Order of Operations

Look at both of the problems. Notice the difference in the way they are solved.

$48 \div 6 \times 2$	The only difference in the way these problems were done is the order the operations were performed.	$48 \div 6 \times 2$
$= 8 \times 2$		$= 48 \div 12$
$= 16$	The one on the left is correct.	$= 4$

Multiplication and division are always done left to right.
Remember multiplication is commutative and associative, but division is not. You can do problems that contain only multiplication in any order, but if division is in the problem, then the order **is** important.

$81 \div 3 \times 5$	$4 \times 21 \div 2$	$144 \div 6 \times 2 \div 3 \times 4$
$= 27 \times 5$	$= 84 \div 2$	$= 24 \times 2 \div 3 \times 4$
$= 135$	$= 42$	$= 48 \div 3 \times 4$
		$= 16 \times 4 = 64$

Practice:

a) 5÷10x200=   45÷3x2=   8÷4x7=   6÷3x10÷5x9=

b) 4.5x2÷5=   510÷5÷12=   8÷4x7=   42x3÷9=

c) 4x3÷5x24=   2÷5x8=   2x5÷8=   2x5x8=

Addition and subtraction work the same way. Subtraction isn't commutative. Remember to think "add the opposite" when subtracting, but do it left to right.

Practice:

d) 9+3-5=   9-3+5=   45-3+2=   12-6-3+7=

e) 534-83+29=   3.4 - 1.2 - 0.65=   5.34 - 0.24 + 4.999=   5.34 + 0.24 - 4.999=

Multiplication and division are always done before addition and subtraction. Write each step out completely under the previous step.

We use three ways to indicate multiplication. 3x4, 3(4) and 3·4 all mean multiplication.

$5 \cdot 5 - 2 \cdot 8 =$ $25 - 16 =$ 9	Multiplication before subtraction. Note: Write the new problem after multiplying.	$8 \cdot 5 + 7(8) =$ $40 + 56 =$ 96	$8 \div 4(6) - 3 + 5$ $2(6) - 3 + 5$ $12 - 3 + 5$ $9 + 5 = 14$

Practice:

f) 45+3x2=   20-6÷3x9=   2.3÷4+5=   5÷8 - 0.003=