Learning Target(s): I can use deductive reasoning to write an algebraic proof.
I can identify the reflexive, symmetric, and transitive properties.

Notes: 2.5 Reason Using Properties from Algebra

ALGEBRAIC PROPERTIES OF EQUALITY

Let a, b and c be real numbers.

Addition Property If $a = b$, then $a + c = b + c$.

Subtraction Property If $a = b$, then $a - c = b - c$.

Multiplication Property If $a = b$, then $ac = bc$.

Division Property If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

Substitution Property If $a = b$, then a can be substituted for b in any equation or expression.

Ex. 1
Solve $2x + 3 = 9 - x$. Write a reason for each step.

Equation	Explanation	Reason
$2x+3=9-x$ $+x \quad +x$	original equation add x to each side	Given Add. Prop.
$3x+3=9$ $-3 \quad -3$	subtract 3 from both sides	Subtraction. Prop Subt.
$\frac{3x}{3} = \frac{6}{3}$	divide both sides by 3	Div. Prop
$x = 2$		

Distributive Property

$a(b + c) =$ $ab + ac$, where a, b, and c are real numbers.

Ex. 2

Solve $-4(6x + 2) = 64$. Write a reason for each step.

Equation	Explanation	Reason
$-4(6x+2)=64$	original equation	Given
$-24x-8=64$	Distribute -4	Dist. Prop
$+8 \quad +8$	Add 8 to each side	Add. Prop.
$-24x=72$		
$\frac{-24x}{-24}=\frac{72}{-24}$	Divide both sides by -24	Div. Prop.
$x=-3$		

Try it!

1. Solve $x - 5 = 7 + 2x$. Write a reason for each step.

Equation	Explanation	Reason

2. Solve $4(5 - x) = -2x$. Write a reason for each step.

Equation	Explanation	Reason