Inequalities and absolute value Worksheet

Algebra

Name _____ Date _____

Warm-up

1. Solve $8x \leq 40$.
   (A) $x \leq 5$ (B) $x \leq 6$ (C) $x \geq 6$ (D) $x \geq 5$

2. Solve $1 < x + 3 < 4$.
   (A) $1 < x < -2$ (B) $4 < x < 7$ (C) $-2 < x < 1$ (D) $1 < x < 4$

3. Solve $|x| = 14$. Give both answers, smaller first.
   Smaller _____ Larger _____

4. Solve $x + 4 > 4$.
   (A) $x < 0$ (B) $x > 8$ (C) $x < 8$ (D) $x > 0$

5. Which value is in $-1 < x < 4$?
   (A) -1 (B) 0 (C) 5 (D) 4

Practice

6. Solve $5x + 7 < -23$.
   (A) $x < -4$ (B) $x > -4$ (C) $x < -6$ (D) $x > -6$

7. How many whole numbers solve $-4 < x \leq 2$?

8. Solve $|x + 2| = 1$, smaller answer first.
   Smaller _____ Larger _____

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9. Solve $-3x > 9$.
   (A) $x < -3$ (B) $x < 4$ (C) $x > 4$ (D) $x > -3$

10. Solve $6 \leq 6x < 24$.
    (A) $4 \leq x < 1$ (B) $6 \leq x < 24$ (C) $1 \leq x < 4$ (D) $1 < x \leq 4$

11. Solve $|5x| = 15$, smaller answer first.
    Smaller _____ Larger _____

12. Which value of x solves $10 - x \geq 7$?
    (A) $x = 2$ (B) $x = 4$

13. Solve $-3 < 2x - 7 \leq 3$.
    (A) $5 < x \leq 2$ (B) $2 < x \leq 5$ (C) $2 \leq x < 5$ (D) $-3 < x \leq 3$

Challenge

14. What's the largest whole number that solves $6x + 6 < 72$?

15. Which has no solution?
    (A) $x < 3$ and $x > 6$ (B) $x > 3$ and $x < 6$ (C) $x < 3$ or $x > 6$ (D) $x > 3$ or $x < 6$

16. Solve $3|x - 5| - 1 = 5$, smaller answer first.
    Smaller _____ Larger _____

17. For which values does $2x + 10 > 2x + 8$ hold?
    (A) Only $x > 0$ (B) Every real number (C) No real number (D) Only $x = 0$

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18. Solve $-9 < -x < 4$.

(A) $-9 < x < -4$ (B) $-9 < x < 4$ (C) $4 < x < 9$ (D) $-4 < x < 9$

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Inequalities and absolute value Worksheet: Answer Key

Algebra

1. (A) $x \leq 5$

   8 is positive, so the sign stays.

2. (C) $-2 < x < 1$

   Subtract 3 from all three parts.

3. Smaller -14, Larger 14

   Both are 14 steps from zero.

4. (D) $x > 0$

   Subtract 4 from both sides, and the sign stays.

5. (B) 0

   It must be strictly between -1 and 4. The endpoints don't count.

6. (C) $x < -6$

   Undo 7, then divide by 5.

7. 6

   They run from -3 up to 2, including 2.

8. Smaller -3, Larger -1

   Split: $x + 2 = 1$ or $x + 2 = -1$.

9. (A) $x < -3$

   Dividing by a negative flips the sign.

10. (C) $1 \leq x < 4$

    Divide all three parts by 6.

11. Smaller -3, Larger 3

    Split, then divide by 5.

12. (A) $x = 2$

    Subtract 10 and flip: $x \leq 3$.

13. (B) $2 < x \leq 5$

    Undo -7 in all three parts, then divide by 2.

14. 10

    $x < 11$. The boundary itself isn't allowed.

15. (A) $x < 3$ and $x > 6$

    Nothing can be below 3 and above 6 at the same time.

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16. Smaller 3, Larger 7

    Isolate to get $|x - 5| = 2$, then split.

17. (B) Every real number

    The x terms cancel, leaving $10 > 8$, which is always true.

18. (D) $-4 < x < 9$

    Multiply all three by -1. Both signs flip, so reorder to read small to large.

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