

PROBLEM SOLVING

- 1) Understand : what's given
what we need to find
- 2) Plan : pick a strategy
- 3) Solve : is math correct? Are you following your plan?
- 4) Check : is answer reasonable?
did I answer the question? } Show that it works...

Evaluate the expression...

$$x + 4 \quad x = 9$$

$$9 + 4 = 13$$

$$2x + x \quad x = 3$$

$$2(3) + 3$$

$$6 + 3$$

$$\textcircled{9}$$

Properties of Addition / Multiplication

Commutative "move"

$$a + b = b + a$$

$$ab = ba$$

order of
addends/factors
does not matter

Associative "group"

$$a + (b + c) = (a + b) + c$$

$$a \cdot (bc) = (ab)c$$

grouping of
addends/factors
does not matter

$$(4 + 5) + 6$$

Justification

$$(5 + 4) + 6 \quad \underline{\text{Commutative of } \pm}$$

$$5 + (4 + 6) \quad \underline{\text{associative of } \pm}$$

$$5 + 10$$

$$15$$

Identity Property

$$a + 0 = a$$

$$a \cdot 1 = a$$

} don't change
the #

Zero Property

$$a \cdot 0 = 0$$

$$a + b = c$$

$$b + a = c$$

$$c - a = b$$

$$c - b = a$$

$$a \cdot b = c$$

$$b \cdot a = c$$

$$c \div a = b$$

$$c \div b = a$$

$$14 \div x = 2$$

$$14 \div 2 = x$$

$$7 = x$$

$$2 \cdot y = 2$$

$$2 \div 2 = y$$

$$1 = y$$

Expanded Notation

digit \times place
value

$$105 = (1 \times 100) + (5 \times 1)$$