5. (2 points each) Circle "TRUE" or "FALSE" for each of the following problems. Circle "TRUE" only if the statement is *always* true. No explanation is necessary.

(a) If $g(x)$ is an everywhere differentiable function, then so is $f(x) = ag(x - h) + b$, where a, b and h are constants.

TRUE   FALSE

(b) Suppose $H(t)$ and $T(t)$ are differentiable functions, and $T(t) = H(t) - 4$. Then H and T have the same derivative at each t.

TRUE   FALSE

(c) If l and m are inverse functions and the graph of m crosses the line $y = x$, the graph of l must also cross this line at the same point.

TRUE   FALSE

(d) If b is a positive constant, then $\lim_{h \to 0} \dfrac{\sqrt{b + h} - \sqrt{b}}{h} = 0.5 \, b^{-1/2}$.

TRUE   FALSE

(e) If $s(t)$ gives the position of an object moving at a constant velocity, then the object's instantaneous velocity at $t = a$ is equal to $\dfrac{s(b) - s(a)}{b - a}$ for all $a \neq b$.

TRUE   FALSE

(f) If t is a differentiable concave up function, then $t'(a) < \dfrac{t(b) - t(a)}{b - a}$ for all $a < b$.

TRUE   FALSE

(g) For any constant a, the equation $ax = e^{2 \ln x} + a^2$ has exactly one solution.

TRUE   FALSE