

Inequalities

Symbol	<	≤	>	≥
Name	Less than	Less than or equal to	Greater than	Greater than or equal to
Key Phrases	<ul style="list-style-type: none"> less than fewer than 	<ul style="list-style-type: none"> at most no more than less than or equal to 	<ul style="list-style-type: none"> greater than more than 	<ul style="list-style-type: none"> at least no less than greater than or equal to
One Variable Graphing	<ul style="list-style-type: none"> open circle and left 	<ul style="list-style-type: none"> closed circle and left 	<ul style="list-style-type: none"> open circle and right 	<ul style="list-style-type: none"> closed circle and right
Two Variable Graphing	<ul style="list-style-type: none"> dashed line and shade below 	<ul style="list-style-type: none"> solid line and shade below 	<ul style="list-style-type: none"> dashed line and shade above 	<ul style="list-style-type: none"> solid line and shade above

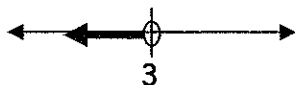
One-Variable Inequalities

- Solve as if there is an equal sign in place of the inequality.
- The inequality sign "flips over" if you multiply or divide by a negative.
- Graph the solution on a number line. The circle used and the direction of the arrow will be based on the inequality sign.

Solve and graph the inequality.

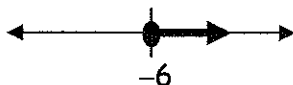
$$\begin{aligned}
 1. \quad 2x + 4 &< 10 \\
 2x &< 6 \\
 x &< 3
 \end{aligned}$$

(open circle and left)



$$\begin{aligned}
 2. \quad 5 - 3x &\leq 23 \\
 -3x &\leq 18 \\
 x &\geq -6
 \end{aligned}$$

(closed circle and right)



$$\begin{aligned}
 3. \quad 2(x - 1) &\leq -2 \\
 2x - 2 &\leq -2 \\
 2x &\leq 0 \\
 x &\leq 0
 \end{aligned}$$

(closed circle and left)



Write the inequality for the given situation.

4. John had \$45 in his piggy bank and plans to add \$10 each week from his allowance. Write an inequality to represent the number of weeks, w John must save to have at least \$300 in his piggy bank.

$$45 + 10w \geq 300$$

If John wanted no more than \$300 in his account, the inequality would be $45 + 10w \leq 300$.

Two-Variable Inequalities

- Solve for y .
- The inequality sign "flips over" if you multiply or divide by a negative.
- Graph the solution on a coordinate grid. The line used and the direction of the shading will be based on the inequality sign.

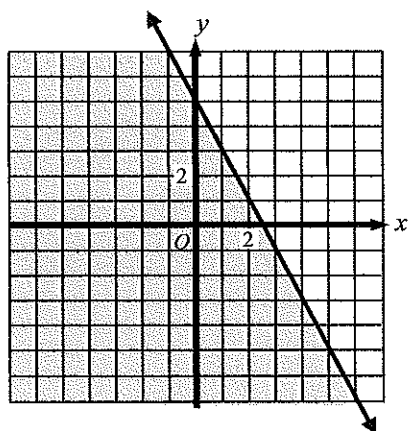
Solve and graph the inequality.

5. $2x + y \leq 5$
 $y \leq -2x + 5$

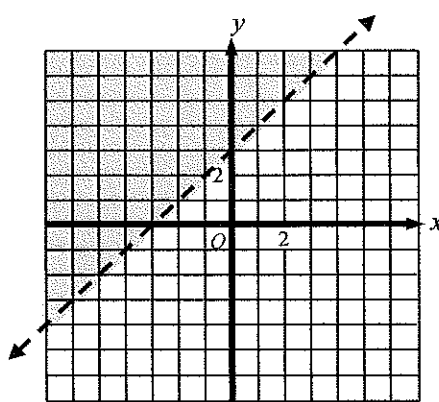
6. $x - y < -3$
 $-y < -x - 3$
 $y > x + 3$

7. $4x + 2y \geq -8$
 $2y \geq -4x - 8$
 $y \geq -2x - 4$

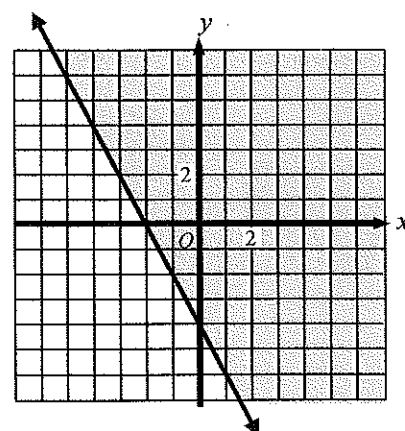
slope is -2
y-intercept is $(0, 5)$
solid line and shade below



slope is 1
y-intercept is $(0, 3)$
dashed line and shade above



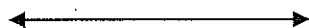
slope is -2
y-intercept is $(0, -4)$
solid line and shade above



One-Variable Practice Problems

Solve and graph each inequality.

