1. $f(0)=0,\ f'(0)=3,\ f'(-1)=2,\ g(0)=-1,\ g'(0)=2$

then $\frac{d}{dx}\left(f(x+g(x))\right)\Big|_{x=0} = f'(0+g(0)) \cdot \frac{d}{dx}(x+g(x))\Big|_{x=0}$

$= \underbrace{f'(-1)}_{2} \cdot (1+\underbrace{g'(0)}_{2}) = 2\cdot(1+2) = 6$

2. $f(x) = \begin{cases} ae^{bx} & \text{for } x>0 \\ 2x-1 & \text{for } x\le 0 \end{cases}$

A. Continuous ? $\lim_{x\to0^+} f(x) = \lim_{x\to0^-} f(x) = f(0)$

$\Rightarrow \lim_{x\to0^+} ae^{bx} = \lim_{x\to0^-}(2x-1) = -1$

$\Rightarrow a = -1$

B. Differentiable ? $f_+'(0) = f_-'(0)$ (left and right derivative are equal)

$\Rightarrow abe^{b\cdot0} = 2$

$\Rightarrow b = -2$

$a=-1,\ e^{b\cdot 0}=1$

For $a=-1$ and $b=-2$, $f(x)$ is continuous and differentiable at $x=0$