Lesson 2.3: Order of Operations with Powers

1. Evaluate.
   a) $5^2 + 3$  
   b) $5^2 - 3$  
   c) $5 + 3^2$  
   d) $5 - 3^2$  
   e) $(5 + 3)^2$  
   f) $(5 - 3)^2$  
   g) $5^2 + 3^2$  
   h) $5^2 - 3^2$

2. Evaluate.
   a) $4^3 \times 2$  
   b) $4^3 \div 2$  
   c) $4 \times 2^3$  
   d) $4 + 2^3$  
   e) $(4 \times 2)^3$  
   f) $(4 + 2)^3$  
   g) $4^3 \times 2^3$  
   h) $4^3 + 2^3$

3. Evaluate.
   a) $(18 + 3^2 + 1)^4 - 4^2$  
   b) $3^3 + 9(3^0 - 2^2)$  
   c) $(12^2 + 5^3)^0 - 2[(-3)^3]$  
   d) $(7 - 5)^3 \times (8 + 2)^4$  
   e) $(4^2 \times 1^2)^2$  
   f) $[(-3)^4 - (-2)^3]^0 \div [(-4)^3 - (-3)^3]^0$

4. Insert brackets to make each statement true.
   a) $15 + 3 + 2 \times 4^2 - 5 = 43$  
   b) $15 + 3 + 2 \times 4^2 - 5 = 27$  
   c) $15 + 3 + 2 \times 4^2 - 5 = 107$  
   d) $15 + 3 + 2 \times 4^2 - 5 = 64$

5. The formula for the volume, $V$, of a cylinder with height, $h$, and radius, $r$, is $V = \pi r^2 h$.
   Janet made 3 L of salsa and stores it in jars with a radius of 4 cm and a height of 10 cm.
   She uses this expression to determine the number of jars she will need: $rac{3000}{\pi(4)^2 \times 10}$
   About how many jars will Janet need for the salsa?

6. Aftab, Shane, and Kyra got different answers when they evaluated this expression:
   $(-4)^2 - 3(-9 + 3)^2$ Aftab’s answer was 97, Shane’s answer was 43, and Kyra’s answer was 19.
   a) Show the correct solution.
   b) Show and explain how the students who got the wrong answer may have evaluated.
   Where did each student go wrong?