5.1-5.2

Solve Inequalities Using Addition, Subtraction, Multiplication, & Division

When graphing inequalities, make sure the variable is on the left.

● closed circle

$\geq$ $\leq$

○ open circle

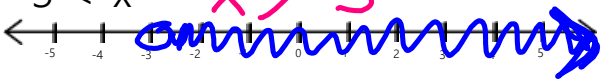
$>$ $<$

Graph the following:

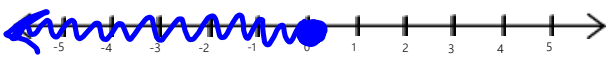
1. $x < 2$

2. $x \geq -1$

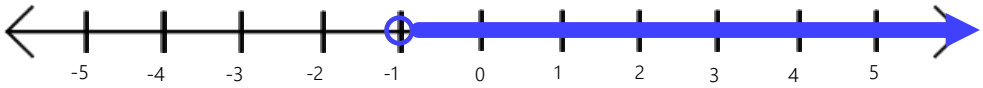
3. $-3 < x$ $x > -3$



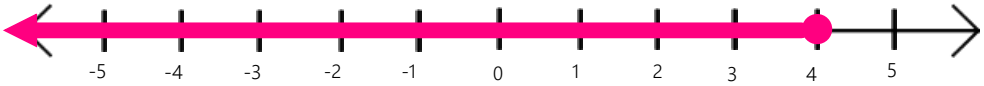
4. $x \leq 0$



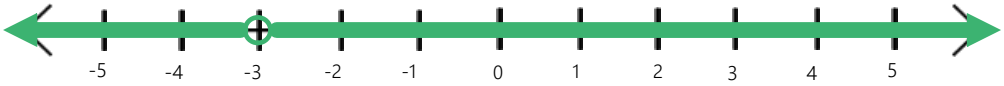
Write an inequality represented by each graph.

5. 

$x > -1$

6. 

$x \leq 4$

7. 

$x \neq -3$

Use inverse operations to solve the inequalities.

Solve and graph.

8. $x + 4 < 17$

$-4 \quad -4$

$x < 13$

9. $3.5 + n \geq 2.0$

$-3.5 \quad -3.5$

$n \geq -1.5$

10. $-5 > a - 5$

$+5 \quad +5$

$0 > a$

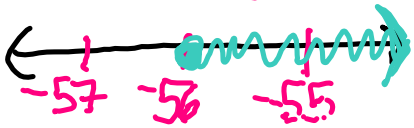
$a < 0$

11. $-22 \leq k - (-34)$

$-34 \quad -34$

$-56 \leq k$

$k \geq -56$



Use inverse operations to solve the inequalities.

Solve and graph.

12. $8y + 3 > 9y - 14$

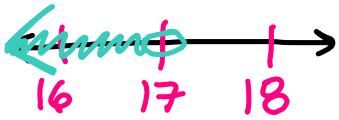
$-8y \quad -8y$

$3 > y - 14$

$+14 \quad +14$

$17 > y$

$y < 17$



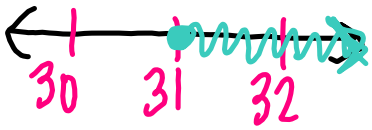
13. $3r - 17 \geq 2r + 14$

$-2r \quad -2r$

$r - 17 \geq 14$

$+17 \quad +17$

$r \geq 31$



Verbal problems containing phrases like greater than or less than can often be solved by using inequalities. The following chart shows some other phrases that indicate inequalities.

<	>	≤	≥
• less than • fewer than	• greater than • more than	• at most • no more than • less than or equal to	• at least • no less than • greater than or equal to

14. The sum of -14 and d is less than -22.
Write an an inequality and solve.

$-14 + d < -22$
$+14 \quad +14$
$d < -8$

15. The difference of 8 and g is at least -17.
Write an an inequality and solve.

$8 - g \geq -17$
$-8 \quad -8$
$-g \geq -25$
$-1 \quad -1$
$g \leq 25$

← Mult. or div. by neg ↓ FLIP

16. Jessie's budget allows her to spend at most $17.50 on new equipment for her model railroad. She has chosen a new railroad car that costs $9.98. How much can Jessie spend on other equipment?

Let x = money left

$x + 9.98 \leq 17.50$
$-9.98 \quad -9.98$
$x \leq \$7.52$

17. A stove and freezer together weigh at least 260 kg. The stove weighs 115 kg.
What can the weight of the freezer be?

let x = weight of freezer

$115 + x \geq 260$
$-115 \quad -115$
$x \geq 145$ kg

18. Cecilia has scores of 8.7, 9.3, 8.8, and 9.4 in a figure skating competition.
What must her fifth score be if she wants a total of no less than 45.9?

