# Graphing Single-Variable Inequalities

| Name: _____ | Date: _____ | Score: _____ / 24 |
|---|---|---|

## Quick Review and Helpful Hints

To graph an inequality on a number line, solve for the variable first if needed. Use an *open* circle for $<$ or $>$ (endpoint *not* included) and a *closed* circle for $\leq$ or $\geq$ (endpoint *included*). Then shade toward the numbers that make it true: to the right for "greater," to the left for "less."

▷ **Example:** Graph $x > 2$ on a number line. **Work:** This says $x$ is greater than $2$, and $2$ itself is not included. So draw an open circle at $2$ and shade everything to the right. ★ **Answer:** open circle at $2$, shade right


$x > 2$: open circle at 2, shade right.

## Practice Problems

*Solve if needed, then graph the solution on the provided number line.*

**1.** $x > 3$


**2.** $x \leq 5$


**3.** $x \geq -2$


**4.** $x < 0$


**5.** $x + 2 > 5$

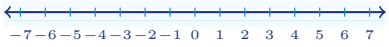

**6.** $x - 4 \leq 1$


**7.** $2x < 8$


**8.** $x + 7 \geq 7$


**9.** $3x \geq 9$


**10.** $x - 1 < 2$




**11.** $\frac{x}{2} > 3$


**12.** $x + 5 \leq 2$


**13.** $4x > -8$

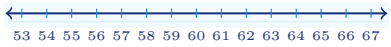

**14.** $x - 6 \geq -6$

## Word Problems

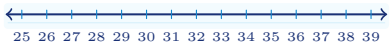
**15.** A ride requires you to be *taller than* $48$ inches. Let $h$ be height in inches. Write an inequality and graph it.


**16.** A parking garage allows vehicles *at most* $7$ feet tall. Let $t$ be height in feet. Write an inequality and graph it.

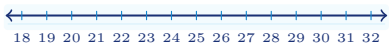

**17.** To pass a test, a student needs *at least* $60$ points. Let $p$ be points. Write an inequality and graph it.




**18.** The temperature stayed *below* $32°$F all day. Let $T$ be temperature. Write an inequality and graph it.

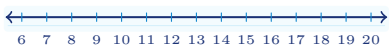



**19.** A coupon can be used when the order total is *at least* $\$25$. Let $c$ be the cost in dollars. Write an inequality and graph it.




**20.** An elevator can hold *no more than* $12$ people. Let $n$ be the number of people. Write an inequality and graph it.

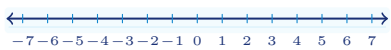

**21.** A child ticket is for ages *under* $13$. Let $a$ be age in years. Write an inequality and graph it.




**22.** To enter the honors program, a score must be *greater than* $80$. Let $s$ be the score. Write an inequality and graph it.


**23.** A family wants to spend *at most* $\$40$ on snacks. Let $b$ be the amount spent. Write an inequality and graph it.


**24.** A freezer should stay *below* $0°$F. Let $F$ be the temperature. Write an inequality and graph it.



# Answer Keys

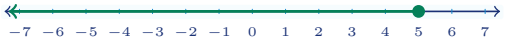
| | | | |
|---|---|---|---|
| **1.** $x > 3$ | **7.** $x < 4$ | **13.** $x > -2$ | **19.** $c \geq 25$ |
| **2.** $x \leq 5$ | **8.** $x \geq 0$ | **14.** $x \geq 0$ | **20.** $n \leq 12$ |
| **3.** $x \geq -2$ | **9.** $x \geq 3$ | **15.** $h > 48$ | **21.** $a < 13$ |
| **4.** $x < 0$ | **10.** $x < 3$ | **16.** $t \leq 7$ | **22.** $s > 80$ |
| **5.** $x > 3$ | **11.** $x > 6$ | **17.** $p \geq 60$ | **23.** $b \leq 40$ |
| **6.** $x \leq 5$ | **12.** $x \leq -3$ | **18.** $T < 32$ | **24.** $F < 0$ |

## Graph Answer Sketches

*Each short answer includes the matching number-line graph: open circles mean the endpoint is not included, closed circles mean it is included.*

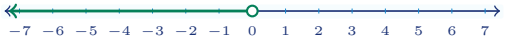
**1.** $x > 3$


**2.** $x \leq 5$




**3.** $x \geq -2$

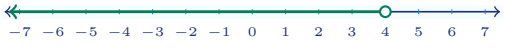

**4.** $x < 0$




**5.** $x > 3$


**6.** $x \leq 5$


**7.** $x < 4$

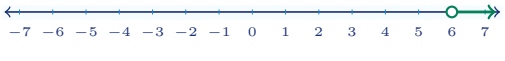



**8.** $x \geq 0$

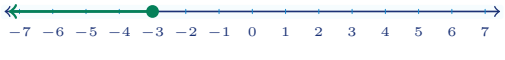

**9.** $x \geq 3$


**10.** $x < 3$


**11.** $x > 6$




**12.** $x \leq -3$




**13.** $x > -2$


**14.** $x \geq 0$


**15.** $h > 48$


**16.** $t \leq 7$


**17.** $p \geq 60$


**18.** $T < 32$


**19.** $c \geq 25$


**20.** $n \leq 12$




**21.** $a < 13$




**22.** $s > 80$




**23.** $b \leq 40$




**24.** $F < 0$

## Step-by-Step Explanations

**1.** Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The variable is already isolated: $x > 3$. Use an open circle at $3$ because $3$ is not included, then shade right toward larger numbers. So the final answer is $x > 3$.

