Learning Objective: To solve equations with pronumerals and algebraic fractions.

Equations with Algebraic Fractions
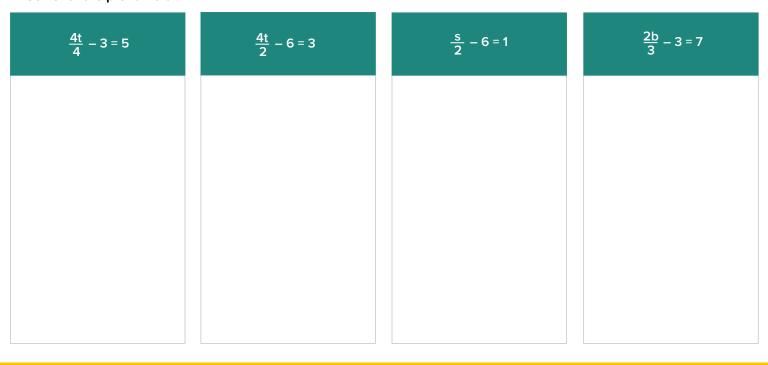
To solve an equation that contains one fraction:
- Take all constant terms to one side by performing inverse operations

- Multiply both sides of the equation by the denominator

- Solve the resulting equation

Examples

Solve for x

$$4 \times \quad \frac{2x+3}{4} = 2 \quad \times 4$$

$$2x + 3 = 8 \quad -3 \quad -3$$

$$2x = 5 \quad \div 2 \quad \div 2$$

$$\therefore x = \frac{5}{2}$$

Solve for t

$$\frac{3t}{2} - 4 = 2 \quad +4 \quad +4$$

$$2 \times \quad \frac{3t}{2} = 6 \quad \times 2$$

$$3t = 12 \quad \div 3 \quad \div 3$$

$$\therefore t = 4$$

Solve for the pronumeral.

$5h + 2 = 3h - 1$	$7 - 2h = 4h - 8$	$6h - 5 = 2 - 8h$	$4 - 2d = 7 - 3d$

Solve for the pronumeral.

$\frac{4t}{4} - 3 = 5$	$\frac{4t}{2} - 6 = 3$	$\frac{s}{2} - 6 = 1$	$\frac{2b}{3} - 3 = 7$

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Solving One-step and Two-step Equations

To simplify an expression with grouping symbols:
- Expand the expression in grouping symbols by multiplying the term outside the grouping symbols by each term inside.

- Collect like terms if possible.

To solve a linear equation:
- Isolation the pronumeral by performing the inverse operation to both sides of the equation.

Example:

Simplify
$$5(3a - 2) - 2a = (5 \times 3a) + (5 \times -2) - 2a$$
$$= (15a - 2a) - 10$$
$$= 13a - 10$$

Solve for x
$$3x + 10 = 22$$
$$\boxed{-10} \quad \boxed{-10}$$
$$3x = 12$$
$$\boxed{\div 3} \quad \boxed{\div 3}$$
$$\therefore x = 4$$

Solve for y
$$\boxed{6 \times} \frac{5y}{6} = 10 \boxed{\times 6}$$
$$5y = 60$$
$$\boxed{\div 5} \quad \boxed{\div 5}$$
$$\therefore y = 12$$

Solve for the pronumeral.

$5h + 2 = 3h - 1$	$7 - 2h = 4h - 8$	$6h - 5 = 2 - 8h$	$4 - 2d = 7 - 3d$
$5h + 2 = 3h - 1$ $5h - 3h + 2 = -1$ $2h = -1 + 2$ $2h = 1$ $h = 1 / 2$ $h = 0.5$	$7 - 2h = 4h - 8$ $7 + 8 - 2h = 4h$ $15 - 2h = 4h$ $15 = 4h + 2h$ $15 = 6h$ $h = 15 / 6$ $h = 5 / 2$ $h = 2.5$	$6h - 5 = 2 - 8h$ $6h + 8h - 5 = 2$ $14h - 5 = 2$ $14h = 2 + 5$ $14h = 7$ $h = 7 / 14$ $h = 0.5$	$4 - 2d = 7 - 3d$ $4 - 2d + 3d = 7$ $4 + d = 7$ $d = 7 - 4$ $d = 3$

Solve for the pronumeral.

$\dfrac{4t}{4} - 3 = 5$	$\dfrac{4t}{2} - 6 = 3$	$\dfrac{s}{2} - 6 = 1$	$\dfrac{2b}{3} - 3 = 7$
$\dfrac{4t}{4} - 3 = 5$ $\dfrac{4t}{4} = 5 + 3$ $\dfrac{4t}{4} = 8$ $4t = 8 \times 4$ $4t = 32$ $t = 32 / 4$ $t = 8$	$\dfrac{4t}{2} - 6 = 3$ $\dfrac{4t}{2} = 3 + 6$ $\dfrac{4t}{2} = 9$ $4t = 9 \times 2$ $4t = 18$ $t = 18 / 4$ $t = 4.5$	$\dfrac{s}{2} - 6 = 1$ $\dfrac{s}{2} = 1 + 6$ $\dfrac{s}{2} = 7$ $s = 7 \times 2$ $s = 14$	$\dfrac{2b}{3} - 3 = 7$ $\dfrac{2b}{3} = 7 + 3$ $\dfrac{2b}{3} = 10$ $2b = 10 \times 3$ $2b = 30$ $b = 30 / 2$ $b = 15$