Exp. and Log. App. and Log Props.

Name: _____
Instructor: Taryn Laird
Math 112 Section: 010

Directions: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.

1. A certain lake is stocked with 2000 fish. The population is growing according to the logistic curve:

$$P = \frac{18{,}000}{1 + 8e^{-0.2t}}$$

where t is measured in months since the lake was initially stocked.

After how many months will the fish population be 4000? Round to the nearest 0.01 months.

Is there a maximum possible fish population that the lake can sustain?

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2. Zaya would like to have $23,000 for a down payment on a house in 8 years. What lump sum, invested now at 2.7% compounded continuously, would be needed in order for her to reach her goal?

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3. Use properties of logarithms to completely expand the logarithmic expression. Wherever possible, evaluate logarithmic expressions.

$$log_2\left(\frac{16a^2b}{c\sqrt{d}}\right)$$

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4. Use properties of logarithms to rewrite as a single logarithm:

$$7 \cdot log_5(x) - 3 \cdot log_5(y) - \frac{1}{9} \cdot log_5(z) + 11 \cdot log_5(w)$$