4.2 Solve Multi-Step Equations

Part 1: Do it Now!

Solve the following equation:

$-9x + 8 = 23$

$-9x = 23 - 8$

$\frac{-9x}{-9} = \frac{15}{-9}$

$x = -\frac{15}{9}$

$x = -\frac{5}{3}$

Part 2: Solving Multi-Step Equations

To solve an equation involving multiple terms:

1) Get rid of any brackets by expanding

2) Collect variable terms on one side of the equation and constant terms on the other.

3) Collect like terms

4) Isolate the variable

Don't forget you can check your solutions!

1) $3x + 2 = 2x - 4$

$3x - 2x + 2 = -4$

$x + 2 = -4$

$x = -4 - 2$

$x = -6$

Start by moving all the variable terms to one side. Collect the variable terms on the left by subtracting $2x$ from both sides.

Now isolate the variable terms by moving the constant terms to the right. Do this by subtracting 2 from each side.

2) $7 - 2x = 8 - 5x$

Remember: start by collecting variable terms on to the left side, then move the constant terms to the right. (you can do this in one step with more practise)

$-2x + 5x = 8 - 7$

$\frac{3x}{3} = \frac{1}{3}$

$x = \frac{1}{3}$

Try on Your Own

3) $5 - 3m = -2 - 2m$

$5 + 2 = -2m + 3m$

$7 = m$

$m = 7$

4) $5(x - 3) - 1(x - 2) = 19$

Start by expanding using the distributive property to get rid of the brackets.

$5x - 15 - 1x + 2 = 19$

$5x - 1x = 19 + 15 - 2$

$\frac{4x}{4} = \frac{32}{4}$

$x = 8$

Complete the question just like the first three examples. Collect the variable terms on the left and the constant terms on the right.

Check your answer.....

LS	RS
$= 5(x-3) - 1(x-2)$	$= 19$
$= 5(8-3) - 1(8-2)$	
$= 5(5) - 1(6)$	
$= 25 - 6$	
$= 19$	

LS = RS

5) $2(x - 3) = -3(x + 5) - 6$

$2x - 6 = -3x - 15 - 6$

$2x + 3x = -15 - 6 + 6$

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

$x = -3$

Try on Your Own

6) $5(5x - 13) = 23x - 13$

$25x - 65 = 23x - 13$

$25x - 23x = -13 + 65$

$\frac{2x}{2} = \frac{52}{2}$

$x = 26$

Part 3: Application

7) The perimeter of the given rectangle is 50cm. Determine the length of each side of the rectangle.

$P = 2(l) + 2(w)$

$50 = 2(3x-1) + 2(4x+5)$

$50 = 6x - 2 + 8x + 10$

$50 + 2 - 10 = 6x + 8x$

$\frac{42}{14} = \frac{14x}{14}$

$x = 3$

Length $= l = 3x - 1 = 3(3) - 1 = 8\text{cm}$

Width $= w = 4x + 5 = 4(3) + 5 = 17\text{cm}$

Practice Practice Practice!!!!!