6. [11 points]

a. [6 points] Find the Taylor series about $x = 0$ for the function $f(x) = 3 + \cos(2x^2)$. Write your answer using sigma notation and also write out the first **three** non-zero terms. You do not need to simplify any factorials or exponentials that appear in your answer.

b. [5 points] The function $f(x)$ from part a) has an antiderivative $F(x)$ which satisfies $F(0) = 9$. Find the first four nonzero terms of the Taylor series about $x = 0$ for $F(x)$. You do not need to simplify any factorials or exponentials that appear in your answer.

7. [5 points] Find an expression for the exact value of

$$12 + \frac{4}{5} - \frac{4^2}{2(5)^2} + \frac{4^3}{3(5)^3} + \cdots + \frac{(-1)^{n+1}4^n}{n5^n} + \cdots$$

which does not involve an infinite sum (i.e. no sigma notation or "...").