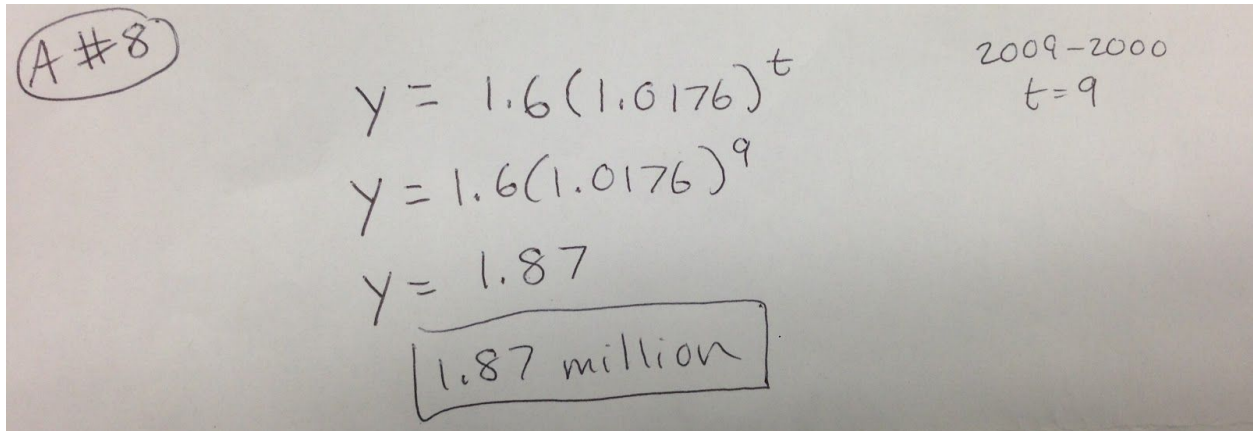


Note: The solution to each problem is underneath the NEXT question!

1) The value of a car y (in thousands of dollars) can be approximated by the model $y = 31(0.92)^t$, where t is the number of years since the car was new. Estimate when the value of the car will be \$9600?



Handwritten solution for problem 1:

A #8

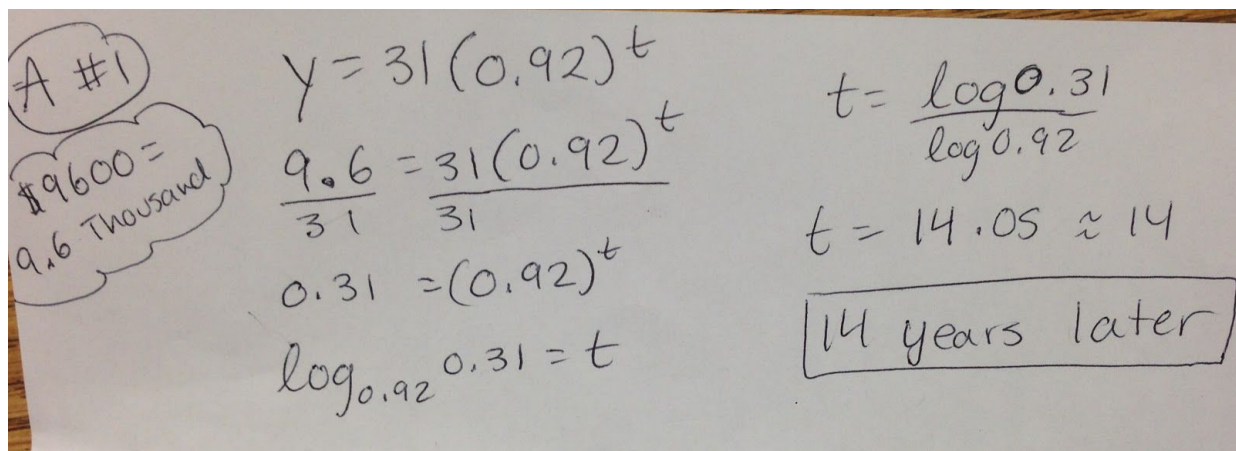
$$y = 1.6(1.0176)^t$$

2009-2000
 $t = 9$

$$y = 1.6(1.0176)^9$$
$$y = 1.87$$

1.87 million

2) In 2000, the population of a city was about 1.04 million. During the next 14 years, the population increased by about 2.05% each year. Write an exponential growth model giving the population (in millions) t years after 2000. Estimate the city's population in 2008.



