$\mathbb{M}^2$ = Math Mediator   Lesson 6: Inequalities

Total Recall (Warm-up) (5 minutes approx.) HMWK?	Total Recall: Your family wants to replace the carpet with tile. Tile is sold by square feet. The three rooms are 10'x12'; 8'x10'; and 25'x15'. Write an equation to evaluate the cost variations of various tile styles at $6/sq.ft.; $7/sq.ft.; and $8/sq.ft. with an installation fee of $1300.00. (Use x = cost/sq.ft.; y = total cost). A: x[(10X12) + (8X10) + (25X15)] + 1300 = y = total cost (x$/sq.ft.)[(120sq.ft.) + (80sq.ft.) + (375sq.ft.)] + $1300 $6/sq.ft[575sq.ft] + $1300 = $4750; $7/sq.ft.[575sq.ft.] +$1300 = $5235 $8/sq.ft.[575sq.ft] + $1300 = $5900
Direct Instruction (10 minutes approx.) **CA Std 1.0** Prep.	From the recall exercise above, what if we wanted to keep the project under $5500.00? We could express this with an inequality. How would you do that? Replace the y with $5500.00 and the equal sign with a less than sign. x[(10X12) + (8X10) + (25X15)] + 1300 < 5500 Now we can solve for x to decide the tile choices we have to work with. Plot the answer on a number line, using an open circle at the end point for < or > and a closed circle for ≤ or ≥. There are many other uses for inequalities; if the temperature gets above a minimum amount you can program the air conditioner to start up or you can go surfing without a wetsuit; if you live at higher elevations you know what the cutoff is to grow certain plants; if you tested the pH of the soil, there is an amount that is greater than or less than for certain plants.
Activity: (10 minutes approx.)	U-DO: 1. If the temperature outside is colder than 60°F, then I put on a wetsuit to surf. Write an inequality for this: T < 60; Please plot it. This may seem simple, but it is important to develop skills for plotting and analyzing inequalities. The endpoint on the temperature number line must be an open circle, indicating that all temperatures just up to 60 are included, but 60 is not part of the solution. 2. The Pacific fir tree grows at elevations between 1600 feet and 4600 feet. What is the inequality for this statement? 1600 < E < 4600; Why isn't there a ≤ instead of a < in the inequality? Because of the word between. If the word including had been used, then a ≤ would be appropriate. ** This inequality with two inequality signs is called a compound inequality. Please plot the inequality 1600 < E < 4600. 3. In order to grow healthy roses; the pH level should be from 5.5 to 7.1. Write an inequality for this statement. 5.5 ≤ P ≤ 7.1 Please plot this.
Direct Instruction: (5 minutes approx.)	Inequality Tools: (Students copy into notebooks)

Tool	Example	Equivalent
Add the same number (positive	x − 8 < 4	x < 12

	or negative) to both sides. Add 8 to both sides
	Subtract the same number (positive or negative) from both sides. $y + 5 \geq -2$ $y \geq -7$ Subtract 5 from both sides
	Multiply by the same number (positive only) to both sides. $(1/4)x < 3$ $x < 12$ Multiply both sides by 4
	Divide by the same number (positive only) to both sides. $3y > 3$ $y > 1$ Divide both sides by 3
	Multiply by the same number (negative only) to both sides. $(-1/2)x < 4$ $x > -8$ Multiply both sides by –2, reverse inequalilty
	Divide by the same number (negative only) to both sides. $-2x > -4$ $x < 2$ Divide both sides by –2, reverse inequalilty
Direct Instruction: (10 minutes approx.)	U-DO: Solve for x and graph the solution of each. 1. $3x + 1 > 13$; A: $x > 4$; 2. $–3x < -18$ A: $x > 6$; 3. $15 – 2x < 1$ A: $x > 7$; 4. $x \geq 7x – 6$ A: $x \leq 1$; 5. $25 < 9x – 2$ A: $x > 3$; 6. $3 – x < 11$ A: $x > -8$
Direct Instruction: (5 minutes approx.)	Compound "and" inequalities: $-4 < 3x – 10 \leq 14$ (3x – 10 is greater than –4 'and' less than or equal to 14). Step one: add 10 to both sides to get the 'x' term by its self. $6 < 3x \leq 24$ Step two: Divide both sides by 3 $2 < x \leq 8$ Now graph this on a number line
Direct Instruction: (5 minutes approx.)	Compound "or" inequalities: $2n + 6 \leq -4$ or $5n – 1 > 4$ Solve each for 'n' and graph it. Shown with solution set notation: {n| n $\leq$ -5 or n > 1}.
Wrap-up (5 minutes approx.)	Wrap up closing comments and housekeeping.