21) Hi this is Sachin! I am a Student Success Coach and will be explaining some practice problems from the MA001 Algebra course. Today we will review an assigned problem from Unit 1. In the “Homework Assessment” you were asked to solve this problem:

\[ 6 \cdot \frac{-8 - 4 + (-4) - [-4 - (-3)]}{(4^2 + 3^2) \div 5} \]

We will use the “order of operations” principles to simplify this expression.

We will approach this problem as follows:

1. Simplify the top.
2. Simplify the bottom.
3. Divide the top by bottom, and simplify the fraction.
4. Perform arithmetic operation.

**Step 1:** Simplify the top:

\[-8 - 4 + (-4) - [-4 - (-3)]\]

a) Simplify the bracket term: \(-4 - (-3)\)

i) Negative number multiplied to negative number is a positive number.

\[-(-3) = +3\]

Therefore, the bracket term is

\[ \rightarrow -4 + 3 \]

ii) Perform addition. To add two numbers with different signs, subtract the smaller number from the larger number and attach the sign of the larger number to this result.

\[ \rightarrow -4 + 3 = -1 \]

This is simplified bracket term.

Therefore, the expression for the top becomes

\[-8 - 4 + (-4) - [-1]\]

b) Eliminate bracket and parenthesis:
i) A positive number multiplied to negative number is a negative number.
\[ +(-4) = -4 \]
Therefore,
\[ \rightarrow -8 - 4 - 4 - [-1] \]
ii) A negative number multiplied to negative number is a positive number.
\[ -[-1] = +1 \]
Therefore, the expression becomes
\[ \rightarrow -8 - 4 - 4 + 1 \]
c) Perform the arithmetic operation.

i) Perform a subtraction as it appears first from left to right:
\[ -8 - 4 = -12 \]
Therefore, the expression becomes
\[ -12 - 4 + 1 \]
ii) Perform subtraction:
\[ -12 - 4 = -16 \]
Therefore,
\[ -16 + 1 \]
iii) Perform addition:
\[ \rightarrow -16 + 1 = -15 \]
Therefore, the simplified top is \(-15\).

**Step 2:** Simplify bottom:
\[ (4^2 + 3^2) \div 5 \]
a) Simplify the parenthesis \((4^2 + 3^2)\):

i) First simplify the exponents inside the parenthesis:
\[ 4^2 = 16 \text{ and } 3^2 = 9 \]
Therefore, the parenthesis expression is \(16 + 9\).

ii) Perform addition:
\[ \rightarrow 16 + 9 = 25 \]
Therefore, the bottom expression becomes
\[ 25 \div 5 \]
b) Perform division:
→ 25 ÷ 5 = 5
Therefore, simplified bottom is 5.

**Step 3:** Perform division of top and bottom:

a) Divide simplified top by simplified bottom:

\[
\begin{array}{c}
15 \\
5
\end{array}
\]

b) Simplify the fraction:
→ \(-\frac{15}{5} = -3\)

**Step 4:** Perform the arithmetic operation:

a) Use simplified value in the given expression:
→ 6 \cdot -3

b) Perform multiplication. Positive number multiplied to negative number is a negative number.
→ 6 \cdot -3 = -18

**Conclusion:**

By using the order of operation, the solution for the given expression

\[
6 \cdot \frac{-8-4+(-4)-[-4-(-3)]}{(4^2+3^2)+5}
\]

is −18.

Please let me know if you have any question on this problem, or ‘Order of Operations’ generally. I will be here in the forum for the next hour.