Let x = fifth score

$8.7 + 9.3 + 8.8 + 9.4 + x \geq 45.9$

$36.2 + x \geq 45.9$
$-36.2 \quad -36.2$
$x \geq 9.7$

Solve and graph.

19. $4y > -22$ ÷2 ÷2

$\frac{4y}{4} > \frac{-22}{4}$ ÷2

$y > -\frac{11}{2}$

20. $\frac{g}{2} \geq 31$ ·2 ·2

$g \geq 62$

21. $-8 < 6b$ ÷6 ÷6

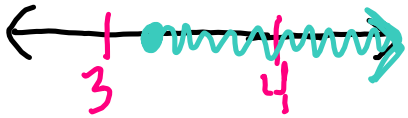
$-\frac{4}{3} < b$

$b > -\frac{4}{3}$

22. $2 \cdot 1.6 \leq \frac{c}{2}$ ·2

$3.2 \leq c$

$c \geq 3.2$

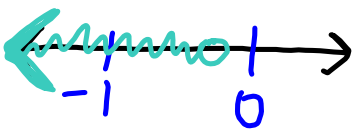


When you multiply or divide BOTH sides of an inequality by a NEGATIVE value, you must FLIP the inequality sign!!

23. $-15h > 5$ ÷5 ÷5

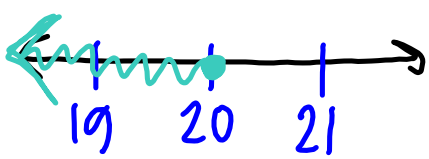
$\frac{-15h}{-15} > \frac{5}{-15}$

$h < -\frac{1}{3}$



24. $\frac{p}{-4} \geq -5$ ·-4 ·-4

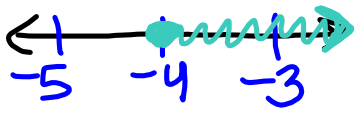
$p \leq 20$



25. $-7m \leq 28$

$\frac{-7m}{-7} \leq \frac{28}{-7}$

$m \geq -4$



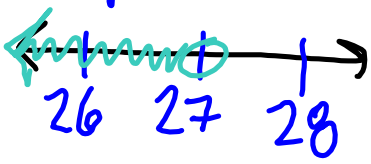
26. $7m \leq -28$

$\frac{7m}{7} \leq \frac{-28}{7}$

$m \leq -4$

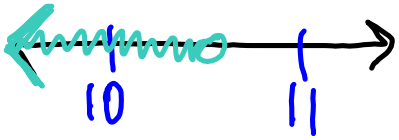
27. $\frac{p}{-9} > -3$ $\cdot -9$

$p < 27$



28. $\frac{3}{4} \cdot \frac{4}{3}x < 14 \cdot \frac{3}{4}$

$x < \frac{21}{2}$



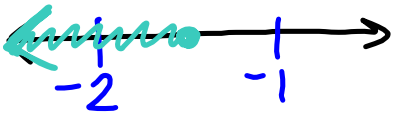
29. $\frac{-2}{5} > \frac{4h}{7}$ $\cdot \frac{7}{4}$

$-\frac{7}{10} > h$

$h < -\frac{7}{10}$

30. $\frac{2p}{9} \leq -\frac{1}{3}$ $\cdot \frac{9}{2}$

$p \leq -\frac{3}{2}$



31. The quotient of x and -4 is greater than or equal to 8.
Write an an inequality and solve.

$-4 \cdot \frac{x}{-4} \geq 8 \cdot -4$

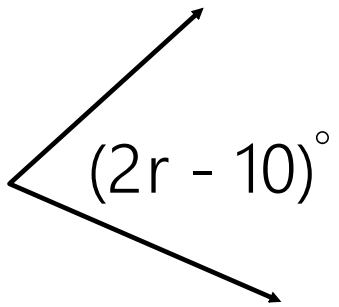
$x \leq -32$

32. The product of 12 and h is at most 16.
Write an an inequality and solve.

$\frac{12h}{12} \leq \frac{16}{12} \div 4 \div 4$

$h \leq \frac{4}{3}$

33. An acute angle has a measure greater than 0 degrees and less than 90 degrees. In the figure shown, what is the set of all possible values of r?



$0 < 2r - 10 < 90$

$+10 \quad +10 \quad +10$

$\frac{10}{2} < \frac{2r}{2} < \frac{100}{2}$

$5 < r < 50$