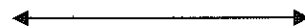
1. $7 - 2x < 3$



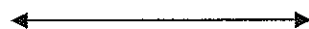
2. $4x - 5 \leq 19$



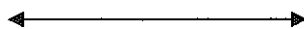
3. $5(x + 2) \geq 30$



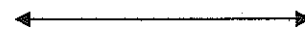
4. $-\frac{1}{3}x < 2$



5. $\frac{4}{5}x + 3 \leq -\frac{1}{5}x$



6. $-2(x - 3) > 18 - 12$



Write an inequality for each situation.

7. Farmer Fred wants to grow 100 pounds of vegetables this season. He has raised 20 pounds so far. Write an inequality that can be used to find p , the number of pounds of vegetables Fred will need to grow to reach his goal.

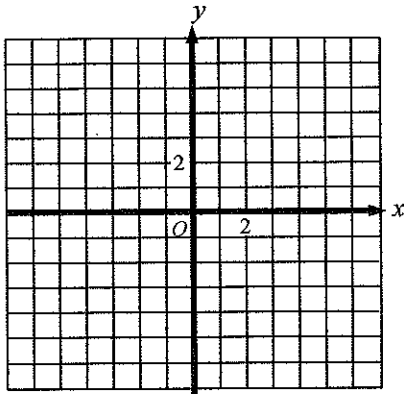
8. Taping Ted is placing an order for blank VCR tapes through the mail. Each tape costs \$3, including the tax. Shipping charges are \$4 for the total order. Write an inequality to find t , the number of tapes Ted can order if he cannot spend more than \$21.

9. Appliance Ann charges \$20 for a service call plus \$25 for each hour it takes to repair the broken appliance. Write an inequality that can be used to find h , the number of hours that Ann has to repair the stove if you want to spend less than \$80.

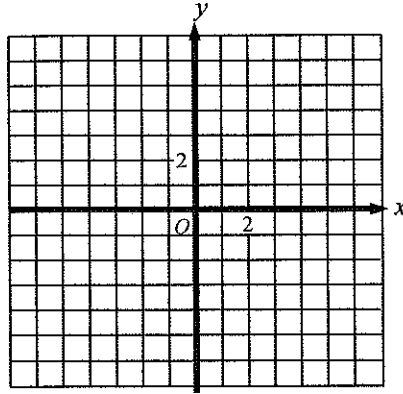
Two-Variable Practice Problems

Graph each inequality.

