

Name: _____

Show your work. Answers without work earn reduced credit.

1. [**2 parts, 1 point each**] An air-freshener starts with 50 grams and evaporates. In each of the following cases, write a formula for the quantity Q in grams of air-freshener remaining t days after the start. The decrease is:

(a) 3 grams a day

(b) 16% a day

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

(a) $3^t = 4$

(c) $7 \left(\frac{2}{3}\right)^t = 2$

(b) $4e^{2t} = 12$

(d) $6e^{-t} = 2^t$

3. [2 points] Find the half-life of a quantity that decreases at a discrete rate of 6% each month.

4. [2 parts, 1 point each] You are negotiating a contract with a client, and three versions are proposed. Contract A calls for the client to make three payments of \$1000 each, to be paid now, one year from now, and two years from now. Contract B calls for a single payment of \$3200 to be paid in two years. Contract C requires a single payment of \$2900 now. You estimate that invested money will grow at a continuous rate of 5% each year.

(a) Find the future value of all three contracts in 2 years.

(b) Find the present value of all three contracts.