Name _____

1-6 Additional Practice

Compound Inequalities

Write a compound inequality that represents each phrase. Graph the solutions.

1. all real numbers that are less than –3 or greater than or equal to 5

   $x < -3$ or $x \geq 5$

2. The time a cake must bake is between 25 minutes and 30 minutes, inclusive.

   $25 \leq x \leq 30$

Solve each compound inequality. Graph your solutions.

3. $5 < k - 2 < 11$ $7 < k < 13$

4. $-4 > y + 2 > -10$ $-12 < y < -6$

5. $6b - 1 \leq 41$ or $2b + 1 \geq 11$

   all real numbers

6. $5 - m < 4$ or $7m > 35$

   $m > 1$

7. $3 < 2p - 3 \leq 12$

   $3 < p \leq 7\frac{1}{2}$

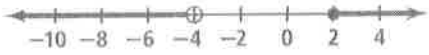
8. $3 > \frac{11 + k}{4} \geq -3$

   $-23 \leq x < 1$

Write a compound inequality that each graph could represent.

9.

   $x < -1$ or $x > -1$

10. 

    $x < -4$ or $x \geq 2$

11.

    $-3 \leq x \leq 2$

12.

    $-2 \leq x < 1$

15. A family is comparing different car seats. One car seat is designed for a child up to and including 30 lb. Another car seat is designed for a child between 15 lb and 40 lb. A third car seat is designed for a child between 30 lb and 85 lb, inclusive. Model these ranges on a number line. Which car seats are appropriate for a 32-lb child?

    Check student graphs: $0 < x \leq 30$; $15 < x < 40$; $30 \leq x \leq 85$; The second and third car seats are suitable.

Name _____

1-6 Enrichment

Compound Inequalities

Sports regulations usually give the sizes and weights of most sports equipment over a range of values. For each type of sports equipment, the diameters and weights to the appropriate type of ball are given. Then write the inequality that represents the range of the diameters and the weights for each ball. Then find a value that satisfies each inequality.

Type of Ball	Range of Diameters	Range of Weights
Tennis ball	$2\frac{1}{2}$ inches to $2\frac{5}{8}$ inches	no less than 2 ounces, no greater than $2\frac{1}{6}$ ounces
Baseball	$2\frac{7}{8}$ inches to 3 inches	5 to $5\frac{1}{4}$ ounces
Basketball (women's)	no less than 9.07, no greater than 9.23 inches	no less than 20 ounces, no greater than 22 ounces
Soccer ball (size 5)	no less than 21.64 inches, no greater than 22.28 inches	14.46 ounces to 15.87 ounces

1. Which sports ball has the greatest range of diameters and what is the range amount?

   Soccer ball; the range is 0.64 inches.

2. Which sports ball has the greatest range of weights and what is the range amount?

   Women's basketball; the range is 2 ounces.

3. A box contains 30 baseballs. Write a compound inequality that shows the range of the weight of the balls. Graph the inequality.

   $150 \leq b \leq 157.5$

4. A square box contains 16 tennis balls. Write a compound inequality that shows the range of widths of tennis balls in this square box. Graph the inequality.

   $10 \leq t \leq 10.5$

Name _____

1-7 Additional Practice

Absolute Value Equations and Inequalities

Solve each equation. Graph and check your solutions.

1. $|b| = \frac{2}{3}$

$b = \frac{2}{3}$ or $b = -\frac{2}{3}$

2. $10 = |y|$

$y = 10$ or $y = -10$

3. $|n| + 2 = 5$

$n = 3$ or $n = -3$

4. $4 = |s| - 3$

$s = 7$ or $s = -7$

5. $|x| - 5 = -1$

$x = 4$ or $x = -4$

6. $7|d| = 49$

$d = 7$ or $d = -7$

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

7. $|r - 9| = -3$
no solution

8. $|c + 3| = 15$
$c = 12$ or $c = -18$

9. $1 = |g + 3|$
$g = -2$ or $g = -4$

10. $2 = \left|m + \frac{2}{3}\right|$
$m = -2\frac{2}{3}$ or $m = \frac{4}{3}$

11. $-2|3d| = 4$
no solution

12. $-3|2w| = -6$
$w = 1$ or $w = -1$

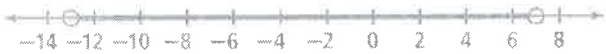
13. $4|v - 5| = 16$
$v = 9$ or $v = 1$

14. $3|d - 4| = 12$
$d = 8$ or $d = 0$

15. $|3f + 0.5| - 1 = 7$
$f = 2.5$ or $f = -2\frac{5}{6}$

Solve and graph each inequality.

16. $|x + 3| < 10$
$-13 < x < 7$



17. $|y + 4| > 12$

$y > 8$ or $y < -16$

18. $|y - 1| \leq 8$
$-7 \leq y \leq 9$

19. $\left|2t + \frac{2}{3}\right| \leq 4$
$-\frac{7}{3} \leq t \leq \frac{5}{3}$

20. In a sports poll, 53% of those surveyed believe their high school football team will win the state championship. The poll shows a margin of error of 0.5 percentage points. Write and solve an absolute value inequality to find the least and the greatest percent of people that think their team will win the state championship.
$|x - 53| \leq 5$; $48 \leq x \leq 58$

Name _____

1-7 Enrichment

Absolute Value Equations and Inequalities

In order to design an appropriate touchscreen for a computer, the manufacturer has to consider the average size of the fingers and hands that will be touching the screen. One lab found that the average width of the index (or pointing) finger for adults is from 1.6 cm to 2 cm wide.

1. All the measurements on this page are inclusive. Explain what that means for the inequality symbols you will use.

   The symbols will be $\leq$ or $\geq$ so that the end points are included.

2. Write the average width as an inequality using centimeters.

   $1.6 \text{ cm} \leq \text{average width} \leq 2 \text{ cm}$

3. One centimeter = 0.39 inches. Write the average width as an inequality using inches.

   $0.63 \text{ in.} \leq \text{average width} \leq 0.79 \text{ in.}$

Pixels, which are similar to dots on a computer screen, vary in size depending on the size of the resolution of a display. The resolution is expressed in pixels per inch, or *ppi*. The resolution is usually between 72 and 300 ppi. The lab converted their average finger width to between 45 and 67 ppi.

4. Write the usual resolution as an inequality using ppi.

   $72 \text{ ppi} \leq \text{usual resolution} \leq 300 \text{ ppi}$

5. Write the average width as an inequality using ppi.

   $45 \text{ ppi} \leq \text{usual resolution} \leq 67 \text{ ppi}$

The average width the lab found is wider that the average width that most manufacturers use for their touch target size.

6. One cell phone manufacturer recommends a target size of 44 ppi wide. Another manufacturer suggests a width that is a minimum of 26 ppi. A third manufacturer has a suggested minimum of 28 ppi. Write an inequality using ppi that puts together this information.

   $26 \text{ ppi} \leq \text{target size} \leq 44 \text{ ppi}$