

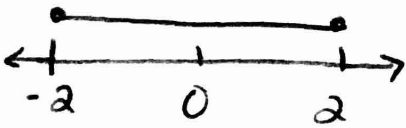
Homework: Absolute Value Inequalities (Less than)

Name: _____

Solve each inequality and graph solutions.

1. $|x| \leq 2$ midpoint: 0

$x \leq 2$ and $x \geq -2$



3. $|5 + 6x| < 11$ midpoint $-\frac{5}{6}$

$5 + 6x < 11$ and $5 + 6x > -11$

$6x < 6$ and $6x > -16$

$x < 1$ and $x > -16/6$

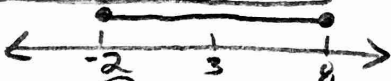


5. $|3 - x| \leq 5$ midpoint: 3

$3 - x \leq 5$ and $3 - x \geq -5$

$-x \leq 2$ and $-x \geq -8$ Flip!

$x \geq -2$ and $x \leq 8$



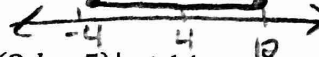
7. $|3 - (x - 1)| \leq 8$ midpoint: 4

$|-x + 4| \leq 8$

$-x + 4 \leq 8$ and $-x + 4 \geq -8$

$-x \leq 4$ and $-x \geq -12$ Flip!

$x \geq -4$ and $x \leq 12$



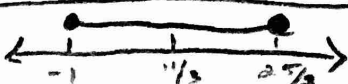
9. $|6 - (3d - 5)| \leq 14$ midpoint: $\frac{4}{3}$

$|-3d + 11| \leq 14$

$-3d + 11 \leq 14$ and $-3d + 11 \geq -14$

$-3d \leq 3$ and $-3d \geq -25$ Flip!

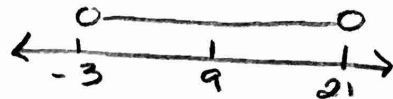
$d \geq -1$ and $d \leq \frac{25}{3}$ or $8\frac{1}{3}$



2. $|x - 9| < 12$ midpoint: 9

$x - 9 < 12$ and $x - 9 > -12$

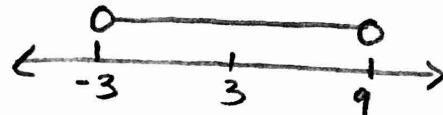
$x < 21$ and $x > -3$



4. $|x - 3| < 6$ midpoint: 3

$x - 3 < 6$ and $x - 3 > -6$

$x < 9$ and $x > -3$



6. $|x - 9| < 0$ midpoint: 9

$x - 9 < 0$ and $x - 9 > 0$

$x < 9$ and $x > 9$

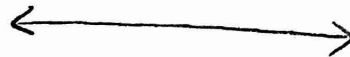


8. $|3r + 2| < -5$ midpoint: $\frac{2}{3}$

$3r + 2 < -5$ and $3r + 2 > 5$

$3r < -7$ and $3r \geq 3$

$r < -\frac{7}{3}$ and $r \geq 1$



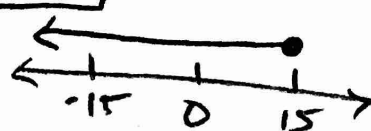
Cannot be less than neg. distance



10. $\frac{2}{3}x - 3 \leq 7$ (Be careful!!!)

$\frac{2}{3}x \leq 10$

$x \leq 15$



Express each statement using an inequality involving absolute value. **DO NOT SOLVE!!**

11. The pH of a buffered eye solution must be within 0.002 of a pH of 7.3.

$$\boxed{|x - 7.3| \leq 0.002}$$

\leq ↓ distance ↓ midpoint

12. Romona's bowling score was within 6 points of her average score of 98.

$$\boxed{|x - 98| \leq 6}$$

\leq ↓ dist. ↓ midpoint

The *average* length of a human pregnancy is 280 days. However, a healthy, full-term pregnancy can be 14 days longer or shorter.

distance ↑ midpoint

13. Write an absolute value inequality for the length of a full-term pregnancy.

x = length of full term pregnancy

$$|x - 280| \leq 14$$

14. Solve the inequality for the length of a full-term pregnancy.

$$\begin{array}{r} x - 280 \leq 14 \quad \text{and} \quad x - 280 \geq -14 \\ +280 \quad +280 \qquad \qquad +280 \quad +280 \\ \hline x \leq 294 \quad \text{and} \quad x \geq 266 \end{array}$$

Within 266 and 294 days

15. A poll showed that 62% of the voters were in favor of a proposed law. The margin of error was 2.5%. What is the range of the percent of voters, p , who are in favor of the law?

dist. ↑

midpoint ↑

p = percent of voters

$$|p - 62| \leq 2.5$$

$$\begin{array}{r} p - 62 \leq 2.5 \quad \text{and} \quad p - 62 \geq -2.5 \\ +62 \quad +62 \qquad \qquad +62 \quad +62 \\ \hline p \leq 64.5 \quad \text{and} \quad p \geq 59.5 \end{array}$$

Within 59.5% and 64.5%