

Notes 5.4 – Solving Equations and Inequalities

Warmup – Solve each equation as indicated.

1. $3x - 9 - 8x = 11$

$$\begin{array}{r} -5x - 9 = 11 \\ +9 \quad +9 \end{array}$$

$$\frac{-5x}{-5} = \frac{20}{-5}$$

$$x = -4$$

2. $9 - 4(x - 1) = 25$

$$9 - 4x + 4 = 25$$

$$\begin{array}{r} -4x + 13 = 25 \\ -13 \quad -13 \end{array}$$

$$\frac{-4x}{-4} = \frac{12}{-4}$$

$$x = -3$$

3. $16x - 4 = 4(2x - 3)$

$$\begin{array}{r} 16x - 4 = 8x - 12 \\ -8x \quad -8x \end{array}$$

$$\begin{array}{r} 8x - 4 = -12 \\ +4 \quad +4 \end{array}$$

$$\frac{8x}{8} = \frac{-8}{8}$$

$$x = -1$$

4. $\frac{x}{6} + 9 = 14$

$$(6) \frac{x}{6} = 5(6)$$

$$x = 30$$

5. $\frac{2}{3}x + 7 = 15$

$$\left(\frac{3}{2}\right) \frac{2}{3}x = 8\left(\frac{3}{2}\right)$$





$$x = 12$$

6. Solve for h : $(2) a = \frac{1}{2}h(b_1 + b_2)(2)$

$$\frac{2a}{(b_1 + b_2)} = \frac{h(b_1 + b_2)}{(b_1 + b_2)}$$

$$h = \frac{2a}{b_1 + b_2}$$

Lesson

Word	Meaning/Notation	Example
Inequality	two math expressions that may not be equal	$2x > 3x - 4$
Less than	$<$ less than \leq less than or equal to	$x < 4$  $x \leq 4$ 
More than	$>$ more than, greater than \geq more than or equal to	$x > 5$  $x \geq 2$ 

Hint

Lesson - What is greater?

Give them values, then compare

a) Statement: $y < x$
Which is greater? $x - y$ or $y - x$
 $1 - 0$ $0 - 1$
 1 -1

$y - x < x - y$

b) Statement: $2x - 3 > 7$
Which is greater? 5 or x

$x > 5$

$2(5) - 3 > 7$
 $10 - 3 > 7$
 $7 > 7$

$2(6) - 3 > 7$
 $12 - 3 > 7$
 $9 > 7$

c) Statement: $10 - 2x < 6$
Which is greater? x or 2

$x > 2$

$10 - 2(2) < 6$
 $10 - 4 < 6$
 $6 < 6$

$10 - 2(3) < 6$
 $10 - 6 < 6$
 $4 < 6$

d) Statement: $4x \leq 0$
Which is greater? 1 or x

$1 > x$

$4(1) \leq 0$
 $4 \leq 0$
false

$4(0) \leq 0$
 $0 \leq 0$

e) Statement: $x > y$
Which is greater? $x + a$ or $y + a$

$x + a > y + a$

because a would change both numbers equally

f) Statement: $5 > 4$
Which is greater? $5x$ or $4x$

$5x > 4x$ for $x > 0$
 $4x > 5x$ for $x < 0$

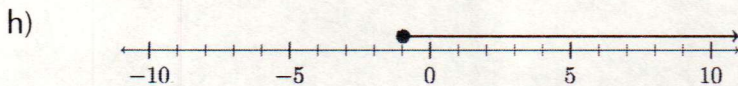
$5(1) > 4(1)$
 $5 > 4$

$5(-1) > 4(-1)$
 $-5 > -4$
false

Write the inequality shown on the graph.



$x < 3$



$x \geq -1$

all # lines must have at least 3 values

Solving & Graphing Inequalities

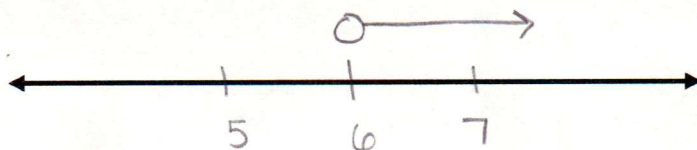
★ Remember to flip the inequality when multiplying or dividing by a negative.

- means \leq or \geq
- means $<$ or $>$

$x <$ or $x \leq$ uses \leftarrow

$x >$ or $x \geq$ uses \rightarrow

g) $x > 6$

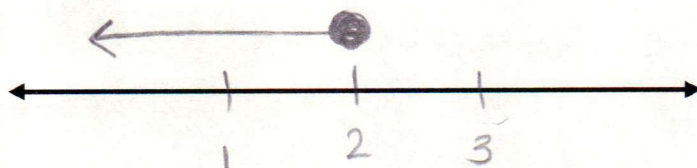


h) $10 \geq 2x + 6$

$-6 \quad -6$

$\frac{4 \geq 2x}{2 \quad 2}$

$x \leq 2$

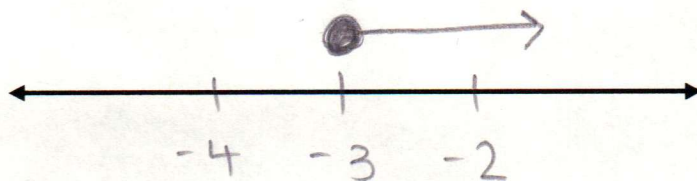


i) $5x + 8 \geq -7$

$-8 \quad -8$

$\frac{5x \geq -15}{5 \quad 5}$

$x \geq -3$

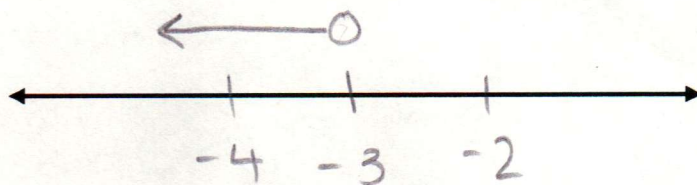


j) $-2x + 3 > 9$

$-3 \quad -3$

$\frac{-2x > 6}{-2 \quad -2}$

$x < -3$

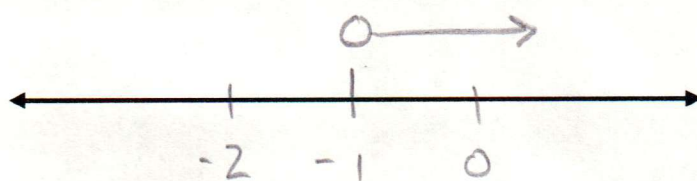


k) $-1 - 4x < 3$

$+1 \quad +1$

$\frac{-4x < 4}{-4 \quad -4}$

$x > -1$



l) $\frac{3}{4}(8x - 16) \leq -10$

$6x - 12 \leq -10$

$+12 \quad +12$

$\frac{6x \leq 2}{6 \quad 6}$

$x \leq \frac{1}{3}$

