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Distributive Property

I can use the distributive property with numerical and variable expressions,

According to the **Distributive Property**, you **distribute** or "pass out" a multiplication to each part of a sum or difference in parentheses.

In $2(a + 3) = 2a + 6$, we "pass out" the 2 by multiplying it by both the a and the 3.

Multiply $6(x - 9)$

$$\begin{array}{l} 6(x) - 6(9) \\ \hline 6x - 54 \end{array}$$

Multiply $-3(h + 2)$

$$\begin{array}{l} -3(h) + -3(2) \\ \hline -3h + (-6) \end{array}$$

Look at the examples, and then try the other problems.

Arithmetic

Order of Operations

$$\begin{array}{l} 3(2 + 6) \text{ P} \\ 3(8) \text{ M} \\ \hline 24 \end{array}$$

Distributive property

$$\begin{array}{l} 3(2 + 6) \\ 3(2) + 3(6) \\ 6 + 18 \\ \hline 24 \end{array}$$

Order of Operations

$$\begin{array}{l} 7(6 - 4) \text{ P} \\ 7(2) \text{ M} \\ \hline 14 \end{array}$$

Distributive property

$$\begin{array}{l} 7(6 - 4) \text{ D} \\ 7(6) - 7(4) \text{ M} \\ 42 - 28 \text{ S} \\ \hline 14 \end{array}$$

Algebraic

$$\begin{array}{l} 4(b + 3) \\ 4(b) + 4(3) \\ \hline 4b + 12 \end{array}$$

$$\begin{array}{l} -2(x + 4) \\ -2(x) + -2(4) \\ \hline -2x + (-8) \end{array}$$

HINT!
Bring the operation in the parentheses down!

With numerical expressions, whether you solve using the distributive property or using the correct order of operations, you get the same solution.

Order of Operations	Distributive property
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$$5(4 + 1) \text{ P}$$

$$5(5)$$

$$\boxed{25}$$

$$5(4 + 1) \text{ Dist.}$$

$$5(4) + 5(1) \text{ Mult.}$$

$$20 + 5 \text{ Add}$$

$$\boxed{25}$$

Order of Operations	Distributive property
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$$-2(3 + 4) \text{ P}$$

$$-2(7) \text{ M}$$

$$\boxed{-14}$$

$$-2(3 + 4) \text{ Dist.}$$

$$-2(3) + -2(4) \text{ mult.}$$

$$-6 + (-8) \text{ Add}$$

$$\boxed{-14}$$

Sometimes, we need to use the distributive property to simplify variable expressions. We will simplify these together.

$$5(t + 1)$$

$$\boxed{5t + 5}$$

$$-2(y + 4)$$

$$\boxed{-2y + (-8)}$$

$$3(-2r + 7)$$

$$\boxed{-6r + 21}$$

$$-6(2 - 7g)$$

$$\boxed{-12 - (-42g)}$$

$$\boxed{-12 + 42g}$$

$$(3v - 4)9$$

$$\boxed{27v - 36}$$

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Practice

Use the distributive property to simplify.

$$1. 4(j + 10) \quad \underline{4j + 40}$$

$$2. 7(4n - 6) \quad \underline{28n - 42}$$

$$3. -2(-g - 4) \quad \underline{2g + 8}$$

$$4. (4c + 2)3 \quad \underline{12c + 6}$$

$$5. 6(-2p + 7) \quad \underline{-12p + 42}$$

$$6. 5(2r - 4) \quad \underline{10r - 20}$$