Name: Key

Section 6.1B

Algebraic Proofs

Solve each equation. Write a reason for every step.

1. $4x = 12x + 32$

① $4x = 12x + 32$	① Given
② $-8x = 32$	② Subtraction prop of =
③ $x = -4$	③ Division property of =

2. $28 + 12x = 8x - 4$

① $28 + 12x = 8x - 4$	① Given
② $28 + 4x = -4$	② Subtraction prop of =
③ $4x = -32$	③ Subtraction prop of =
④ $x = -8$	④ Division prop of =

3. $60x + 153 = 9x + 51$

① $60x + 153 = 9x + 51$	① Given
② $51x + 153 = 51$	② Subtraction prop of =
③ $51x = -102$	③ Subtraction prop of =
④ $x = -2$	④ Divisions prop of =

4. $-4x + 10 = -5x + 18$

① $-4x + 10 = -5x + 18$	① Given
② $x + 10 = 18$	② Addition prop of =
③ $x = 8$	③ Subtraction prop of =

5. $-3(x + 2) = 16 - x$

① $-3(x+2) = 16 - x$	① Given
② $-3x - 6 = 16 - x$	② Distributive property
③ $-6 = 16 + 2x$	③ Addition prop. of =
④ $-22 = 2x$	④ Subtraction prop of =
⑤ $-11 = x$	⑤ Divisions prop of =
⑥ $x = -11$	⑥ Symmetric prop of =

6. $-x - 2(9 - 8x) = 12$

① $-x - 2(9 - 8x) = 12$	① Given
② $-x - 18 + 16x = 12$	② Distributive property
③ $15x - 18 = 12$	③ Substitution property
④ $15x = 30$	④ Addition prop of =
⑤ $x = 2$	⑤ Division prop of =

7. $6(x - 6) = x(16 - 7)$

① $6(x-6) = x(16-7)$	① Given
② $6x - 36 = 16x - 7x$	② Distributive property
③ $6x - 36 = 9x$	③ Substitution property
④ $-36 = 3x$	④ Subtraction prop of =
⑤ $-12 = x$	⑤ Division prop of =

8. $\frac{1}{4}x + 10 = 2$

① $\frac{1}{4}x + 10 = 2$	① Given
② $\frac{1}{4}x = -8$	② Subtraction prop of =
③ $x = -32$	③ Multiplication prop of =

9. $2(4-x)+1=16-3x$

① $2(4-x)+1=16-3x$	① Given
② $8-2x+1=16-3x$	② Distributive Property
③ $9-2x=16-3x$	③ Substitution Prop of =
④ $9+x=16$	④ Addition prop of =
⑤ $x=7$	⑤ Subtraction prop of =

10. $\frac{1}{3}x+4=6x+12$

① $\frac{1}{3}x+4=6x+12$	① Given
② $\frac{1}{3}x=6x+8$	② Subtraction prop of =
③ $-\frac{17}{3}x=8$	③ Subtraction prop of =
④ $x=\frac{-24}{17}$	④ multiplication prop of =

11. **Given:** $8x - 5 = 2x + 1$
Prove: $x = 1$
Proof:

Statements	Reasons
a. $8x - 5 = 2x + 1$	a. Given
b. $8x - 5 - 2x = 2x + 1 - 2x$	b. Subtraction prop of =
c. $6x-5=1$	c. Substitution Property
d. $6x-5+5=1+5$	d. Addition Property
e. $6x = 6$	e. Substitution property
f. $\frac{6x}{6} = \frac{6}{6}$	f. Division Property of =
g. $x=1$	g. Substitution property

12.

Given: $\frac{4x + 6}{2} = 9$
Prove: $x = 3$
Proof:

Statements	Reasons
a. $\frac{4x + 6}{2} = 9$	a. Given
b. $2\left(\frac{4x + 6}{2}\right) = 2(9)$	b. Mult. Prop.
c. $4x + 6 = 18$	c. Substitution
d. $4x + 6 - 6 = 18 - 6$	d. Subtraction
e. $4x = 12$	e. Substitution
f. $\frac{4x}{4} = \frac{12}{4}$	f. Div. Prop.
g. $x=3$	g. Substitution

13.

Given: $4x + 8 = x + 2$
Prove: $x = -2$
Proof:

Statements	Reasons
a. $4x + 8 = x + 2$	a. Given
b. $4x + 8 - x = x + 2 - x$	b. Subtraction
c. $3x + 8 = 2$	c. Substitution
d. $3x+8-8=2-8$	d. Subtr. Prop.
e. $3x=-6$	e. Substitution
f. $\frac{3x}{3} = \frac{-6}{3}$	f. Division
g. $x=-2$	g. Substitution