Problem Solving

Fill in the guided notes as you watch the video in the Digital Toolbox.

- **Problem solving** in math is more than just finding an answer.
- Problem solving is a **SKILL** that includes **perseverance and planning**, among other things, to help make the math make sense to you.
- The greatest mathematicians:
  - **persist**.
  - **look** for counter-examples to disprove themselves.
  - **ask** others to find errors in their work.
  - go back and **fix** it or **try again**.
- Important aspects of problem solving:
  - You **persevere**.
  - You appropriately use **math tools** to assist you.
  - You look for **efficient** ways to solve problems.
  - You embrace **mistakes** and then **correct** them.
  - You **make a plan** to solve complex problems.
- Problem-solving plan for equations:

1) At every instance, ask yourself, "What is happening to the **variable**?" and **list** each response to that question.

2) After your list is complete, **draw** an arrow going from the bottom of your list to the top.

3) For each item in your list, ask yourself, "What operation will **"undo"** (be the inverse) it?" and list the inverse operation.

- No matter the context, the **rules** of mathematics, including order of operations and inverse operations, stay **the same**.

Example 1

Complete the example as you watch the video in the Digital Toolbox.

Write a plan to isolate x. Then name the inverse of each step.

$$\frac{85}{76}x - 243 = 901$$

$$\cdot\frac{85}{76} \uparrow \cdot\frac{76}{85}$$
$$-243 \uparrow +243$$

Find x and circle it

What is happening to x?
x is multiplied by $\frac{85}{76}$
243 is subtracted from the x-term

What operation will "undo" what you wrote down?

Example 2

Complete the example as you watch the video in the Digital Toolbox.

Write the plan to isolate x.

$$\frac{x}{AB} + E = CD$$

$$\div AB \uparrow \cdot AB$$
$$+E \uparrow -E$$

Find x and circle it

What is happening to x?
x is divided by AB
E is added to the x-term

What operation will "undo" what you wrote down?

Example 3

Complete the example as you watch the video in the Digital Toolbox.

Write the plan to isolate x.

$$-3 - \frac{4}{7}x + P = 6$$

$$\cdot\left(-\frac{4}{7}\right) \uparrow \cdot\left(-\frac{7}{4}\right)$$
$$-3 \uparrow +3$$
$$+P \uparrow -P$$

Practice

Write a plan to isolate x. Then write the inverse of each step.

1) $\frac{x}{7} - 11 = -1$

$\frac{(x)}{7} - 11 = -1$

$\div 7 \uparrow \cdot 7$

$-11 \uparrow +11$

2) $4x + \frac{1}{4} = 7$

$4(x) + \frac{1}{4} = 7$

$\cdot 4 \uparrow \div 4$

$+\frac{1}{4} \uparrow -\frac{1}{4}$

3) $5x + 8 = 45$

$5(x) + 8 = 45$

$\cdot 5 \uparrow \div 5$

$+8 \uparrow -8$

4) $Ax + P = G$

$A(x) + P = G$

$\cdot A \uparrow \div A$

$+P \uparrow -P$

5) $-\frac{2}{3}x + \frac{4}{3} = -3$

$-\frac{2}{3}(x) + \frac{4}{3} = -3$

$\cdot\left(-\frac{2}{3}\right) \uparrow \cdot\left(-\frac{3}{2}\right)$

$+\frac{4}{3} \uparrow -\frac{4}{3}$

6) $2 = 9x + \frac{4}{5}$

$2 = 9(x) + \frac{4}{5}$

$\cdot 9 \uparrow \div 9$

$+\frac{4}{5} \uparrow -\frac{4}{5}$

Write a plan to isolate x. Then write the inverse of each step.

7) $\frac{x}{6} + 3 = 11$

$\frac{(x)}{6} + 3 = 11$

$\div 6 \uparrow \cdot 6$

$+3 \uparrow -3$

8) $\frac{x}{C} - B = Q$

$\frac{(x)}{C} - B = Q$

$\div C \uparrow \cdot C$

$-B \uparrow +B$

9) $5 - 1x = -10$

$5 - 1(x) = -10$

$\cdot(-1) \uparrow \div(-1)$

$+5 \uparrow -5$

10) $\frac{7}{4} - \frac{5}{6}x = 8$

$\frac{7}{4} - \frac{5}{6}(x) = 8$

$\cdot\left(-\frac{5}{6}\right) \uparrow \cdot\left(-\frac{6}{5}\right)$

$+\frac{7}{4} \uparrow -\frac{7}{4}$

11) $\frac{x+8}{9} = 3$

$\frac{(x)+8}{9} = 3$

$+8 \uparrow -8$

$\div 9 \uparrow \cdot 9$

12) $\frac{x-D}{5} = Q$

$\frac{(x)-D}{5} = Q$

$-D \uparrow +D$

$\div 5 \uparrow \cdot 5$