Math 9 – Unit 1: Real Numbers

Lesson #4b: Order of Operations

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Date: _Nov 21, 2022_

Learning Goal: We are learning to work with the Order of Operations

Recap: Evaluate the following:

a) $\dfrac{4}{7} \times \dfrac{3}{10}$

$$= \dfrac{12 \div 2}{70 \div 2}$$

$$= \dfrac{6}{35}$$

b) $\dfrac{4}{7} \div \dfrac{3}{10}$

$$= \dfrac{4}{7} \times \dfrac{10}{3}$$

$$= \dfrac{40}{21}$$

c) $\dfrac{4}{7} + \dfrac{3 \times 7}{10}$ CD = 70

$$= \dfrac{40}{70} + \dfrac{21}{70}$$

$$= \dfrac{61}{70}$$

d) $\left(\dfrac{4}{7}\right)^2$

$$= \left(\dfrac{4}{7}\right) \times \left(\dfrac{4}{7}\right)$$

$$= \dfrac{16}{49}$$

$3^2 = 3 \times 3 = 9$

BEDMAS

The same order MUST be applied when we work with fractions. Let's do some examples:

a) $\dfrac{2}{7} + \dfrac{4}{5} \times \dfrac{1}{4}$ $\dfrac{4}{20}$ CD: 5

$$= \dfrac{2 \times 5}{1 \times 5} + \dfrac{1}{5}$$

$$= \dfrac{10}{5} + \dfrac{1}{5}$$

$$= \dfrac{11}{5}$$

b) $\dfrac{3}{2} - \dfrac{7}{5} \div \dfrac{1}{3} + \dfrac{3}{2}$

$$= \dfrac{3}{2} - \dfrac{7}{5} \times \dfrac{3}{1} + \dfrac{3}{2}$$

$$= \dfrac{3 \times 5}{2} - \dfrac{21 \times 2}{5} + \dfrac{3 \times 5}{2} \quad CD = 10$$

$$= \dfrac{15}{10} - \dfrac{42}{10} + \dfrac{15}{10}$$

$$= \dfrac{-12}{10} \div 2$$

$$= \dfrac{-6}{5}$$

MTH1W

c) $\dfrac{5}{6}+\left(\dfrac{9}{5}\div\dfrac{6}{5}\right)^2-\dfrac{1}{2}$

$=\dfrac{5}{6}+\left(\dfrac{9}{5}\times\dfrac{5}{6}\right)^2-\dfrac{1}{2}$

$=\dfrac{5}{6}+\left(\dfrac{3}{2}\right)^2-\dfrac{1}{2}$

$=\dfrac{5}{6}+\dfrac{9}{4}-\dfrac{1}{2}$

CD=12

$=\dfrac{10}{12}+\dfrac{27}{12}-\dfrac{6}{12}=\dfrac{31}{12}$

6	4	2
12	8	4
18	12	6
24	16	8
30		10
		12

d) $\dfrac{2}{5}\times\dfrac{3}{5}+\left(\dfrac{4}{3}+\dfrac{2}{1}\right)\times\dfrac{1}{2}$ CD=3

$=\dfrac{6}{25}+\left(\dfrac{4}{3}+\dfrac{6}{3}\right)\times\dfrac{1}{2}$

$=\dfrac{6}{25}+\dfrac{10}{3}\times\dfrac{1}{2}$

$=\dfrac{6\times3}{25}+\dfrac{5}{3}$ CD = 75

$=\dfrac{18}{75}+\dfrac{125}{75}=\dfrac{143}{75}$

In Math, you are usually given an algebraic expression which you need to use to solve given certain values. When you substitute numbers into letters, always do so with parenthesis ().

Example: Solve the following two expressions given $x=4$ and $y=-2$.

a) $6y-x^2-y$

$=6(-2)-(4)^2-(-2)$

$=-12-16+2$

$=-26$

b). $2x^2+x\div y$

$=2(4)^2+(4)\div(-2)$

$=2(16)+(4)\div(-2)$

$=32-2$

$=30$

Application: Jimmy went to Tim Horton's during their "Roll up the Rim" season and won a bike. However, in order to get the bike, he had to answer the following skill testing question: $4+4\div2\times(3+1)$. Jimmy answered 16. Did he get the bike?

$=4+4\div2\times4$

$=4+2\times4$

$=4+8$

$=12$:(

Jimmy does not get the bike.

Success Criteria:
- I can BEDMAS
- I can solve multi-step questions using the proper order of operations
- I can safely substitute numbers into parentheses/brackets