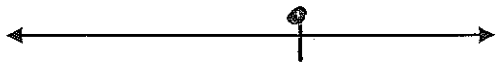
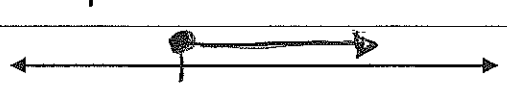
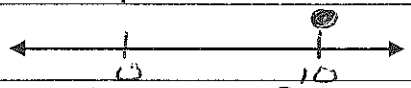
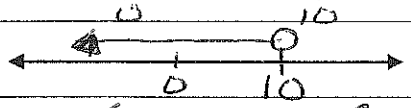
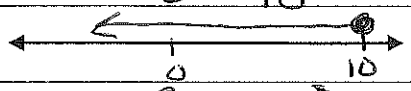
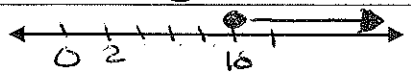
Solving Inequalities
Classwork PreAP

One Variable Inequalities

Notes: Inequality Symbols		
Symbol	Phrase	Graph of Solution
=	equal to	
<	less than, below	
≤	less than or equal to At most	
>	Greater than, above	
≥	Greater than or equal to At least	

Notes: Graphing Solutions to One Variable Inequalities				
Symbol	Problem	Statement of Solution	Graph of Solution	List 3 Solutions
=	$x + 2 = 12$	$x = 10$		10
<	$x + 2 < 12$ $-2 \quad -2$	$x < 10$		6, 0, -4
≤	$x + 2 \leq 12$	$x \leq 10$		10, 6, -4
>	$x + 2 > 12$	$x > 10$		12, 20, 80
≥	$x + 2 \geq 12$	$x \geq 10$		10, 12, 15

Notes: Solving One Variable Inequalities

1. To solve one variable inequalities, use the same methods we used to solve equations (ex: $3X-2=10$, and $-2(X-2)=8$)
2. When solving inequalities, make sure your answer has the variable on the left. This will lead to a better interpretation of the solution.
3. Interpretation of solutions: Graph the solution on a number line by shading and use:
   ○ Open circle for < and > ● Closed circle for ≤ and ≥
4. Rules for Inequalities: When multiplying and dividing by negatives on both sides of an inequality, the inequality sign is reversed.
5. Check your answer: Try picking a number you just shaded over. Substitute your chosen number in for x in the original inequality. Does it make a true statement? If not, check your shading. If yes, your answer and graph are correct!

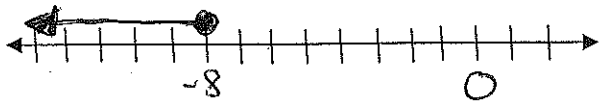
Harder examples of Solving One Variable Inequalities

Day 2

5) $8 + 3x \leq 2x$

$-8 \quad -2x \quad -2x - 8$

$x \leq -8$



Check your answer:

$8 + 3(-10) \leq 2(-10)$

$-22 \leq -20$ ✓

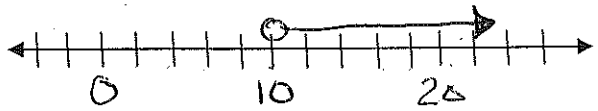
6) $10 + 6x - 2x > 50$

$10 + 4x > 50$

$-10 \quad -10$

$4x > 40$

$x > 10$



Check your answer:

$10 + 6(20) - 2(20) > 50$

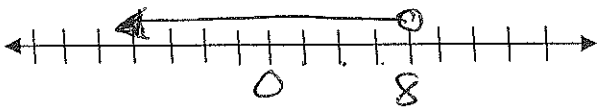
$90 > 50$ ✓

7) $\frac{-2}{-2}(x + 3) > \frac{-22}{-2}$

$x + 3 < 11$

$-3 \quad -3$

$x < 8$



Check your answer:

$-2(0+3) > -22$

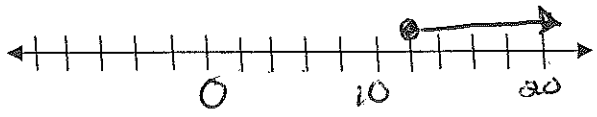
$-6 > -22$ ✓

8) $\frac{2}{3}x + 2 \geq 10$

$-2 \quad -2$

$\frac{3}{2} \cdot \frac{2}{3}x \geq 8 \cdot \frac{3}{2}$

$x \geq 12$



Check your answer:

$\frac{2}{3}(15) + 2 \geq 10$

$12 \geq 10$ ✓

Notes: Solving Word Problems with One Variable Inequalities

1. Define the variable from the word problem.
2. Write the inequality describing the situation.
3. Solve the inequality. Box your answer.
4. Check your answer by naming two solutions, and check that it makes sense from the original word problem.

Example 9: Four times a number plus 12 is greater than twenty minus 8.

$4n + 12 > 20 - 8$

$4n + 12 > 12$

$-12 \quad -12$

$4n > 0$

$n > 0$

Check: $n = 5 \quad 4(5) + 12 > 12$

$32 > 12$ ✓

Example 10: Negative thirty-six is no more than one half of a number.

$-36 \leq \frac{1}{2}n$

$\frac{1}{2} \quad \frac{1}{2}$

$-72 \leq n$

Check: $n = 10 \quad -36 \leq \frac{1}{2}(10)$

$-36 \leq 5$ ✓

Example 11: The charge per mile for a sports rental car at Fast Rentals is $0.15. Mr. Zoom is on a business trip and must rent a car for all of his meetings. What is the greatest number of miles Mr. Zoom can travel without going over his budget of $75 per rental for mileage charges? m: miles

maximum

$\frac{.15m}{.15} \leq \frac{75}{.15}$

$m \leq 500$

500 miles

Check: $m = 50$

$.15(500) \leq 75$

$75 \leq 75$ ✓

Example 12: Fred, the farmer, has started a savings account for a tractor. He saved $600 last month and plans to add $100 each month until he has saved more than $2000. Write an inequality in terms of the number of months, m, that he has to save for the tractor.

m: months

$600 + 100m > 2000$

$-600 \quad -600$

$100m > 1400$

$\frac{100m}{100} > \frac{1400}{100}$

$m > 14$

Day2: What I need to remember from today's lesson on Inequality Word Problems