

Week 5
MATH 34B
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14. The speed of car A after t minutes is $8t$ m/s.
How long will it take the car to travel $\frac{100}{6}$ meters?

16. How quickly a leaf grows is proportional how big [ie the surface area] the leaf is. If the area of the leaf grows from 2cm^2 to 3cm^2 in 3 days, how long will it take for the leaf's area to increase to 5cm^2 ?

36. The population of a country Dnalgne is 100 million in 1997 and increasing at a rate of 0.6 million per year. The average annual income of a person in Dnalgne during 1997 was 24000 dollars per year and increasing at a rate of 500 dollars per year.

How quickly was the total income of the entire population rising in 1997?

27. An artery has a circular cross section of radius 4 millimeters. The speed at which blood flows along the artery fluctuates as the heart beats. The speed after t seconds is $30 + 5 \sin(2\pi t)$ meters per second. What volume of blood passes along the artery in one second?

47. The volume of a sphere of radius R is $V(R) = 4R^3/3$. If the radius is increased by ΔR , what is the increase in volume to the first order?

50. Find a linear approximation to the function $f(x) = e^{x/500}$ for the range $0 < x < 100$. Do this by making the linear approximation equal to the function at the end points $x=0$ and $x=100$. Find the percent error in the approximation when (a) $x = 25$ and (b) $x = 50$.

43. What are the local max/min for $y = e^x \sin(x)$ between $x = 0$ and $x = 2\pi$?

12. Assume the amount of pollution entering the world's oceans grows exponentially. At the start of 1900 suppose that the instantaneous rate at which pollution enters the oceans is 10^5 tons per year, and that the amount doubles every 10 years thereafter. Express the rate that pollution enters, in units of tons per year, at a time t years after 1900.

Find an integral which expresses the total amount of pollution which has entered during the period 1900 to 1990.