**2.** A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The $\leq$ symbol includes the endpoint, so put a closed circle at $5$ and shade left for all numbers less than or equal to $5$. So the final answer is $x \leq 5$.

**3.** Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The $\geq$ symbol includes $-2$. Put a closed circle at $-2$ and shade right because the solution is all numbers at least $-2$. So the final answer is $x \geq -2$.

**4.** Strict less-than does not include the endpoint. Put an open circle at $0$ and shade left.

**5.** Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract $2$ from both sides: $x > 3$. Put an open circle at $3$ and shade right. So the final answer is $x > 3$.

**6.** A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add $4$ to both sides: $x \leq 5$. Put a closed circle at $5$ and shade left. So the final answer is $x \leq 5$.

**7.** Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by positive $2$: $x < 4$. Put an open circle at $4$ and shade left. So the final answer is $x < 4$.

**8.** Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract $7$ from both sides: $x \geq 0$. Put a closed circle at $0$ and shade right. So the final answer is $x \geq 0$.

**9.** Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by positive $3$: $x \geq 3$. Put a closed circle at $3$ and shade right. So the final answer is $x \geq 3$.

**10.** A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add $1$ to both sides: $x < 3$. Put an open circle at $3$ and shade left. So the final answer is $x < 3$.

**11.** Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Multiply both sides by positive $2$: $x > 6$. Put an open circle at $6$ and shade right. So the final answer is $x > 6$.

**12.** Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract $5$ from both sides: $x \leq -3$. Put a closed circle at $-3$ and shade left. So the final answer is $x \leq -3$.

**13.** Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by positive $4$: $x > -2$. Put an open circle at $-2$ and shade right. So the final answer is $x > -2$.

**14.** A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add $6$ to both sides: $x \geq 0$. Put a closed circle at $0$ and shade right. So the final answer is $x \geq 0$.

**15.** Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Taller than" is strict, so $h > 48$. Put an open circle at $48$ and shade right. So the final answer is $h > 48$.

**16.** Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "At most" means $\leq$, so $t \leq 7$. Put a closed circle at $7$ and shade left. So the final answer is $t \leq 7$.

**17.** Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "At least" means $\geq$, so $p \geq 60$. Put a closed circle at $60$ and shade right. So the final answer is $p \geq 60$.

**18.** A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Below" is strict, so $T < 32$. Put an open circle at $32$ and shade left. So the final answer is $T < 32$.

**19.** Step by step: Read the phrase first. "At least" means the endpoint is included, so the inequality is $c \geq 25$. On the number line, put a closed circle at $25$ and shade right.

**20.** Take it one move at a time: "No more than" means the value can be $12$ or less, so $n \leq 12$. Use a closed circle at $12$ and shade left.

**21.** The word "under" is strict, so $13$ is not included. Write $a < 13$, then graph it with an open circle at $13$ and shading to the left.

**22.** "Greater than" is also strict, so the score must be more than $80$. Write $s > 80$, use an open circle at $80$, and shade right.

**23.** For "at most," the endpoint is allowed. That gives $b \leq 40$, so the graph needs a closed circle at $40$ and shading left.

**24.** "Below" means the temperature must be less than $0$, not equal to $0$. Write $F < 0$, draw an open circle at $0$, and shade left.

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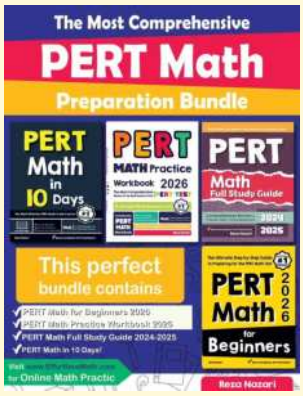


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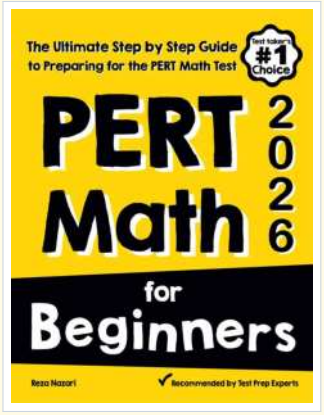


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