College Mathematics
linear growth vs. exponential growth

1. Classify each of the following situations as <u>linear</u> growth or <u>exponential</u> growth.
   (a)   Each banana costs you 19 cents.
   (b)   Each additional minute you talk costs you 7 cents.
   (c)   Each time you talk one more minute, your total bill is 5 times as big.
   (d)   Each year, 170 people move into New Braunfels.
   (e)   Each year, Angus gets a 8% raise.
   (f)   Each year, Bea gets a $8000 raise.
   (g)   Each year, the population of Newton triples.

2. Cyndi's phone company charges 32 cents to connect a call and 6 cents per minute.
   (a)   Write an equation giving Cyndi's cost C in terms of her talk time T.
   (b)   If Cyndi makes a call lasting 49 minutes, how much will it cost her?
   (c)   If Cyndi wants to spend less than 99 cents on a call, how long can she talk?

3. Dana's phone company charged her $1.77 for a 30-minute call
   and $2.97 for a 60-minute call.
   (a)   Assuming a linear cost function, write an equation giving Dana's cost C
          in terms of her talk time T.
   (b)   If Dana makes a call lasting 45 minutes, how much will it cost her?
   (c)   If Dana wants to spend less than $10.00 on a call, how long can she talk?

4. The population of Wheatsville is 25,000.
   (a)   If the population increases by 3000 each year,
          what will the population be 6 years from now?
   (b)   If the population increases by 3% each year,
          what will the population be 6 years from now?

5. Cyrus earns $6.80 per hour. Next year, he will earn $8.50 per hour.
   (a)   Assuming linear growth, what will his pay rate be 9 years from now?
   (b)   Assuming exponential growth, what will his pay rate be 9 years from now?