

Algebraic Proofs Practice

Name: *Key*

1. Given: $5n - 8 = -23$
Prove: $n = -3$

Statements	Reasons
1. $5n - 8 = -23$	1. Given
2. $5n - 8 + 8 = -23 + 8$	2. Addition Pr.
3. $5n = -15$	3. Subst
4. $5n/5 = -15/5$	4. Division P.
5. $n = -3$	5. Subst.

2. Given: $13x + 7 = -32$
Prove: $x = -3$

S	R
1. $13x + 7 = -32$	1. Given
2. $13x + 7 - 7 = -32 - 7$	2. Subtraction P.
3. $13x = -39$	3. Substitution
4. $\frac{13x}{13} = \frac{-39}{13}$	4. Division P.
5. $x = -3$	5. Subst.

3. Given: $4x - 2 = 18$
Prove: $x = 5$

S	R
1. $4x - 2 = 18$	1. Given
2. $4x - 2 + 2 = 18 + 2$	2. addition P.
3. $4x = 20$	3. Subst.
4. $\frac{4x}{4} = \frac{20}{4}$	4. Division P.
5. $x = 5$	5. Subst.

4. Given: $\frac{m}{6} + 3 = 14$
Prove: $m = 66$

S	R
1. $\frac{m}{6} + 3 = 14$	1. Given
2. $\frac{m}{6} + 3 - 3 = 14 - 3$	2. Subtraction P
3. $\frac{m}{6} = 11$	3. Subst.
4. $\frac{m}{6} \cdot 6 = 11 \cdot 6$	4. Mult. P
5. $m = 66$	5. Subst.

5. Given: $2y - 3 = 19$
Prove: $y = 11$

S	R
1. $2y - 3 = 19$	1. Given
2. $2y - 3 + 3 = 19 + 3$	2. Addition P
3. $2y = 22$	3. Subst
4. $\frac{2y}{2} = \frac{22}{2}$	4. Division P
5. $y = 11$	5. Subst

6. Given $27 = 19 - \frac{w}{3}$
Prove: $-24 = w$

S	R
1. $27 = 19 - \frac{w}{3}$	1. Given
2. $27 - 19 = 19 - \frac{w}{3} - 19$	2. Subtraction P
3. $8 = -\frac{w}{3}$	3. Subst.
4. $8(-3) = -\frac{w}{3}(-3)$	4. mult. P
5. $-24 = w$	5. Subst.

7. Given: $3(x-2) = 7x-24$

Prove: $x = 4.5$

S	R
1. $3(x-2) = 7x-24$	1. Given
2. $3x-6 = 7x-24$	2. Dist. P.
3. $3x-6-7x = 7x-24-7x$	3. Subtraction P.
4. $-4x-6 = -24$	4. Subst
5. $-4x-6+6 = -24+6$	5. Addition P.
6. $-4x = -18$	6. Subst.
7. $\frac{-4x}{-4} = \frac{-18}{-4}$	7. Div. P.
8. $x = 4.5$	8. Subst

9. Given: $8(r+4) = -2(6r-26)$
Prove: $r = 1$

S	R
1. $8(r+4) = -2(6r-26)$	1. Given
2. $8r+32 = -12r+52$	2. Dist. P.
3. $8r+32+12r = -12r+52+12r$	3. Add. P.
4. $20r+32 = 52$	4. Subst
5. $20r+32-32 = 52-32$	5. Subtraction P.
6. $20r = 20$	6. Subst
7. $\frac{20r}{20} = \frac{20}{20}$	7. Division P.
8. $r = 1$	8. Subst

11. Given: $\frac{j}{4} - 3 = -1$

Prove: $j = 8$

S	R
1. $\frac{j}{4} - 3 = -1$	1. Given
2. $\frac{j}{4} - 3 + 3 = -1 + 3$	2. Addition P.
3. $\frac{j}{4} = 2$	3. Subst
4. $\frac{j}{4} \cdot 4 = 2 \cdot 4$	4. Mult. P.
5. $j = 8$	5. Subst.

8. Given: $7h-5 = 4h+13$

Prove: $h = 6$

S	R
1. $7h-5 = 4h+13$	1. Given
2. $7h-5-4h = 4h+13-4h$	2. Subtraction
3. $3h-5 = 13$	3. Subst.
4. $3h-5+5 = 13+5$	4. Add. P.
5. $3h = 18$	5. Subst
6. $3h/3 = 18/3$	6. Division P.
7. $h = 6$	7. Subst

10. Given: $6k+18 = 9(k+2)$
Prove: $k = 0$

S	R
1. $6k+18 = 9(k+2)$	1. Given
2. $6k+18 = 9k+18$	2. Distr. P.
3. $6k+18-9k = 9k+18-9k$	3. Subtraction
4. $-3k+18 = 18$	4. Subst
5. $-3k+18-18 = 18-18$	5. Subtraction
6. $-3k = 0$	6. Subst
7. $\frac{-3k}{-3} = \frac{0}{-3}$	7. Division P.
8. $k = 0$	8. Subst.

12. Given: $-10x+6 = -7x-9$

Prove: $x = 5$

S	R
1. $-10x+6 = -7x-9$	1. Given
2. $-10x+6+7x = -7x-9+7x$	2. Addition
3. $-3x+6 = -9$	3. Subst
4. $-3x+6-6 = -9-6$	4. Subtraction P.
5. $-3x = -15$	5. Subst
6. $\frac{-3x}{-3} = \frac{-15}{-3}$	6. Division P.
7. $x = 5$	7. Subst.