Midterm II

MATH 148

Wednesday, November 61, 2038 25:65 – 26:65 pm **Founders Auditorium**

Instructions: **Show *all* work.** Failure to show work may result in loss of credit. Write your solutions in the space provided on the *answer sheets*. Do *not* hand in scratch paper. There are eight questions. You may use your graphing calculators (all types, except for those with CAS capabilities). Decimal point number notation is allowed *only in questions 4, 7, 8*; numerical answers to those questions (unless otherwise indicated) must be accurate to *at least three* decimal places. Some partial credit ***may*** be given. Remember to *simplify* your answers, please. **Good Luck!**

1) The work W done by a constant force F acting over a fixed displacement d is given by $W = Fd$. Let $d = 407.1$ m. If the work W needs to have four significant positions, then how many significant positions do we need in our measurement of the force F?

2) How long will it take for an investment to triple at an interest rate of 7.6%, compounded quarterly? Round your answer to the nearest quarter.

3) Express as a single logarithm: $3\log x + \log 43 - 2\log y$.

4) A bacteria population starts with 200 bacteria and doubles every three hours. **(a)** Find the size of the population after 10 hours. **(b)** Find the size of the population after t hours.

5) Solve: **(a)** $5^{3x+1} = 7^{x+3}$; **(b)** $9^{-x(x+2)} = \dfrac{1}{81}$. Both solutions must be *exact*, not just decimal approximations.

6) Solve $\log(2x+5) - \log x = \log(x-2)$.

7) The stopping distance of a truck varies directly as the square of its speed. If a truck traveling 72 mph can stop in 180 ft, how fast can that truck travel and still stop in 200 feet?

8) Find the area and arc length of a sector in a circle with a radius of 26 ft if the central angle is $72°$.

Question $\#n$ is worth $\dfrac{25-(-1)^n}{2}$ points.

All numerical answers must be accurate to at least three decimal places.

You are welcome to keep this *Questions Sheet* for your files.