MPM 1DI 4.1 Solve Simple Equations Date: Oct. 15/09

When we solve an equation, we have to perform operations which keep the equation BALANCED.
To solve an equation, we need to find the value of the variable which makes the equation true.
To "isolate the variable" [another way of saying "solve the equation"],
the first method we will use is to perform the same operation on both sides of the equation.

Ex. 1 Solve for the variable.

a) $x+2=7$

$x+2-2=7-2$

$x=5$

b) $y-9=15$

$y-9+9=15+9$

$y=24$

c) $14=g-21$

$14+21=g-21+21$

$35=g$

$\frac{5}{1}\left(\frac{x}{5}\right)=(3)5$

$\frac{5x}{5}=15$

$x=15$

d) $3y=24$

$\frac{3y}{3}=\frac{24}{3}$

$y=8$

e) $\frac{x}{5}=3$

$\frac{5}{1}\left(\frac{x}{5}\right)=5(3)$

$x=15$

f) $\frac{y}{20}=100$

$20\left(\frac{y}{20}\right)=20(100)$

$y=2000$

g) $-2y=-50$

$\frac{-2y}{-2}=\frac{-50}{-2}$

$y=25$

h) $\frac{1}{-4}y=-7$

$-4\left(\frac{1}{-4}y\right)=-4(-7)$

$y=28$

i) $-8y=20$

$\frac{-8y}{-8}=\frac{20}{-8}$ $\div 4$

$y=-\frac{5}{2}$

Shortcut: When adding or subtracting to keep the balance, we will now simply "***transpose***" the term to the other side of the equation.

Ex. 2 Solve for the variable.

a) $x+2=7$

$x=7-2$

$x=5$

b) $y-9=15$

$y=15+9$

$y=24$

c) $3y=24$

$\frac{3y}{3}=\frac{24}{3}$

$y=8$

d) $3+y=24$

$y=24-3$

$y=21$

Note: "***Transposing***" only applies to terms that are added or subtracted.
Ex. 2c above is NOT an example of "*transposing*".

Now we will learn the method for performing a "proper" mathematical "Check".

Step 1: Solve the equation like you normally would.
Step 2: Substitute your solution value into the original Left Side [L.S.] of the equation, (use brackets) then use BEDMAS to find the L.S. "balance value".
Step 3: Substitute your solution value into the original Right Side [R.S.] of the equation, (use brackets) then use BEDMAS to find the R.S. "balance value".
Step 4: Compare the L.S. and R.S. values and **GIVE A CONCLUSION**.

Ex. 3 Solve and check.

a) $3y-5=22$

$3y=22+5$

$3y=27$

$\frac{3y}{3}=\frac{27}{3}$

$y=9$

Check if $y=9$

L.S. $=3y-5$ R.S. $=22$

$=3(9)-5$

$=27-5$

$=22$

$\therefore LS=RS$

$\therefore y=9$ is correct

b) $-5-7x=-33$

$-7x=-33+5$

$-7x=-28$

$\frac{-7x}{-7}=\frac{-28}{-7}$

$x=4$

Check if $x=4$

L.S. $=-5-7x$ R.S. $=-33$

$=-5-7(4)$

$=-5-28$

$=-33$

$\therefore LS=RS$

$\therefore x=4$ is correct.