2-6 Algebraic Proofs

** Must Know all the properties of real numbers on page 136 **

1. Addition Property of Equality — If $a=b$, then $a+c=b+c$
   ex $2=2$, then $2+4=2+4$, $6=6$
2. Subtraction Property of Equality — If $a=b$, then $a-c=b-c$
   ex $8=8$, then $8-6=8-6$, $2=2$
3. Multiplication Property of Equality — If $a=b$, then $a\cdot c=b\cdot c$
   ex $5=5$, then $5\cdot 2=5\cdot 2$, $10=10$
4. Division Property of Equality — If $a=b$ + $c\neq 0$, then $\frac{a}{c}=\frac{b}{c}$
   ex $12=12$, then $\frac{12}{6}=\frac{12}{6}$, $2=2$
5. Reflexive Property of Equality — $a=a$
   ex $5=5$
6. Symmetric Property of Equality — If $a=b$, then $b=a$
   ex $4x+5=11$ then $11=4x+5$
7. Transitive Property of Equality — If $a=b$ + $b=c$, then $a=c$
   ex $2x=5$ $5=5y$ then $2x=5y$
8. Substitution Property of Equality — If $a=b$, then you may replace a with b.
9. Distributive Property — $a(b+c)=ab+ac$
   ex $2(x+7)=2x+14$

Example #1 Write a 2-Column Proof

(18) Solve $\frac{1}{5}x + 3 = 2x - 24$

Homework

	Statement	reason
(1)	$\frac{1}{5}x + 3 = 2x - 24$	(1) given
(2)	$5(\frac{1}{5}x + 3) = 5(2x - 24)$	(2) Mult. Prop.
(3)	$x + 15 = 10x - 120$	(3) Distributive Property
(4)	$15 = 9x - 120$	(4) Subtraction Prop.
(5)	$135 = 9x$	(5) Addition Prop.
(6)	$15 = x$	(6) Division Prop.
(7)	$x = 15$	(7) Symmetric Prop.

Example #2 Write a 2-Column Proof

(21) Solve $d = vt + \frac{1}{2}at^2$ for a

Homework

	Statement	reason
(1)	$d = vt + \frac{1}{2}at^2$	(1) Given
(2)	$2d = 2(vt + \frac{1}{2}at^2)$	(2) Mult. Property
(3)	$2d = 2vt + at^2$	(3) Distributive Property
(4)	$2d - 2vt = at^2$	(4) Subtraction Property
(5)	$\frac{2d - 2vt}{t^2} = a$	(5) Division Property
(6)	$a = \frac{2d - 2vt}{t^2}$	(6) Symmetric Property

Ex. #3

25 Homework

If $\angle Y \cong \angle Z$, then $x = 100$

	Statement	reason
1	$\angle Y \cong \angle Z$	1 Given
2	$x + 10 = 2x - 90$	2 Def. of congruent angles
3	$10 = x - 90$	3 Subtraction Property
4	$100 = x$	4 Addition Property
5	$x = 100$	5 Symmetric Property