Notes:

M9

Equation Solving

3.4 and 3.5

- To solve an equation is to find the numerical value of the variable.
- When solving equations, it is important to remember to apply the same operation to each side of the equation.
- Once we find the value of the variable, we have to carry out the "Check" to show that even after substituting the solution into the **original equation** LS=RS.

One-Step Equations:

Solve	Check
$\frac{2x}{2} = \frac{5}{2}$ $x = \frac{5}{2}$ $x = 2.5$	$2(1.5) = 5$ $5 = 5$ $LS = RS$ ✓
Solve	**Check**
$x - 4 = 15$ $+4 \quad +4$ $x = 19$	$19 - 4 = 15$ $15 = 15$ $LS = RS$ ✓
Solve	**Check**
$\frac{-x}{-1} = \frac{-8}{-1}$ $x = 8$	$-(8) = -8$ $-8 = -8$ $LS = RS$ ✓
Solve	**Check**
$(-3)\left(\frac{x}{-3}\right) = 21(-3)$ $x = -63$	$\frac{-63}{-3} = 21$ $21 = 21$ $LS = RS$ ✓

- **Remember:** To carry the check properly, substitute the solution and solve the LS separately from the RS. It is very important that you do not repeat the algebra steps you used to solve the equation. This could lead to a fake LS=RS result.

Two-Step Equations:

Solve	Check
$2 - x = 12$ $-2 \quad -2$ $\frac{-x}{-1} = \frac{10}{-1}$ $x = -10$	$2 - (-10) = 12$ $12 = 12$ $LS = RS$ ✓
Solve	**Check**
$\frac{x}{2} - 10 = 16$ $+10 \quad +10$ $2 \times \frac{x}{2} = 26 \times 2$ $x = 52$	$\frac{52}{2} - 10 = 16$ $26 - 10 = 16$ $16 = 16$ $LS = RS$ ✓

Solve	Check
$-16 = 3r - 8$ $+8 \quad +8$ $\frac{-8}{3} = \frac{3r}{3}$ $r = \frac{-8}{3}$	$-16 = 3\left(\frac{-8}{3}\right) - 8$ $-16 = \frac{-24}{3} - \frac{8}{1}$ $-16 = -8 - 8$ $-16 = -16$ $LS = RS$ ✓
Solve	**Check**
4. $\frac{(6+x)}{4} = -21$ $\frac{1}{1}$ $(6+x) = -84$ $6 + x = -84$ $-6 \quad -6$ $x = -90$	$\frac{6+(-90)}{4} = -21$ $\frac{-84}{4} = -21$ $-21 = -21$ $LS = RS$ ✓

Distributive Property

$2(x+9) = 2x + 18$

Apply the distributive property:

$3(x-7) = 3x - 21$	$-3(2x-7) = -6x + 21$
$-(x+y) = -x - y$	$6(-x-20) = -6x - 120$
$-3(a-5) = -3a + 15$	$\frac{3}{8}(a+1)+5 = \frac{3a}{8} + \frac{3}{8} + 5$ $\frac{3a}{8} + \frac{43}{8} = \frac{3a}{8} + \frac{3+40}{8}$
$-0.5(c+4) = -0.5c - 2$	$-9(3x+y-5)-2z$ $= -27x - 9y + 45 - 2z$