Worksheet **Name:** _____ **pd:** ____

Algebraic Proofs

For Exercises 1–12 , write the letter of each property next to its definition.

1. If a = b, then b = a _____
2. If a = b, then ac = bc _____
3. $\overline{AB} \cong \overline{AB}$_____
4. a = a _____
5. If a = b, then a + c = b + c _____
6. a (b+c) = ab + ac _____
7. If a = b and b = c, then a = c_____
8. If $\angle P \cong \angle Q$, the $\angle Q \cong \angle P$ _____
9. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$ _____
10. If a = b and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$ _____
11. If a = b, then a - c = b - c _____
12. If a = b, then b can be substituted for a in any expression_____

A. Addition Property of Equality
B. Subtraction Property of Equality
C. Multiplication Property of Equality
D. Division Property of Equality
E. Reflexive Property of Equality
F. Symmetric Property of Equality
G. Transitive Property of Equality
H. Substitution Property of Equality
I. Distributive Property
J. Reflexive property of Congruence
K. Symmetric Property of Congruence
L. Transitive Property of Congruence

Write a justification for each step:

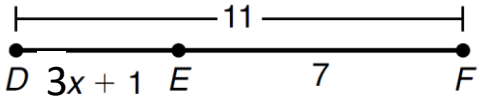
13. Solve the following. Write a justification for each step. $x + 1 = 9 - 3x$

x + 1 = 9 - 3x	
3x = 3x	
4x + 1 = 9	
1 = 1	
4x = 8	
4 = 4	
x = 2	

14. Solve the following. Write a justification for each step. $x = 2(6 - x)$

x = 2(6 – x)	
x = 12 – 2x	
2x = 2x	
3x = 12	
3 = 3	
X = 4	

15. Solve the following. Write a justification for each step.



DE + EF = DF	
3x + 1 + 7 = 11	
3x + 8 = 11	
8 = 8	
3x = 3	
3 = 3	
X = 1	

16. Given: x + 3 = 7 – x

Prove: x = 2

x + 3 = 7 - x	
x = x	
2x + 3 = 7	
3 = 3	
2x = 4	
2 = 2	
x = 2	

17. Given: $2x+5 = 20-3x$

Prove: $x = 3$

STATEMENTS	REASONS
1. _____	1._____
2. $3x = 3x$	2._____
3. $5x + 5 = 20$	3._____
4. $-5 = -5$	4._____
5. $5x = 15$	5._____
6. $5 = 5$	6._____
7. _____	7._____

Write a complete proof for # 18

18. Given: $5(x-1) = 4x + 13$

Prove: $x = 18$

STATEMENTS	REASONS