6a. $g(4.5) = 13.5$. This is the area under the graph of f in the first quadrant between $x = 0$ and $x = 4.5$.

$g'(4.5) = f(4.5) = 0$; $g''(4.5) = f'(4.5) = -2$, the slope of the line segment containing $(4.5, 0)$.

6b. Average value of f equals $\frac{1}{5-(-3)}\int_{-3}^{5} f(x)\,dx = \frac{1}{8}\left[\int_{-3}^{3} f(x)\,dx + \int_{3}^{5} f(x)\,dx\right]$

$$= \frac{1}{8}[27+2] = \frac{29}{8}$$

The two integrals are found by finding the signed areas under the graph of f.

6c. There is a point of inflection where f, the derivative of g, has a maximum or minimum. This occurs only at $x = 5$, where f changes from decreasing to increasing, or where f' changes from negative to positive.

6d. The function g increases from $x = -3$ to $x = 4.5$, then decreases until $x = 7$, and then increases again until $x = 9$. There is a maximum at $(4.5, 13.5)$ (from part (a)). There is an endpoint maximum at $x = 9$. Use the signed area to find $g(9)$:

$$\begin{aligned} g(9) &= g(4.5) + \int_{4.5}^{9} f(x)\,dx \\ &= 13.5 - 0.25 \end{aligned}$$

The endpoint maximum occurs at (9, 13.25).