Sec. 1-2 Order of Operations
Numerical expressions often contain more than one operation. A rule is needed to let you know which operation to perform first. This rule is called order of operations.

Order of Operations:
Step 1: Evaluate the expressions inside grouping symbols
Step 2: Evaluate all powers
Step 3: Multiply and/or divide in order from left to right
Step 4: Add and/or subtract in order from left to right

Evaluate each expression:

$$
\begin{array}{cc}
\text { ex. } 15 \div 3 \cdot 6-4^{2} & \text { ex. } 8-6 \cdot 4 \div 3 \\
15 \div 3 \cdot 6-16 & 8-24 \div 3 \\
5 \cdot 6-16 & 8-8 \\
30-16 & 0 \\
14 & \text { ex. } 24-8 \div 2+3 \cdot 4 \\
\text { ex. } 32+7^{2}-5 \cdot 2 & 24-4+3 \cdot 4 \\
24-4+12 \\
& 20+12 \\
& 32
\end{array}
$$

Grouping symbols such as parentheses ( ), brackets [ ], and braces \{ \} are used to clarify or change the order of operations. They indicate that the expression within the grouping symbol is to be evaluated first. A fraction bar also acts as a grouping symbol. It indicates that the numerator and denominator should each be treated as a single value.

$$
\begin{aligned}
& \text { ex. } 2(5)+3(4+3) \\
& 2(5)+3(7) \\
& 10-3(7) \\
& 10+21 \\
& \text { ex. } \frac{6+4(3)}{3^{2} \cdot 4} \quad \frac{6+12}{9 \cdot 4} \\
& \frac{18}{36}=\frac{1}{7} \\
& 31 \\
& \text { ex. }(15-9)+3 \cdot 6 \\
& \text { ex. } \frac{6^{2}-8}{4(3+7)} \rightarrow \frac{36-8}{4(10)} \\
& \rightarrow \frac{28 \div 4}{40 \div 4} \rightarrow \frac{7}{10} \\
& \text { ex. } 12+3[2+(14-\underset{\sim}{6} \cdot 2) 3]^{2} \quad 588 \quad 204 \quad 960 \\
& 12+3[2+(14-12) 3]^{2} \\
& 12+3[2+(2) 3]^{2} \\
& 12+3[2+6]^{2} \\
& 12+3[8]^{2} \\
& 12+3(64)
\end{aligned}
$$

$$
\frac{12+192}{204}
$$

evaluate $\quad x\left(y^{3}+8\right) \div 12$ if $x=3$ and $y=4$

$$
\begin{aligned}
& 3\left(4^{3}+8\right) \div 12 \\
& 3(64+8) \div 12 \\
& 3(72) \div 12 \\
& 216 \div 12
\end{aligned}
$$



According to market research, the average consumer spends $\$ 78$ per trip to the mall on weekends and only $\$ 67$ per trip during the week.
a) Write an algebraic expression to represent how much the average consumer spends at the mall in $x$ weekend trips and y weekday trips.


$$
78(5)+67(2)
$$

b) Evaluate the expression to find what the average consumer spends after going to the mall twice during the week and 5 times on the weekends.

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