

Writing and Graphing Inequalities on a Number Line

Grade 6 math · Worksheet Answer Key · Standards: 6.EE.B.5, 6.EE.B.8

Each solution explains the choice of symbol and circle, and substitutes values to test them. Compare your shading direction with the graphs shown, and remember that the endpoint is included only for $\leq$ and $\geq$.

Standards: 6.EE.B.5, 6.EE.B.8 · **Level:** Grade 6

Problem 1 Reading inequalities

(a) x is greater than 9. (b) x is less than or equal to 4. (c) x is greater than or equal to 0. (d) x is less than -2 .

Problem 2 Writing inequalities

- a. $n < 12$
- b. At least means 7 or more: $y \geq 7$
- c. At most means 30 or less: $p \leq 30$
- d. $w > 2.5$

Problem 3 Testing a value

(a) $5 > 3$ is true: **yes**. (b) $5 \geq 5$ is true: **yes**. (c) $5 < 5$ is false: **no**. (d) $5 \leq 4$ is false: **no**.

Problem 4 Testing values in an expression

Substitute each: $2 + 3 = 5$, $4 + 3 = 7$, $6 + 3 = 9$, $8 + 3 = 11$. Only 9 and 11 are greater than 8. **6 and 8.**

Problem 5 Reading a graph

The circle is open at 4 and the shading goes left, so the values are less than 4. $x < 4$.

Problem 6 Solutions and non-solutions

Any numbers 10 or greater work, for example 10, 10.5 and 25. A number below 10 does not, for example 9.9. **Solutions: 10, 10.5, 25. Non-solution: 9.9.**

Problem 7 Graph with an open circle

Draw an open circle at 7, because 7 is not included, and shade to the left.



$$x < 7.$$

$$x < 7.$$

Problem 8 Reading a closed circle

The closed circle at -2 means -2 is included, and the shading goes right. $x \geq -2$.

Problem 9 Testing with a coefficient

Compute $2x$: 8, 10, 12, 14. Only 8 and 10 are less than 12. **4 and 5.**

Problem 10 Negative numbers

A value works if it is -2 or to the right of -2 on the number line. -5 is left of -2 , so it fails. **-2 , 0 and 1.**

Problem 11 Write and graph

At most 6 means 6 or less: $x \leq 6$, so use a closed circle at 6 and shade left.



$$x \leq 6.$$

$$x \leq 6.$$

Problem 12 Decimal boundary

The open circle at 0.5 with shading right gives $x > 0.5$. Since 0.5 is not greater than 0.5, it is not a solution. $0.51 > 0.5$, so it is. **$x > 0.5$; 0.5 no, 0.51 yes.**

Problem 13 Limits in context

- No more than means at most: **$w \leq 800$.**
- $h \geq 48$.**
- $s < 25$.**

Problem 14 Same or different

Both $x > 11$ and $11 < x$ say that x is greater than 11, so they are the same. The difference between $x \geq 11$ and $x > 11$ is the number 11 itself: it is a solution of $x \geq 11$ but not of $x > 11$.

Same solutions; they differ only at 11.

Problem 15 Roller coaster

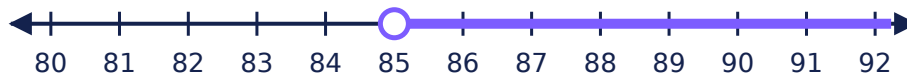
The inequality is $h \geq 48$, with a closed circle at 48. Ana (52) and Cy (48) are in the shaded region. Bo (47.5) and Dee (45) are left of 48. **Ana and Cy.**

Problem 16 Spending limit

At most 40 gives $t \leq 40$. $38.50 \leq 40$ is true; $41 \leq 40$ is false. **$t \leq 40$; \$38.50 yes, \$41 no.**

Problem 17 Prize score

More than 85 means $s > 85$, with an open circle at 85 (85 does not win) and shading right.



$s > 85$.

$s > 85$. Winning: 86, 90, 91.5. Losing: 85.

Problem 18 Greenhouse temperature

At least 60: $t \geq 60$. At most 85: $t \leq 85$. Check: 58 fails the first. 60 and 72 pass both. 85 passes both. 90 fails the second. **$t \geq 60$ and $t \leq 85$; the values 60, 72 and 85 work.**

Problem 19 Breaking even

At least 120 gives $m \geq 120$. The smallest total allowed is 120, and $120 - 74 = 46$. **$m \geq 120$; at least 46 more meals.**

Problem 20 Explain infinitely many

There is no greatest number above 7, and between any two numbers there are more numbers, so the solutions never run out. The circle is open because 7 is not greater than 7. A solution between 7 and 8 is 7.5. **Infinitely many solutions; open circle at 7; for example 7.5.**