MPM 1DI

Unit 3 - Equations
Day 1 - Solving Simple Equations

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When we are asked to solve an equation we are trying to determine what value of x makes the mathematical statement true.

ex. $x + 5 = 8$

By inspection we can see that if x = ☐ the statement is true.

Not all equations can be solved by inspection. To solve equations we want to get the variable term by itself.

For example when solving

$x - 3 = 15$

Pull

When working with equations we need to keep the equation balanced... Therefore whatever is done to one side needs to be done to the other side as well.

x ☐ $= 15$ ☐

$x = 18$

Example 2: Solve

a) $x + 4 = 70$

$-4 \quad -4$

$x = 66$

$x + 4 - 4 = 70 - 4$

$x = 66$

b) $25 = 5 + x$

$25 - 5 = 5 - 5 + x$

$20 = x$

c) $\frac{3x}{3} = \frac{15}{3}$

$x = 5$

d) $\frac{6y}{6} = \frac{-48}{6}$

$y = -8$

e) $\frac{b}{4} = 16$ $\times 4$ $\times 4$

$b = 64$

f) $\frac{y}{2} = -3$ $\times 2$ $\times 2$

$y = -6$

When solving multi - step equations, we need to isolate the variable TERM first, THEN isolate the VARIABLE.

Example 3: Solve

a) $4k - 7 = 9$

$+7 \quad +7$

$4k - 7 + 7 = 9 + 7$

$\frac{4k}{4} = \frac{16}{4}$

$k = 4$

b) $3x - 2 = 10$

$+2 \quad +2$

$3x - 2 + 2 = 10 + 2$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

c) $\frac{y}{4} + 7 = 12$

$\frac{y}{4} + 7 - 7 = 12 - 7$

$\frac{y}{4} \times 4 = 5 \times 4$

$y = 20$

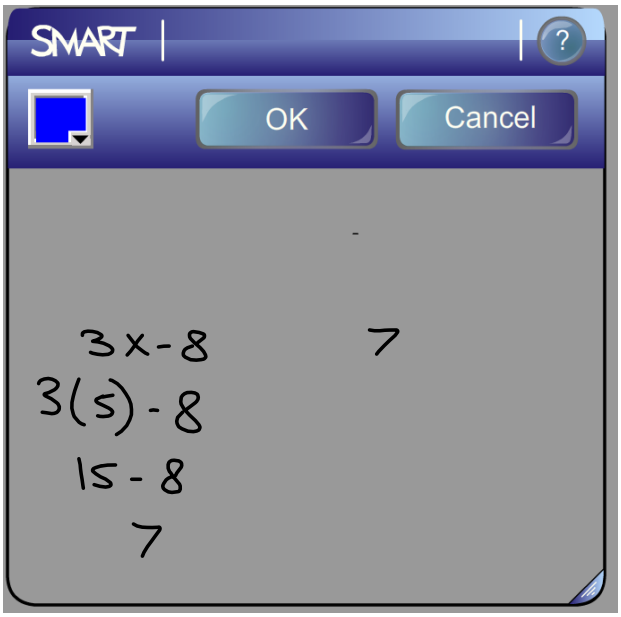
Example 4: Solve the following and check your answer:

$3x - 8 = 7$

$3x = 8 + 8$

$\frac{3x}{3} = \frac{15}{3}$

$x = 5$



Example 5: Fred is building an ultralight airplane. The fuel tank is made of plastic and has a mass of 5000g. Each litre of gasoline has a mass of 840g. The total mass of the fuel plus the tank can not exceed 21 800 g.

a) Write an equation to model the number of litres of gasoline that the tank may hold.

Let n represent the number of litres of gasoline.

$840n + 5000 = 21\,800$

b) Solve the equation to determine the number of litres in a fuel tank

$840n + 5000 = 21,800$

$840n + 5000 - 5000 = 21\,800 - 5000$

$\frac{840n}{840} = \frac{16\,800}{840}$

$n = 20$

LS	RS
$840n + 5000$	$21\,800$
$840(20) + 5000$	
$16\,800 + 5000$	
$21\,800$	