6. [4 points] Determine the **exact** value of the infinite series in each of the following questions. No decimal approximations are allowed. You do not need to show your work. **Circle** your answer.

a. [2 points] $\dfrac{1}{5^2} - \dfrac{1}{5^4} + \dfrac{1}{5^6} - \dfrac{1}{5^8} + \dfrac{1}{5^{10}} - \dfrac{1}{5^{12}} + \cdots =$

b. [2 points] $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n 5^{2n}}{(2n+1)!} =$

7. [6 points] Consider the differential equation $y' = 1 - 2xy$.

a. [4 points] Suppose k is an arbitrary constant. Show that the function

$$y(x) = \frac{k + \int_2^x e^{t^2}\, dt}{e^{x^2}}$$

is a solution to the differential equation.

b. [2 points] Give the value of k so that the graph of the solution to the differential equation passes through the point $(2, 7)$.