1. (14 points) Problems (a), (b) and (c) below are independent of each other.

   (a) (5 pts.) Compute the linear approximation to $g(x) = 3\ln(x^2)$ near $x = 1$.

   (b) (3 pts.) Write the limit definition of the derivative of the function $f(x) = e^x - e^{-x}$ at the point $x = a$. You do *not* need to simplify or attempt to compute the limit.

   (c) (6 pts.) Assuming the following table accurately represents the behavior of the continuous function $s(x)$ over the interval $[0, 12]$, approximate the following:

   [*NOTE*: the values in the table are for $s'(x)$, not $s(x)$].

x	0	3	6	10	12
$s'(x)$	-6	-3	0	1.2	17

   (i) $s''(3)$

   (ii) All intervals in $[0, 12]$ (if any) over which s is decreasing.

   (iii) All intervals in $[0, 12]$ (if any) over which s is concave down.