

Name: _____

Date: _____

THE DISTRIBUTIVE PROPERTY COMMON CORE ALGEBRA I



In the last lesson we saw the important properties of addition and multiplication: the commutative and associative. The last of the three major properties combines addition and multiplication: **the distributive property**. The first exercise will illustrate the idea.

Exercise #1: Consider the product 4×15 .

(a) Evaluate using the standard algorithm.

(b) Represent the equivalent product $4 \times (10 + 5)$ as repeated addition of 10 and 5. Find the product.

Exercise #1 shows the important property of being able to **apply a multiplication to all parts of a sum**. In symbolic form:

THE DISTRIBUTIVE PROPERTY (OF MULTIPLICATION OVER ADDITION)

If a , b , and c all represent real numbers then: $a(b + c) = a \cdot b + a \cdot c$

Exercise #2: Evaluate each product by using the distributive property to make it easier. On (b), express 18 as a subtraction. Do not use a calculator.

(a) $7(23)$

(b) $9(18)$

Exercise #3: The distributive property can be used twice in order to multiply two digit numbers. For example find the product $(12)(28)$ by evaluating $(10 + 2)(20 + 8)$. Show each step in your calculation. Do not use a calculator unless it is to check.



The distributive property can also be used on **expressions** that involve variables.

Exercise #4: Express the following products as **binomial** expressions. Show each step in your calculation.

(a) $5(2x + 3)$

(b) $-4(5x - 8)$

(c) $x(x + 4)$

(d) $5x(2 - 7x)$

One common mistake students make is not realizing that the distributive property works for division as well as multiplication. For division, the property would look in symbolic form like:

THE DISTRIBUTIVE PROPERTY (OF DIVISION OVER ADDITION)

If a , b , and c all represent real numbers then: $\frac{b+c}{a} = \frac{b}{a} + \frac{c}{a}$

Exercise #5: Express each of the following **quotients** as **binomials** in simplest form. Show your calculations. Some of your final answers will contain fractional **coefficients**.

(a) $\frac{8x+4}{2}$

(b) $\frac{25x-50}{5}$

(c) $\frac{2x-16}{4}$

(d) $\frac{-9x+18}{12}$



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THE DISTRIBUTIVE PROPERTY
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Using the equivalent expressions provided find the value of the product on the left by evaluating the expression on the right.

(a) $5(42) = 5(40+2)$

(b) $3(27) = 3(25+2)$

(c) $5(58) = 5(60-2)$

2. Simplify the following expressions using the distributive property. Show your calculations.

(a) $2(4x+2)$

(b) $4(3x-1)$

(c) $3(7-x)$

(d) $\frac{36x+21}{3}$

(e) $\frac{18-36x}{4}$

(f) $\frac{3(4x+8)}{6}$

APPLICATIONS

3. Using your knowledge of the distributive property, rewrite the following and evaluate without using your calculator. See Problem #1 if you need a hint how to do these.

(a) $6(38) =$

(b) $7(35) =$



4. Nate noticed that when using the distributive property you multiply the term outside the parenthesis by **each** term inside. Using his realization see if you can multiply the following using the distributive property.

(a) $3(246) = 3(200 + 40 + 6)$

(b) $2(3269) = 2(3000 + 200 + 60 + 9)$

(c) $3(2x^2 + 4x + 6)$

(d) $2(5x^3 + 2x^2 + 6x + 9)$

REASONING

5. In the lesson we saw that we can multiply 2 digit numbers by using the distributive property twice. Use this knowledge to multiply the following terms. Show the calculations that lead to you answers.

(a) $(22)(31)$

(b) $(52)(11)$

6. Which of the following is equivalent to $(2x + 2)(3x + 1)$? It may help to use problem #5(a) as a reference.

(1) $6x^2 + 2$

(3) $6x^2 + 8x + 2$

(2) $5x^2 + 8x + 3$

(4) $16x^3$

