The best 14 out of the first 15 questions will count 5 points each.
Three of the four graphs (16 − 19) will count 10 points each.

1. a) Evaluate $\log_{10} 0.001$ b) Evaluate $\ln e^{2.79}$

2. Give the domain for $\log_{10}(5x - 12)$ in interval notation.

3. a) Write in exponential form $\log_4 1024 = 5$ b) Write in logarithmic form $7^3 = 343$

4. Solve for x: $\log_6 216 = x$

5. Use the change of base formula (below) to approximate $\log_5 130$ to three decimal places
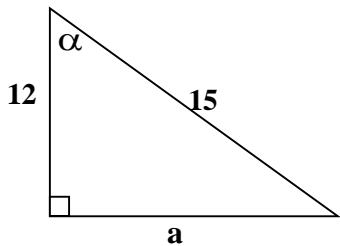
$$\log_a x = \frac{\log_b x}{\log_b a}$$

6. Use logarithmic properties to write the following as a single logarithm

$$2\log_{10}(x - 7) - 4\log_{10}(3x - 1) - 3\log_{10}(2x + 11)$$

7. Solve $\log_5(4x - 1) = \log_5(x + 5)$

8. Solve $\log_4(x + 1) + \log_4(3x - 5) = 2$

9. The population of a city is given by $50000e^{0.023t}$, where t represents the year and t = 0 is 2000. What is the predicted population of the city in 2035?

10.

a) Find the length of side **a**

b) Find $\tan \alpha$

11. A person 250 feet away from the base of a building must look up at an angle of 35 degrees to see the top of the building. How tall is the building?

12. Given the coordinates for a 30 degree angle are ($\sqrt{3}$/2, 1/2) what is the sine of 150 degrees? Use the unit circle to explain your answer.

13. Suppose a statistician is interested in the average age of all customers for the Dover Walmart. One day, 250 customers at the store are questioned about their ages.

   a) What is the variable of interest?

   b) What is the population?

14. Classify the following data by class (qualitative, quantitative) and by type (nominal, ordinal,
     interval, ratio)

     a) The Kelvin temperature outside today.

     b) The position a horse finishes in a race.

15. Five hundred members of a population are divided into five subgroups based upon their
     ages. Members from each subgroup are then randomly selected. This best represents
     which of the following types of sampling.

     a) Stratified   b) Cluster   c) Systematic   d) Multistage

Pick 3 of the four graphs 10 points each (16 − 19)

16. The annual incomes of 30 randomly selected instructors of a small college are recorded
     Below in thousands of dollars. Construct a frequency histogram using a class interval of 2.0
     and 75.45 as the lower class boundary of the first class.

          75.5   75.6   75.7   75.8   76.0   76.0   76.4   76.5
          77.0   77.0   77.4   77.4   77.9   78.0   79.0   79.1
          79.2   79.2   79.8   80.1   80.7   80.9   81.7
          81.9   82.7   82.9   83.1   85.3   85.4   85.4

17. Suppose a company has $160,000 to spend during this month. $40,000 will go
      towards payroll, $40,000 for rent, $20,000 for utilities, $20,000 for supplies, and the rest for
      miscellaneous expenses.
      Draw a pie chart (use % instead of $) to show this information and make sure to give your
      chart an appropriate title as well.

18. Suppose a company has 100 workers (5 custodians, 35 shelve stockers, 25 cashiers, 15
      managers, and 20 others).
      Construct a relative frequency bar chart to depict this information.

19. Construct a stem and leaf display for the following prices in cents for a pound of meat
      at various Delaware supermarkets.

          391, 309, 314, 397, 399, 308, 301, 335, 320, 313, 322, 337, 314
          299, 306, 308, 317, 315, 294, 350, 312, 306, 357, 314, 309