Secondary 2 Mathematics · Practice Worksheet · tutorinmontreal.ca

Algebra - Equations and Inequalities

Name: _____ Date: _____

Concepts

- General Methods for Solving Equations
- Representing a Solution Set
- Solving Equations and Inequalities
- Solving First-Degree Equations and Inequalities
- Translating a Statement Into an Equation or an Inequality

General Methods for Solving Equations

1. Solve each equation using the method named, then **verify** your solution by substituting it back into the original equation.

a) Balancing: $4x + 7 = 2x + 19$

b) Inverse operations: $\frac{3x}{5} - 4 = 8$

c) Hidden terms (cover-up): $7(x - 3) = 56$

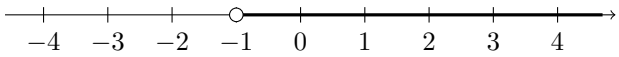
Representing a Solution Set

2. Answer each part.

a) Solve $3x + 5 \leq 20$ over the real numbers. Write the solution set in set-builder notation and in interval notation, and draw it on a number line (say whether the endpoint is a solid or an open point).

b) Write out, in a list between braces, the solution set $\{x \in \mathbb{Z} \mid -4 < x \leq 2\}$.

c) The number line below shows a solution set over the real numbers, and the shading continues to the right. Write it in set-builder notation and in interval notation.



Solving Equations and Inequalities

3. Two equations (or inequalities) are **equivalent** when they have exactly the same solution set. For each pair, decide whether the two are equivalent. Name the transformation used, or show the two solution sets.

a) $3x = 27$ and $3x + 8 = 35$

b) $x - 4 = 6$ and $5(x - 4) = 30$

c) $-2x < 8$ and $x < -4$

Solving First-Degree Equations and Inequalities

4. Solve each equation or inequality. For the inequality, state the solution set in interval notation.

a) $5x - 8 = 3x + 10$

b) $2(x + 4) - 3x = 11$

c) $\dfrac{x}{3} + 2 = \dfrac{x - 4}{2}$

d) $7 - 4x \geq 2x + 25$

Translating a Statement Into an Equation or an Inequality

5. Translate each statement into one equation or one inequality, using the variable given. Do not solve.

a) A bubble-tea shop sold three times as many taro drinks as mango drinks, and 96 drinks in all. Let m be the number of mango drinks.

b) Zach is 5 years younger than Amel. In 4 years, their two ages will add up to 41. Let a be Amel's age today.

c) The climbing room holds no more than 24 people at a time, and 9 climbers are already inside. Let p be the number who may still enter.

d) A number decreased by 7 is at least twice the number. Let n be the number.

Synthesis — drawing on several sheets in this topic

6. A student council orders reusable water bottles printed with the school logo. The printer charges \$60 to set up the design, plus \$4.50 per bottle. The council sells each bottle for \$12 and expects to sell every one it orders. Let n be the number of bottles.

a) Translate into an inequality the statement "the money taken in is at least as large as the amount paid to the printer", then solve it.

b) Write the solution set in set-builder notation, choosing the number set that fits the situation, and justify your choice.

c) Verify the endpoint of your solution set in the original inequality.