

Oct. 1st, 2014 Oct. 15th, 2015

Week #15

Mini-Lesson #3

Order of Operations

Mar. 15th, 2018

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To avoid getting different answers when we evaluate an expression, we use this order of operations:

No need to copy

- Evaluate the expression in brackets first. ✓
- Evaluate the powers. ✓
- Multiply and divide, in order, from left to right. ✓
- Add and subtract, in order, from left to right. ✓

BEDMAS

Brackets

Exponents ←

Division

Multiplication } in order, from left to right

Addition

Subtraction } in order, from left to right

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Example 1 Adding and Subtracting with Powers

Evaluate.

a) $3^3 + 2^3$ b) $3 - 2^3$ c) $(3 + 2)^3$

Handwritten solutions:

a) $3 \times 3 \times 3 + 2 \times 2 \times 2$
 $27 + 8$
 $= 35$

b) $3 - 2 \times 2 \times 2$
 $3 - 8$
 $= -5$

c) $(5)^3$ or 5^3
 $= 5 \times 5 \times 5$
 $= 125$

A Solution

a) Evaluate the powers before adding.
 $3^3 + 2^3 = (3)(3)(3) + (2)(2)(2)$
 $= 27 + 8$
 $= 35$

b) Evaluate the power, then subtract.
 $3 - 2^3 = 3 - (2)(2)(2)$
 $= 3 - 8$
 $= -5$

c) Add first, since this operation is within the brackets. Then evaluate the power.
 $(3 + 2)^3 = 5^3$
 $= (5)(5)(5)$
 $= 125$

When we need curved brackets for integers, we use square brackets to show the order of operations. When the numbers are too large to use mental math, we use a calculator.

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Example 2 Multiplying and Dividing with Powers

Handwritten: BEDMAS

Evaluate.

a) $[2 \times (-3)^3 - 6]^2$ b) $(18^2 + 5^0)^2 \div (-5)^3$

Handwritten solutions:

a) $[2 \times (-3) \times (-3) \times (-3) - 6]^2$
 $[2 \times (-27) - 6]^2$
 $[-54 - 6]^2$
 $[-60]^2$
 $(-60)(-60)$
 $= +3600$

b) $((18 \times 18) + 5^0) \div (-5)^3$
 $(324 + 1) \div (-5)^3$
 $325 \div (-5) \times (-5) \times (-5)$
 $105625 \div (-125)$
 $= -845$

A Solution

a) Follow the order of operations.
 Do the operations in brackets first: evaluate the power $(-3)^3$
 $[2 \times (-3)^3 - 6]^2 = [2 \times (-27) - 6]^2$ Then multiply: $2 \times (-27)$
 $= [-54 - 6]^2$ Then subtract: $-54 - 6$
 $= (-60)^2$ Then evaluate the power: $(-60)^2$
 $= 3600$

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