

Review Problems

October 14, 2016

1. (Fall 2002, Exam 2, #9) The half life of Polonium 210 is 140 days. How many days will it take for a sample to decay to 5% of its original value? (Since you are not allowed to use a calculator, give your answer in the form $t = A \times \frac{\ln B}{\ln C}$)
2. (Fall 2003, Exam 2, #10) If $f(x) = \cosh 2x$, then find $f''(x)$.
3. (Fall 2007, Exam 2, #10) The half-life of a certain element is 20 years. Suppose we have a 50-mg sample. After how long will only 2 mg remain?
4. (Fall 2007, Exam 3, #2) The ratio $\frac{1 + \tanh x}{1 - \tanh x}$ is identical to which of the following? $\sinh x$, $\cosh x$, e^{2x} , e^{-2x} , 1
5. (Fall 2008, Exam 2, #3) At time 0 a ball is thrown directly upward from a platform 10m tall. Its height above the ground after t seconds is $s = -5t^2 + 5t + 10$, where s is in meters. The ball hits the ground after 2 seconds. What is its velocity at impact?
6. (Fall 2008, Exam 2, #13) 60% of a radioactive substance decays in 3 hours. What is the half-life of the substance?
7. (Fall 2008, Exam 3, #2) Evaluate $\cosh(\ln 5)$
8. (Fall 2009, Exam 3, #1) The position function of a particle after t seconds is given by $s = 42t^2 - t^3$. After how many seconds is the acceleration equal to zero?
9. (Fall 2009, Exam 3, #2) A material has a half-life of 12 hours. If initially there are 4 grams of the material, how much is present after 8 hours?
10. (Fall 2010, Exam 2, #1) The position of a particle moving along a line is $s = 4 + \frac{t}{2} - \ln(t + 1)$ for $t \geq 0$. For what t is the velocity equal to zero?
11. (Fall 2010, Exam 2, #9) A bacteria population triples every 2 hours. How long does it take a population of 200 bacteria to grow to 1500?
12. (Fall 2010, Exam 3, #5) If $f(x) = \sinh(\ln x)$, calculate $f'(2)$.