Handwritten solution for problem 2:

A #1

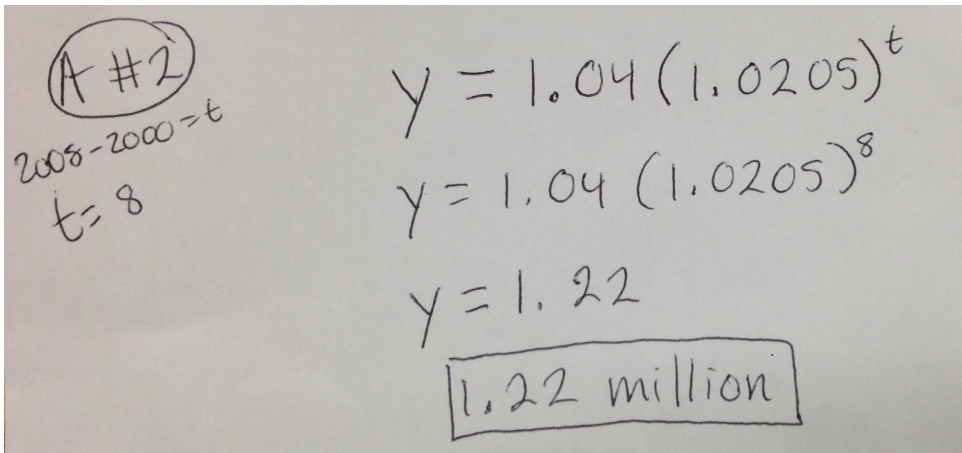
\$9600 = 9.6 Thousand

$$y = 31(0.92)^t$$
$$\frac{9.6}{31} = \frac{31(0.92)^t}{31}$$
$$0.31 = (0.92)^t$$
$$\log_{0.92} 0.31 = t$$
$$t = \frac{\log 0.31}{\log 0.92}$$
$$t = 14.05 \approx 14$$

14 years later

Note: The solution to each problem is underneath the NEXT question!

3) In 2000, the population of a city was about 1.04 million. During the next 14 years, the population increased by about 2.05% each year. Write an exponential growth model giving the population (in millions) t years after 2000. Estimate the year when the city's population was 1.3 million.



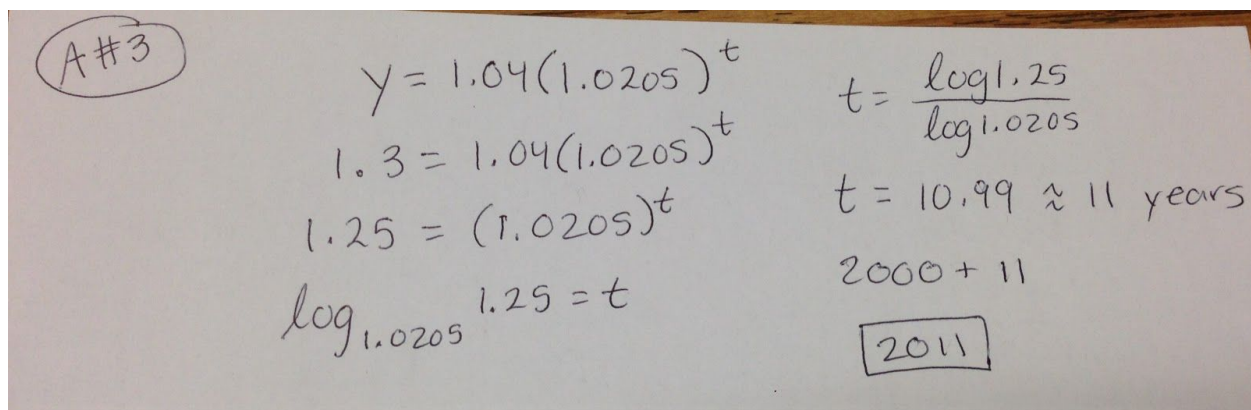
Handwritten solution for problem 3:

A #2
 $2008 - 2000 = t$
 $t = 8$

$$y = 1.04(1.0205)^t$$
$$y = 1.04(1.0205)^8$$
$$y = 1.22$$

1.22 million

4) The amount, in grams, of the radioactive isotope barium-140 remaining after t days is $y = a(0.5)^{\frac{t}{13}}$, where a is the initial amount in grams. What percent of the barium-140 decays each day?



Handwritten solution for problem 4:

A #3

$$y = 1.04(1.0205)^t$$
$$1.3 = 1.04(1.0205)^t$$
$$1.25 = (1.0205)^t$$
$$\log_{1.0205} 1.25 = t$$
$$t = \frac{\log 1.25}{\log 1.0205}$$
$$t = 10.99 \approx 11 \text{ years}$$
$$2000 + 11$$

2011

Note: The solution to each problem is underneath the NEXT question!

5) You deposit \$8600 into an account that pays 1.32% annual interest. Find the balance after 4 years when the interest is compounded quarterly.

A#4

$$y = a(0.5)^{t/13}$$
$$y = a(0.5)^{\frac{1}{13} \cdot t}$$
$$y = a(0.5^{\frac{1}{13}})^t$$
$$y = a(\underline{0.95})^t$$
$$y = a(1-r)^t$$
$$1-r = 0.95$$
$$r = 0.05$$

5% decay

6) You deposit \$8600 into an account that pays 1.32% annual interest. Find the balance after 4 years when the interest is compounded daily.

