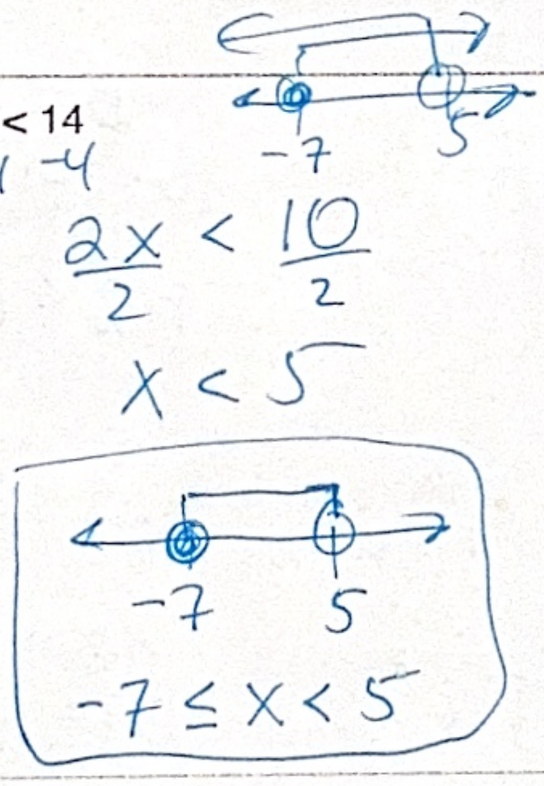
$+6 \quad +6$

$x < 5$

$-3x \le 21$

$\frac{-3x}{-3} \ge \frac{21}{-3}$

$x \ge -7$



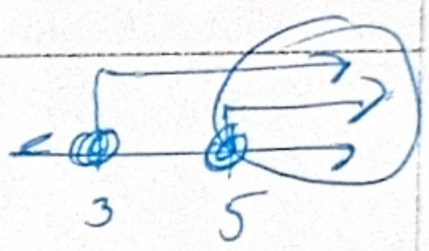
$-7 \le x < 5$

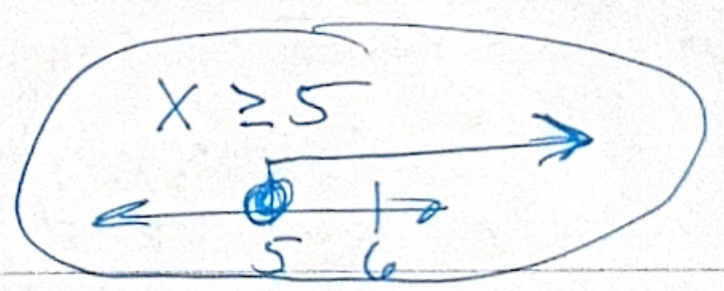
6. $5x - 7 \ge 8$ AND $2x + 1 \ge 11$

$+7 \quad +7 \qquad -1 \quad -1$

$\frac{5x}{5} \ge \frac{15}{5} \qquad \frac{2x}{2} \ge \frac{10}{2}$

$x \ge 3 \qquad x \ge 5$





Write a compound inequality for each situation below. Be sure to define your variable and use appropriate units! DEFINE your variable.

All Front page

7. Wait Times: The wait time for a popular restaurant is usually between 45 minutes and 90 minutes on a Friday night, depending on the party size. Write a compound inequality for the Friday night wait times.

Define variable: t = time of wait

$45 < t < 90$

minutes minutes

U1 L8 Writing Compound Inequalities Name: _____ HR: _____

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8. **Chemical Storage:** A certain chemical must be stored at a temperature between 35°F and 45°F, inclusive. Write a compound inequality for the temperatures the chemical must be stored at.

Define variable: T = temp stored at

$35°F < T < 45°F$

9. **Speed Limits:** The speed limit on an interstate is 70 mph, and the minimum speed is 45 mph. Write a compound inequality for the speed limit on the interstate.

Define variable: S = Speed

$45 \text{ mph} \leq S \leq 70 \text{ mph}$

10. **Discount Eligibility**: A museum offers free admission to children under 5 years old and senior citizens 65 years old or older. Write a compound inequality for the people who get discounts.

$c < 5$ $S \geq 65$

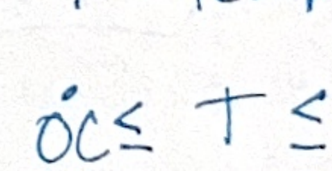
Define variable: A = ages that get discounts

$A < 5 \text{ yrs}$ OR $A \geq 65 \text{ yrs}$

11. **Soil pH Levels:** A particular plant will die if the soil pH drops below 5.5 or rises above 7.5. Write an inequality representing the *good* pH levels for the plant

Bad ph < 5.5 or ph > 7.5

Define variable: P = ph Level



$5.5 \leq p \leq 7.5$

12. **Part Tolerance**: A machine part is supposed to be 15 cm long. Quality control will accept the part if it is within a tolerance of 0.1 cm of the target length (inclusive). Write a compound inequality for the acceptable lengths.

$15 + .1 = 15.1$
$15 - .1 = 14.9$

Define variable: L = Acceptable Length

$14.9 \text{ cm} \leq L \leq 15.1 \text{ cm}$

13. **Letter Grade:** To earn a B in math class, a student's final average must be at least an 80% but strictly less than 90%. Write an inequality for the presents needed to get a B.

$B \geq 80$ and $B < 90$

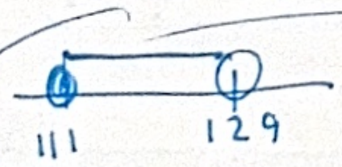
Define variable: G = grade

$80\% \leq G < 90\%$

14. **Hurricane Warnings**: A category 3 hurricane has sustained winds of at least 111 mph but no more than 129 mph. Write a compound inequality for the wind speed of a category 3 hurricane.

$W \geq 111 \text{ mph}$ $W < 129 \text{ mph}$

Define variable: W = Wind Speed



$111 \text{ mph} \leq W < 129 \text{ mph}$

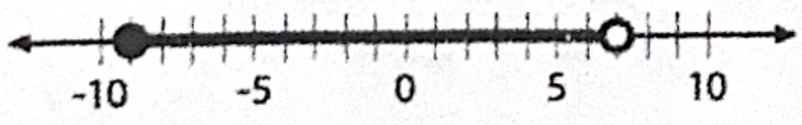
15. **Water States**: Water is not in a liquid state if its temperature is strictly below 0°C or strictly above 100°C. Write an inequality for when water is a liquid.

$t < 0°$ solid $t > 100°C$ gas

Define variable: T = temp of water

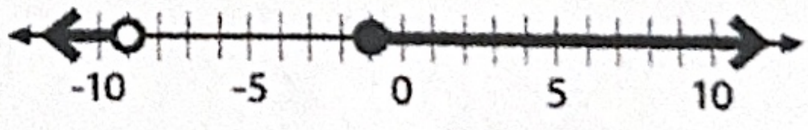
$0°C \leq T \leq 100°C$

16. Write the simplest inequality that represents the graph.



$-9 \leq x < 7$

17. Write the simplest inequality that represents the graph.



$x < -9$ OR $x \geq -1$