

Name: _____

Directions: Show all work. No credit for answers without work.

1. [**3 points**] The population of a town decreases exponentially with a discrete annual rate of 1.7%. Find the half-life of the population.

2. [**4 parts, 1 point each**] Solve the following equations for t exactly. Decimal approximations are worth partial credit.

(a) $5 \cdot 3^t = 12$

(c) $4 \ln(3t + 2) = 7$

(b) $5 \cdot t^3 = 12$

(d) $8 \cdot 2^t = 5e^{6t}$

3. [3 points] A publishing company offers you two payment options for your book. Plan A calls for an immediate payment of \$85,000 and a payment of \$10,000 in 2 years, when the book will be complete. Plan B calls for three equal payments of \$30,000: one immediately, one after 1 year, and a final payment after 2 years. Assume that money earns interest at a continuous annual rate of 6%.

(a) Find the future value of Plan A and Plan B.

(b) Find the present value of Plan A and Plan B.

(c) Which plan should you take?