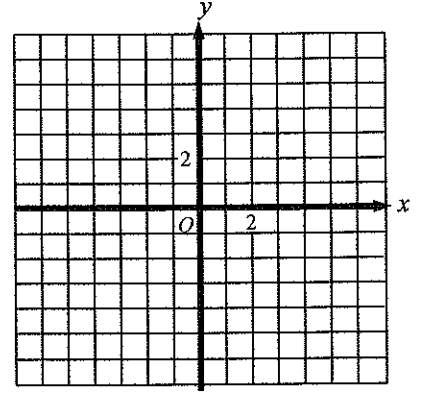
10. $y < x + 3$



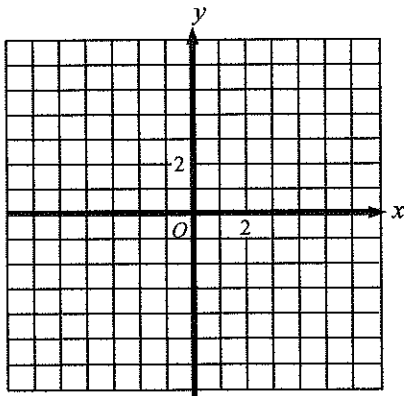
11. $y \geq -5$



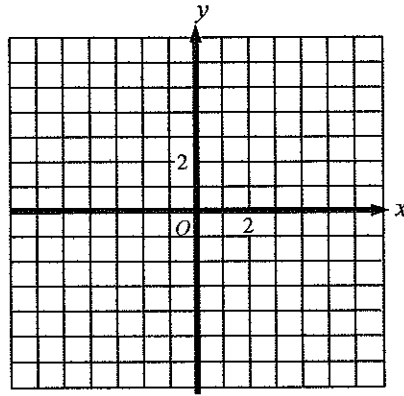
12. $6x + 3y > 12$



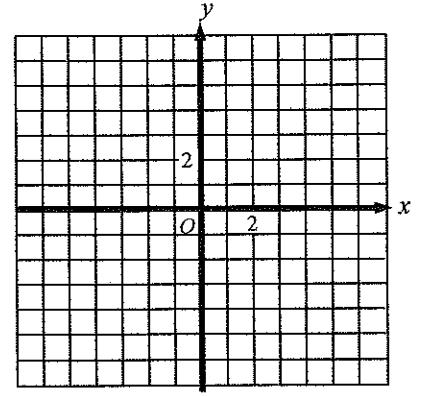
13. $x - 2y \geq -6$



14. $2x - 5y < 10$

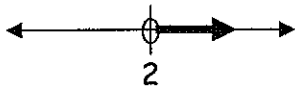


15. $x \leq 3$



Answers

1. $x > 2$



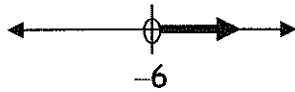
2. $x \leq 6$



3. $x \geq 4$



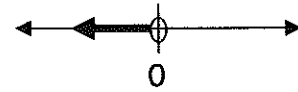
4. $x > -6$



5. $x \leq -3$



6. $x < 0$

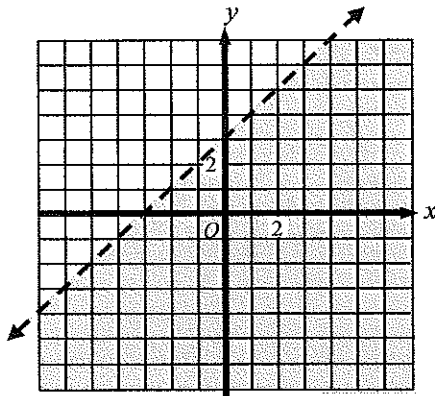


7. $20 + p \geq 100$

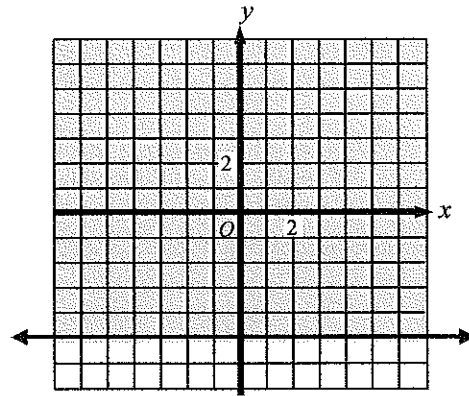
8. $3t + 4 \leq 21$

9. $20 + 25h < 80$

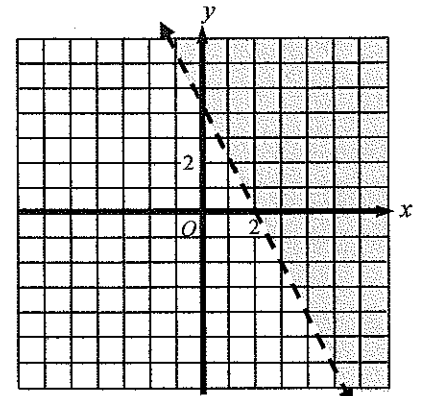
10. $y < x + 3$



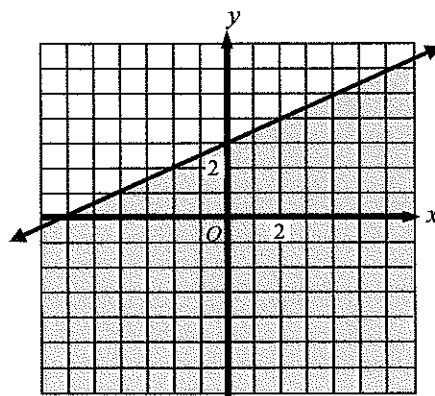
11. $y \geq -5$



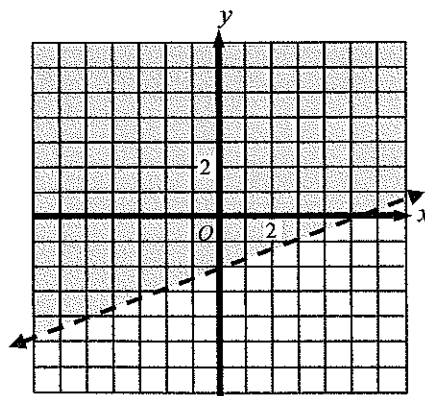
12. $y > -2x + 4$



13. $y \leq \frac{1}{2}x + 3$



14. $y > \frac{2}{5}x - 2$



15. $x \leq 3$

