(1) [6] Compute the average value of \( r(x) = 6x^{\frac{1}{2}} \) over the interval from \( x = 1 \) to \( x = 9 \). Simplify your answer.

**Solution.** The average value is given by

\[
\frac{1}{9 - 1} \int_1^9 6x^{\frac{1}{2}} \, dx.
\]

Because \( 4x^{\frac{3}{2}} \) is an antiderivative of \( 6x^{\frac{1}{2}} \), you find that

\[
\frac{1}{9 - 1} \int_1^9 6x^{\frac{1}{2}} \, dx = \frac{1}{8} \left( 4x^{\frac{3}{2}} \right) \bigg|_1^9 = \frac{1}{2} \left( x^{\frac{3}{2}} \right) \bigg|_1^9 = \frac{1}{2} \left( 9^{\frac{3}{2}} - 1^{\frac{3}{2}} \right) = \frac{1}{2} \left( 27 - 1 \right) = \frac{26}{2} = 13.
\]

(2) [4] Consider the function \( g(x, y) = 2x^2 - y \).

(a) Compute \( g(1, 3) \).

(b) Give the equation of the level curve of \( g(x, y) \) that contains the point \( (1, 3) \).

**Solution (a).** \( g(1, 3) = 2 \cdot 1^2 - 3 = 2 - 3 = -1 \).

**Solution (b).** The equation of the level curve will be \( g(x, y) = g(1, 3) \), which is given by

\( 2x^2 - y = -1 \).

**Remark.** Notice that this can be written as \( y = 2x^2 + 1 \), which is the equation of a parabola that could have been easily sketched had you been asked to do so.