2007 AB3

A. h(1) = f(g(1))-6 = f(2)-6 = 9-6=3
h(3) = f(g(3))-6 = f(4)-6 = -1-6=-7

Therefore by the IVT since h(1)=3 and h(3)=-7, there must be a 1<r<3 where h(r) takes on the value of -5.

B. $\frac{h(3)-h(1)}{3-1}=\frac{-7-3}{3-1}=\frac{-10}{2}=-5$. Since the average rate of change of h between 1<x<3 is equal to -5 and f and g are differentiable then there exists a point c (1<c<3) where the slope of h will also be -5.

C. $w'(x)=f(g(x))g'(x)$ so

$w'(3)=f(g(3))g'(3)$

$=f(4)\bullet 2$

$=-1\bullet 2$

-2

D. Need to know $\left(g^{-1}\right)'(2)=\frac{1}{g'(1)}=\frac{1}{5}$ and g(1) = 2 so the tangent line is

$y=\frac{1}{5}(x-2)+1=\frac{1}{5}x+\frac{3}{5}$