

You may keep this page of questions. Turn in your answers with all of your work on the green colored paper. You are **NOT** allowed to use your calculator for any of the questions on this exam. Each question is worth 10 points.

(1) Find $F'(x)$ if $F(x) = \int_4^x \sin(\sqrt{t + e^{5t}}) dt$.

(2) Write down the abstract partial fractions decomposition for

$$f(x) = \frac{x^5 - 2x^3 + 7x - 71}{(x+3)(x-5)^4(x^2+4x+53)^2}.$$

Evaluate the following antiderivatives and definite integrals.

(3) $\int_0^1 x(x^3 + 2) dx$. (4) $\int t\sqrt{2t+5} dt$. (5) $\int_0^3 \frac{x dx}{x^2 + 16}$.

(6) $\int \frac{x^2 dx}{\sqrt{9-x^2}}$. (7) $\int x^2 \sinh(ax) dx$. Assume that $a \neq 0$.

(8) Solve the initial value problem: $\frac{dP}{dt} = 6e^{-2t}$, $P(0) = 4$.

(9) Given the values of the derivative $f'(x)$ in the table below and that $f(5) = 40$, estimate $f(x)$ for $x = 10, 15, 20$.

x	5	10	15	20
$f'(x)$	16	10	12	4

(10) Find the exact positive value of c which makes the area under the graph of $y = c(16 - x^4)$ and above the x -axis equal to 1.