Week 4
MATH 34B
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9. The acceleration (rate of change of velocity) of an object is 2t+1 meters per square second where t is the time in seconds. The velocity of the object at t=0 is 9 meters per second.

   (a) What is the velocity after t seconds?

   (b) When is the velocity 65 meters per second?

   (c) How far does the object move between t=0 and t=4?

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?

39. A tree trunk is approximated by a circular cylinder of height 100 meters and diameter 2 meters. The tree is growing taller at a rate of 4 meters per year and the diameter is increasing at a rate of 5 cm per year. The density of the wood is 1000 Kg per cubic meter.

    How quickly is the mass of the tree increasing?

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?

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 $5cm^2$?

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) $x = 50$.