

**Algebraic Proofs**

**Given:**  $5x - 1 = 24$

**Prove:**  $x = 5$

Step	Statement	Step	Reason
1)	$5x - 1 = 24$	1)	Given
2)	$5x = 25$	2)	Addition Property
3)	$x = 5$	3)	Division Property

**Given:**  $2(x + 1) = 10$

**Prove:**  $x = 4$

Step	Statement	Step	Reason
1)	$2(x + 1) = 10$	1)	Given
2)	$2x + 2 = 10$	2)	Distributive Property
3)	$2x = 8$	3)	Subtraction Property
4)	$x = 4$	4)	Division Property

**Given:**  $3x + 2(x - 1) = 13$

**Prove:**  $x = 3$

Step	Statement	Step	Reason
1)	$3x + 2(x - 1) = 13$	1)	Given
2)	$3x + 2x - 2 = 13$	2)	Distributive Property
3)	$5x - 2 = 13$	3)	Simplification
4)	$5x = 15$	4)	Addition Property
5)	$x = 3$	5)	Division Property

**Given:**  $5x = y - 1$  and  $3(x - 1) = y - 4x$

**Prove:**  $x = 2$  and  $y = 11$

Step	Statement	Step	Reason
1)	$5x = y - 1$	1)	Given
2)	$5x + 1 = y$	2)	Addition Property
3)	$3(x - 1) = y - 4x$	3)	Given
4)	$3x - 3 = y - 4x$	4)	Distributive Property
5)	$7x - 3 = y$	5)	Addition Property
6)	$7x - 3 = 5x + 1$	6)	Substitution Property (from steps 2 and 5)
7)	$2x = 4$	7)	Subtraction and Addition Properties
8)	$x = 2$	8)	Division Property
9)	$5(2) + 1 = y$	9)	Substitution Property (from steps 2 and 8)
10)	$11 = y$	10)	Simplification
11)	$y = 11$	11)	Symmetric Property