CALCULUS AB
SECTION II, Part B
Time—45 minutes
Number of problems—3

No calculator is allowed for these problems.

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4. The functions f and g are given by $f(x) = \int_0^{3x} \sqrt{4 + t^2}\ dt$ and $g(x) = f(\sin x)$.

   (a) Find $f'(x)$ and $g'(x)$.

   (b) Write an equation for the line tangent to the graph of $y = g(x)$ at $x = \pi$.

   (c) Write, but do not evaluate, an integral expression that represents the maximum value of g on the interval $0 \le x \le \pi$. Justify your answer.

WRITE ALL WORK IN THE EXAM BOOKLET.