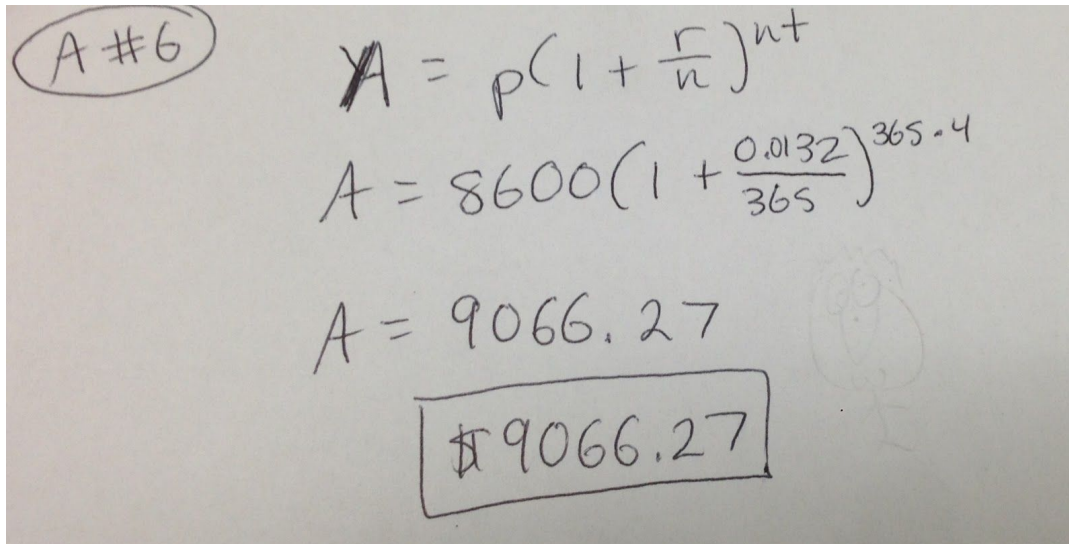
A#5

$$A = p\left(1 + \frac{r}{n}\right)^{nt}$$
$$A = 8600\left(1 + \frac{0.0132}{4}\right)^{4 \cdot 4}$$
$$A = 9065.49$$

\$9065.49

Note: The solution to each problem is underneath the NEXT question!

7) The value of a car (in thousands) can be approximated by the model $y = 24(0.83)^t$. Estimate when the value of the car will be \$6500.

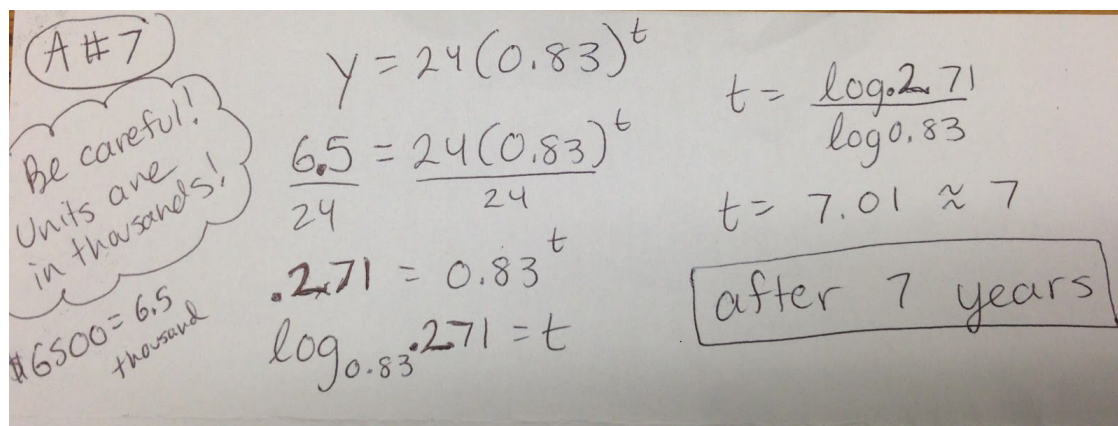


A #6

$$A = p\left(1 + \frac{r}{n}\right)^{nt}$$
$$A = 8600\left(1 + \frac{0.0132}{365}\right)^{365 \cdot 4}$$
$$A = 9066.27$$

\$9066.27

8) In 2000, the population of a city was about 1.6 million. During the next 15 years, the population increase by about 1.76% each year. Write an exponential growth model giving the population y (in millions) t years after 2000. Estimate the city's population in 2009.



A #7

Be careful!
Units are in thousands!

\$6500 = 6.5 thousand

$$y = 24(0.83)^t$$
$$\frac{6.5}{24} = \frac{24(0.83)^t}{24}$$
$$.271 = 0.83^t$$
$$\log_{0.83} .271 = t$$
$$t = \frac{\log .271}{\log 0.83}$$
$$t = 7.01 \approx 7$$

after 7 years