

Activity 10 Assessment

Variables and Equations Consolidation

Solving for an Unknown in Multi-Step Equations

Uses 'guess and check.'

$$28 - t = 12$$

"I know $28 - 8 = 20$.
So, t must be more than 8.
 $28 - 10 = 18$ (too high)
 $28 - 15 = 13$ (too high, but close)
So, $n = 16$ because $28 - 16 = 12$."

Uses the balance model.

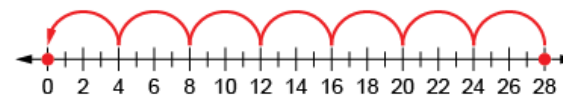
$$18 = d + 7$$

$$18 - 7 = d + 7 - 7$$

$$11 = d$$

"I subtracted 7 from each side to keep the balance and to make the equation easier to solve."

Uses relationships among operations (inverse operations, associative property).



$$28 = 4x + 4$$

"I rewrote it as a subtraction equation,
then divided both sides by 4."
 $28 - 4 = 4x \rightarrow 24 = 4x \rightarrow 6 = x$

Observations/Documentation

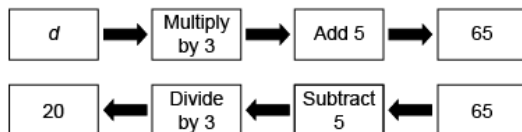
Activity 10 Assessment

Variables and Equations Consolidation

Solving for an Unknown in Multi-Step Equations (con't)

Uses a flow chart and inverse operations.

$$3d + 5 = 65$$



"I decomposed the equation into parts, then reversed the flow using inverse operations."

Writes an equation with an unknown to solve a problem.

Chico works for a dog-walking company. Chico earns \$25 a day, plus \$5 for every dog he walks. On Thursday, Chico earned \$70. How many dogs did Chico walk?

"I let d represent the number of dogs Chico walked.
I wrote the equation: $70 = 25 + 5d$."

Flexibly uses multiple strategies to solve equations.

$$\begin{aligned}
 70 &= 25 + 5d \\
 25 + 45 &= 25 + 5d \\
 25 + 45 - 25 &= 25 + 5d - 25 \\
 45 &= 5d \\
 \frac{45}{5} &= \frac{5d}{5} \\
 9 &= d
 \end{aligned}$$

"I made the equation easier to solve by decomposing 70, subtracting 25 from each side, then dividing both sides by 5."

Observations/Documentation

Activity 10 Assessment

Variables and Equations Consolidation

Solving and Graphing Inequalities

Identifies range of numbers in solution to inequalities.

$$45 + 5n \geq 100$$

$$45 + 5n > 100$$

“Each time, the unknown can be any number greater than 11. In the second equation, it could also be 11. There are many quantities that would work.”

Represents solutions to simple inequalities by graphing on a number line.

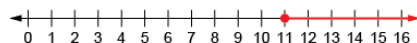
$$45 + 5n \geq 100$$

$$45 + 5n = 45 + 55$$

$$5n = 55$$

$$n = 11$$

At least 11 cars need to be washed.



“Since 11 is part of the solution, I drew a closed circle at 11. Since n must be greater than or equal to 11, the arrow goes to the right.”

Verifies the solution to an inequality.

$$45 + 5n \geq 100$$

$$n \geq 11$$

“To check, I substituted a number greater than 11 into the left side.
 $45 + 5(20) = 145$.
 Since $145 > 100$, the solution is correct.”

Flexibly solves inequalities using various strategies, then verifies and graphs the solutions.

$$13 > 6 + \frac{d}{3}$$

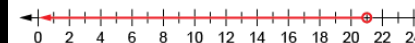
$$13 = 6 + \frac{d}{3}$$

$$6 + 7 = 6 + \frac{d}{3}$$

$$7 = \frac{d}{3}$$

$$d = 21$$

So, $d < 21$
 To check, substitute $d = 15$.
 $6 + \frac{d}{3} = 6 + \frac{15}{3}$, or 11
 $13 > 11$, so the solution is correct.



Observations/Documentation