Exam type questions for sections 6.3, 6.5, 7.1, 7.2 *MATH 140.*

Credit is given only if you pick the correct answer *and* you show your work.

1. What is the volume of a solid of revolution generated by rotating around the y-axis the region enclosed by the graph of $y = e^{-x^2}$, the x-axis, and the lines $x = 0$ and $x = 2$?

   A.) πe^{-4} B.) $\pi(1 - e^{-4})$ C.) πe^{-2} D.) $\pi(1 - e^{-2})$ E.) πe^{4} F.) $\pi(e^4 - 1)$

2. What is the slope of the tangent line to the graph of the function $f(x) = e^{2x \cos x}$ at the point $(0, 1)$?

   A.) -2 B.) -1 C.) π D.) e E.) $+1$ F.) $+2$

3. The function

   $$f(x) = \frac{2 - \sqrt{x}}{3 + \sqrt{x}}$$

   is one-to-one on its domain $x \geq 0$. What is the formula for the inverse function $f^{-1}(x)$?

   A.) $\frac{3+x^2}{2-x^2}$ B.) $\frac{9x^2-4}{x^2+1}$ C.) $\frac{(3x-2)^2}{(x+1)^2}$ D.) $\frac{7+\sqrt{x}}{5+2\sqrt{x}}$ E.) $\frac{3\sqrt{x}+4}{\sqrt{x}+1}$ F.) $\ln\left(\frac{5x+7}{3x-2}\right)$

4. The function $f(x) = x^6 + x^5 + 2$ is one-to-one. Find the value of the derivative $(f^{-1})'(4)$.

   A.) $\frac{1}{5}$ B.) $\frac{1}{7}$ C.) $\frac{1}{9}$ D.) $\frac{1}{11}$ E.) $\frac{1}{13}$ F.) $\frac{1}{15}$