Arithmetic
Skill-Builder # W - 3
Performing Combined Operations on Whole Numbers Part 2

When performing combined operations on whole numbers, follow **PEMDAS** (**P**arentheses, **E**xponentiation, **M**ultiplication, **D**ivision, **A**ddition, **S**ubtraction). This means everything within parentheses (or any other symbol of grouping) has to be performed first, then all exponentiations; multiplication and division need to be performed in the order in which they appear from left to right; likewise, addition and subtraction need to be performed in the order in which they appear from left to right.

<u>Examples</u>

1. $3(5-3)^3 + 80 \div (7-3)^2$

      Solution:

$$3(5-3)^3 + 80 \div (7-3)^2$$
$$= 3(2)^3 + 80 \div (4)^2 \qquad \text{Perform the operation S inside the parentheses.}$$
$$= 3 \cdot 8 + 80 \div 16 \qquad 2^3 = 2 \cdot 2 \cdot 2 = 8 \text{ and } 4^2 = 4 \cdot 4 = 16$$
$$= 24 + 5 \qquad 3 \cdot 8 = 24 \text{ and } 80 \div 16 = 5$$
$$= 29$$

2. $\dfrac{1^2 + 2^2 + 3^2 + 4^2}{(1+2)^2 + (4-3)^2}$

      Solution:

$$\frac{1^2 + 2^2 + 3^2 + 4^2}{(1+2)^2 + (4-3)^2}$$
$$= \frac{1 + 4 + 9 + 16}{3^2 + 1^2} \qquad \text{Perform the exponentiations on top and the operations inside the ( ) below.}$$
$$= \frac{30}{9+1} \qquad \text{Perform the addition on top and the exponentiations below.}$$
$$= \frac{30}{10} \qquad 9 + 1 = 10$$
$$= 3$$

3. $\dfrac{(8-6)^3}{3 \cdot 2^3 - 4^2} + \dfrac{2 \cdot 3 + 4 \cdot 5}{2^2 + 3^2}$

      Solution:

$$\frac{(8-6)^3}{3 \cdot 2^3 - 4^2} + \frac{2 \cdot 3 + 4 \cdot 5}{2^2 + 3^2}$$
$$= \frac{2^3}{3 \cdot 8 - 16} + \frac{6 + 20}{4 + 9}$$
$$= \frac{8}{24 - 16} + \frac{26}{13}$$
$$= \frac{8}{8} + 2$$
$$= 1 + 2$$
$$= 3$$

Arithmetic
Skill-Builder # W - 3
Performing Combined Operations on Whole Numbers Part 2

Find the value of the given numeric expression.

1. $5 \cdot 2^3 - 2\left(5^2 - 3^2\right) + \left(2+3\right)^2 \div 5$

2. $\left(8-2\right)\left(3+6\right) \div \left(6^2 - 3^2\right)$

3. $\dfrac{6\left(2 \cdot 3 + 5\right) - 3 \cdot 4^2}{3\left(6 \div 2 - 4 \div 2\right)^4}$

4. $2\left(2^2 \cdot 2 + 2\left(2^2 + 2\right)\right) - \dfrac{2^2 - \left(2^2 - 2\right)}{2^2 - 2}$

Arithmetic
Skill-Builder # W - 3
Performing Combined Operations on Whole Numbers

Answers
1. 13
2. 2
3. 6
4. 39