6. I will use the “upper right” corners. (This means that I will use the larger $x$ and $y$ values of each rectangle.) Also, notice that each rectangle is 5 by 5, so $\Delta A = 25$. I get $25[(3 + 4 + 7 + 8 + 10 + 8) + (4 + 6 + 8 + 10 + 12 + 10) + (3 + 4 + 5 + 6 + 8 + 7) + (2 + 2 + 2 + 3 + 4 + 4)] = 3500$ cubic feet. The parentheses indicate summing across rows in anticipation of 15.2. Note that I did not use all of the blue numbers in the table. Doing so would mean that I was actually choosing two numbers from the same subrectangle for some of the subrectangles.

9. (a) The midpoints of the squares are $(1, 1), (1, 3), (3, 1),$ and $(3, 3)$. The heights at these points are about 28, 5, 13, and 17, respectively. I estimated $z$-values between the values of the level curves. This gives $\iint f(x, y)dA \approx 4(28 + 5 + 13 + 17) = 252$. ($dA = 2(2) = 4$ since that is the area of each subrectangle.

(b) The average value of $f$ is about $\frac{1}{16}(252) = 15.75$.

11. This is just a box with base 4, width 5, and height 3; its volume is 60.

12. This is a triangular prism (a “wedge”). It volume is the area of its triangular base (which appears in the $xz$-plane) times its height (which is along the $y$-axis). The triangular base has area $\frac{1}{2}(5)(5) = \frac{25}{2}$ and the height is 3, so the volume is $\frac{75}{2} = 37.5$. 

\[ \text{Solutions to Homework Assignment 19} \]

\[ \text{MATH 249} \]

\[ \text{Section 15.1, Page 958 Stewart 6e} \]

\[ 4, 6, 9, 11, 12 \]