If the annual rate of inflation averages 5% over the next ten years, the approximate cost of C of goods or services during any year in that decade is:

$$C(t) = P(1.05)^t$$

where t is the time in years and P is the present cost.

a) if the price of an oil change for you car is presently $24.95, estimate the price 10 years from now?

$C(10) = 24.95(1.05)^{10}$

$C(10) = 40.64$

b) Find the rate of change of C with respect to t when t=1 and t=8

$C(t) = P(1.05)^t$

$a^u = \ln(a)\, a^u\, du$

$\frac{dC}{dt}\ C = P(1.05)^t$

$C'(t) = P\ln(1.05)\,1.05^t$

$P\ln(1.05)1.05$

$t=1$

$C'(1) = 0.05P$

$t=8$

$C'(1) = 0.07P$

After t years, the value of a car purchased for $20,000 is:

$$V(t) = 20,000\left(\frac{3}{4}\right)^t$$

a) Determine the value of the car 2 years after it was purchased.

$V(2) = 20,000\left(\frac{3}{4}\right)^2 = 11250$

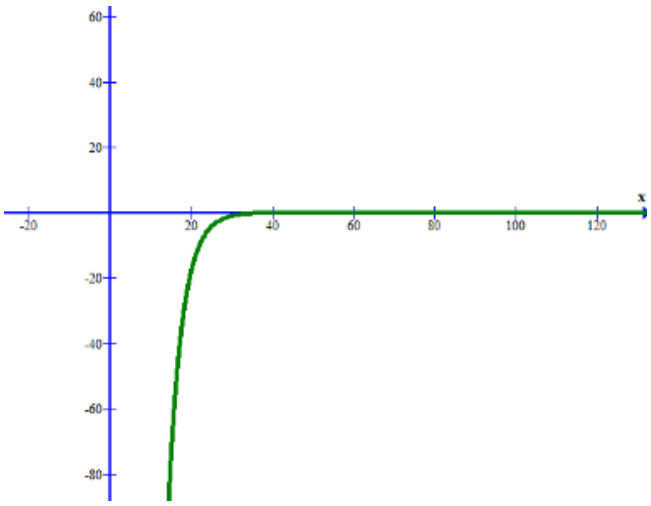
b) Find the rate of change of V with the respect to t when t=1 and t=4.

$V(t) = 20,000\left(\frac{3}{4}\right)^t$ $(20,000)\ln\frac{3}{4}\cdot\frac{3}{4}^t\cdot 1$

$V'(1) = -4315.231$

$V'(4) = -67.425$

c) use a graphing utility to graph v'(t) and determine the horizontal asymptote of V'(t). Interpret its meaning



asymptote at x=0.

this means there is a point when the car stops loosing value, and maintains its value. This value is probably very small, but not zero.

Assume that you can earn 6% on an investment compounded daily. Which of the following options would yield the greatest balance in 8 years?

Compounding n times a year: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

a) 20,000 now $A = 20{,}000\left(1 + \frac{.06}{365}\right)^{365 \cdot 8}$

$A = 32320.21$

b) 30,000 in 8 years

it didn't have anytime to gain interest

$A = 30{,}000$

c) \$8000 now and \$20,000 in 4 years $A = P\left(1 + \frac{r}{n}\right)^{nt}$

$8000\left(1 + \frac{.06}{365}\right)^{2920}$

2920

$(\quad)^{1460}$

$37{,}852.56$

$2{,}928.085$

$+ \quad 25{,}424.481$

$12928.08 + 25424.48$

$38{,}352.56$