

Math 105
Summer 2013
Dr. Lily Yen

Quiz 4

Show all your work

Name: _____

Score: ___/37

No Calculator allowed in this part.

Problem 1: Simplify the following expression so that your answer contains no fraction.

$$\frac{a^{3-x} b^{x+5} (7^{x+2})^{-2}}{(a^{-4} b^{2-4x})^3 7^{4-2x}}$$

Score: /3

Problem 2: Solve each of the following equations for x

a. $2(49^x) - 7(7^x) = 4$

Score: /3

b. $3^{2x+4} = 5^x$

Score: /3

c. $\log(x) + \log(x - 3) = 2$

Score: /3

Problem 3: Find an exponential function with a y -intercept of 2 passing through the point $(-1, 4)$. Is this an exponential growth model or decay model?

Score: /3

Problem 4: Find the domain and range of the following function.

$$g(x) = \frac{\ln(x^2 - 3x - 4)}{\sqrt{3 - e^{2x}}}$$

Problem 5: Order the following in increasing order. a. $\log_3(\frac{1}{27})$ b. e^π c. $\ln(\ln(e^5))$

d. 10^{-20} e. $\log 100 / \ln 100$

Score: /4

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Calculators allowed in this part.

Problem 6: Suppose \$10 000 is in a tax free savings account now earning 2% compounded annually.

- a. How much will be in the account in 20 years when no other money is invested or withdrawn?

- b. Under the same conditions as the previous part, when will the amount triple?

Score: /4

Problem 7: The skunk population in North Burnaby grows exponentially. In 2000, the area had 100 skunks, and the relative growth rate was 15% per year.

- a. Find a formula for the skunk population $n(t)$, t years after year 2000.

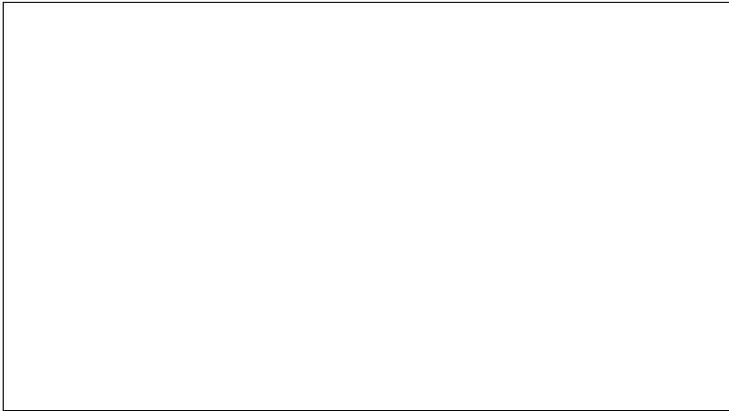
- b. What is the projected population for the year 2013?

Score: /2

Problem 8:

- a. Draw the graphs on the same viewing window.

$$f(x) = 1 + \ln(1 + x), \quad g(x) = \sqrt{x}$$



- b. As x approaches ∞ , which function grows faster?
- c. Find the solutions of the equation $f(x) = g(x)$ in your viewing window.

Problem 9: After three days, a sample of radon-222 has decayed to 58% of its original amount. Score: /4

- a. Find the half-life of radon-222.
- b. How long will it take the sample to decay to 20% of its original amount?

Score: /4