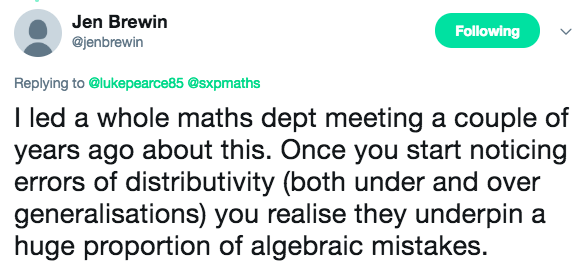
# The Distributive Property

**Overall aim / Motivation:**

To know why certain steps in rearranging calculations and equations are allowed and others are not.



**Prior Knowledge:**

**Intro:**

<https://www.youtube.com/watch?v=6mCgiaAFCu8>

It’s not as amazing as it looks. By the end of this topic, you will understand how he did it (and perhaps be able to apply the strategy yourself)

### Aims:

To know the word distributes

### Activities:

Read the definition:

An operation distributes if it produces the same result when operating on a whole expression as when operating on each part separately

### Aims:

To understand the distributive property

To know which operations distribute over others

### Activities:

True or False?











Class notes on what it means for an operation to distribute over another

**Activity**

Decide whether each of the following statements is true or false. You only need one *counterexample* to convince yourself that it is false. If you believe it is true, you need to give **two** examples to back this up.

Example:

Multiplication distributes over itself

A Multiplication distributes over subtraction

B Addition distributes over itself

C Subtraction distributes over multiplication

D Division distributes over itself

E Division distributes (from the right) over addition

F Multiplication distributes over division

G Division distributes over multiplication

Let \* be an operation (i.e. one of division, multiplication, addition and subtraction). Which of these must \* be, if \* is...

(a) ... commutative and distributive over addition;

(b) ... not commutative and not distributive over addition;

(c) ... not commutative, but distributive over addition;

(d) ... commutative, but not distributive over addition.

Mini whiteboards:

Either: Distribute the operation OR write ‘doesn’t distribute’

5 x (4 – 3) =

( 4 x 8 ) 2 =

### Aims:

To generalise to which operations distribute over other operations

### Activity:

Think, pair, share with previous answers.

Consider order of operations

Colombe’s metaphor: The government and the peasants.

### Aims:

To understand that you already knew the distributive property for multiplication and division

To understand better why we write division as fractions

### Activity:

### Class discussion and notes with reference to

### the rectangle and non-examples when expanding brackets

### adding fractions

### Activity:

As a class: use the distributive property to simplify:

Watch again, and be less impressed.

<https://www.youtube.com/watch?v=6mCgiaAFCu8>

### Aims:

To know whether powers are distributive over other operations

### Activities:

Try distributing the powers and roots over other operations:

Are the statements you get true or false?

Make a conjecture about which operations powers and roots distribute over.

Test your conjecture by making up your own examples.

### Aims:

To know that powers and roots distribute over multiplication and division, but not over addition and subtraction

**Activities:**

Notes: Summarise the distributive property with a diagram linking power and roots, multiplication and division, addition and subtraction.

Exercise:

Answer true or false with “because \_\_\_\_\_ (doesn’t) distribute over \_\_\_” Check your answer by calculating

From here on.. either distribute the operation and show that it works by calculation, or write “doesn’t distribute”

**Assessment**

Fill the gaps

24 × (30 + 17) = 24 × \_\_\_ + \_\_\_ × 17 because multiplication \_\_\_\_\_\_\_\_\_\_\_\_\_\_ over addition.

20 ÷ 10 ≠ 10 ÷ 20 because division is not a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ operation.

(30 – 15) ÷ 5 = \_\_\_ ÷ 5 − 15 ÷ \_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_ distributes over \_\_\_\_\_\_\_\_\_\_\_\_\_\_

because \_\_\_\_\_\_\_\_\_\_\_\_\_\_ doesn’t distribute over \_\_\_\_\_\_\_\_\_\_\_\_\_\_

For DQ’s

…is an example which shows that…

A Multiplication is distributive over itself

B Addition is distributive over multiplication

C Multiplication is distributive over addition

D None of the above

…is an example which shows that…

A Division is distributive over itself

B Addition is distributive over division

C Division is distributive over addition

D None of the above

Which of the following examples demonstrates that

multiplication is distributive over addition:

A

B

C

D

Which of the following is true

A Multiplication is distributive over division

B Division is distributive over subtraction

C Addition is distributive over subtraction

D Subtraction is distributive over division

Which of the following is true

A Multiplication is distributive over addition

B Division is distributive over multiplication

C Subtraction is distributive over multiplication

D None of A, B or C are true

Which of the following is true

A Multiplication is distributive over division

B Division is distributive over itself

C Subtraction is distributive over multiplication

D None of A, B or C are true

Which of the following examples

demonstrates that division is

distributive over addition:

A

B

C

D

…is an example which shows that…

A Multiplication is distributive over subtraction

B Subtraction is distributive over multiplication

C Multiplication is distributive over itself

D None of the above

…is an example which shows that…

A Subtraction is distributive over itself

B Subtraction is distributive over division

C Division is distributive over subtraction

D All of the above