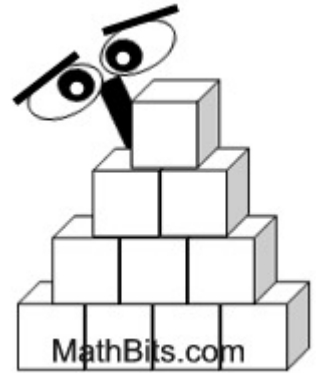# Examining Cubes

Name_____

Directions: Please show all work.

1. In the movie *Wall-E*, a small robot named Wall-E is left on Earth to clean up the garbage left by the departed humans. Wall-E compacts garbage into equally sized cubes and stacks the cubes in a high-rise, skyline fashion.
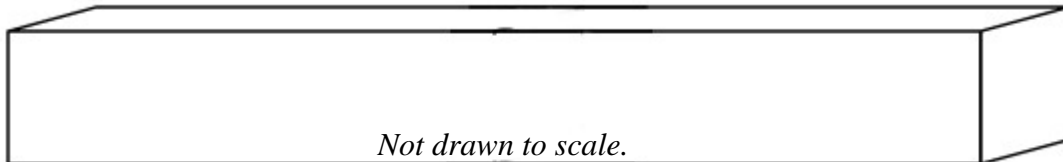
Wall-E has stacked 10 cubes as shown at the right. If the side of each cube measures 18 inches, find the volume of this stack of cubes.

2. a. If Wall-E was able to double the length of the sides of the cubes in problem 1, what would be the new volume of the 10 cubes?

   b. Make a conjecture regarding what happens to the volume of a cube when the side is doubled.

3. During a hot summer day, a single horizontal line of cubes has fused together so you cannot tell where one cube stops and the next begins (as shown below). If the cubes have a side length of 18 inches and the front length of the fused cubes measures 24 feet, how many cubes were used to create this horizontal line?
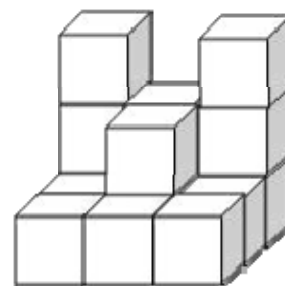
Not drawn to scale.

4. **a.** More cubes have been added to the stack. Assuming that the stack is solid (with no internal empty spaces), how many cubes comprise the stack shown at the right?
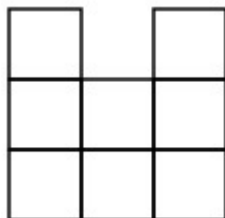
b. If the side of each cube remains at 18 inches, find the number of cubic **feet** in the volume of this stack.

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5. Cubes are stacked as shown at the right. Assume each cube is stacked upon another cube and that there are no hidden empty spaces. The cubes have 18 inch sides.

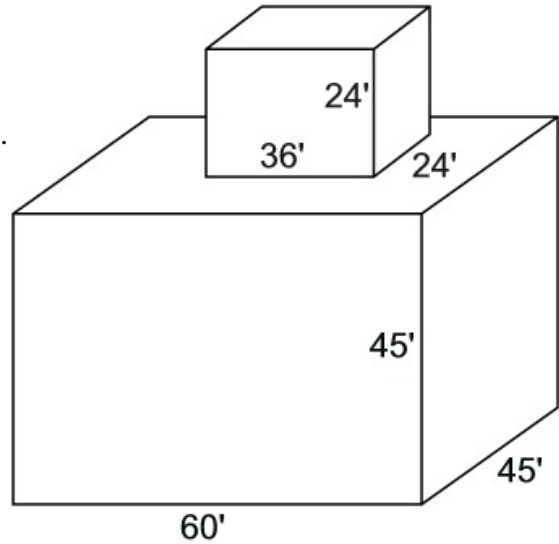**a.** How many cubes were used to create this stack?

b. Draw 3 pictures showing a two-dimensional view of the front of the stack, the side of the stack, and the top of the stack. The front view is done for you. (These drawings are called *orthographic projections*.)

Front

c. Find the surface area of this stack.

6. Using his compacted 18" cubes, Wall-E created the stack resembling two rectangular solids piled as shown at the right. The bottom portion measures 60' x 45' x 45'. The top portion measures 36' x 24' x 24'. How many of Wall-E's cubes are in this stack? Assume there are no empty spaces in the interiors.

7. Wall-E has created a skyline of four buildings, each similar to the one shown in question #6. The dimensions of each building are shown in the chart below:

Building #	Bottom Dimensions	Top Dimensions
Building #1	66' x 48' x 48'	48' x 42' x 42'
Building #2	81' x 54' x 54'	60' x 36' x 36'
Building #3	114' x 96' x 96'	93' x 72' x 72'
Building #4	93' x 45' x 45'	66' x 33' x 33'

How many cubes did Wall-E use to create the skyline?