Problem 1  Find the area of the region in the first quadrant between the
x-axis and the curves given by \( y = 9 - 3x^2 \) and \( y = 8 - 2x \).

Solution  From solving 
\[
9 - 3x^2 = 8 - 2x
\]
we get \( x = 1 \) and \( x = -1/3 \) as the \( x \)-coordinates of points where the two
given curves meet. We discard \( x = -1/3 \) since it does not give a point in the
first quadrant. The curve \( y = 8 - 2x \) and the \( x \)-axis (with equation \( y = 0 \))
intersect at \( x = 4 \). Interpreting the region as that between the \( x \)-axis and
the higher of the two curves, we split it into the part \( A \) above \([0, 1]\) and the
part \( B \) above \([1, 4]\).
Region \( A \) has area
\[
\int_0^1 (9 - 3x^2) \, dx = [9x - x^3]_0^1 = 8.
\]
Region \( B \) has area
\[
\int_1^4 (8 - 2x) \, dx = [8x - x^2]_1^4 = 9.
\]
So the total area equals 17.