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 \( \lim_{h \to 0} \frac{\sqrt{b + h} - \sqrt{b}}{h} = 0.5 b^{-1/2} \).

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 \( \frac{s(b) - s(a)}{b - a} \) for all \( a \neq b \).

True  False

(f) If \( t \) is a differentiable concave up function, then \( t'(a) < \frac{t(b) - t(a)}{b - a} \) 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