The University of Calgary
Department of Mathematics and Statistics
MATH 249
Worksheet #5

1. How much money one has to invest today at the interest of 3% compounded quaterly to get $10,000 in 10 years?
2. Find the domain and derivative of $f(x) = (3x)^{\pi} + \pi^{3x} + (\pi x)^{3x}$.
3. Find y' if $y = 2^{x^4} + \frac{2}{x^4} + \left(\frac{1}{x}\right)^x$,for $x > 0$.
4. How long does it take to double your investment if the interest of 7 % is compounded

   (a) (a) yearly? (b) monthly?
5. In the first few weeks after birth,a baby gains weight at a rate proportional to its weight.A baby weighing 4kg at birth weighs 4.4kg after 2 weeks.

   How much did it weigh 4 days after birth ?
6. For $f(x) = 3^x \ln \frac{3}{x}$ find $f'(3)$.
7. Find y' if $y = x^{x^2} + \ln \frac{1}{1-x}$,for $0 < x < 1$.
8. After 3 days a sample of radon-222 decayed to 58% of its original amount.What is half-life of radon-222?
9. Evaluate (a) $\lim_{x\to+\infty} \frac{x}{2^x - 1}$ (b) $\lim_{x\to-\infty} \frac{x}{2^x - 1}$ (c) $\lim_{x\to 0} \frac{x}{2^x - 1}$
10. Evaluate

    (a) $\lim_{x\to\infty} \frac{x^2}{e^{3x}}$ (b) $\lim_{x\to-\infty} \frac{x^2}{e^{3x}}$ (c) $\lim_{x\to\infty} \frac{(\ln x)^2}{x}$ (d) $\lim_{x\to 0^+} \frac{(\ln x)^2}{x}$.
11. Solve for x : $\frac{1}{2^{x+1}} = \frac{5}{4^x}$.

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12. Solve for x: (a) $\frac{1}{2}\ln(x+3) + 1 = 0$; (b) $3^{x^2} = 9^{x-3}$.