

Full name(s): _____ .

Questions

- Use a tangent approximation to estimate the following. Compute the true value and the error in each case.
 - $\sqrt{10200}$
 - $\sqrt{8.95}$
 - $\sin(1.5)$
 - $\log_2(4.4)$
 - $\sec(.5)$
 - 1.1^{10}
- Find the tangent line approximation to each of the following at $x = 1$
 - $f(x) = \frac{1}{1+\sqrt{x}}$
 - $f(x) = \csc\left(\frac{\pi}{2}x^2\right)$
 - $f(x) = \tan^{-1}\left(\frac{1}{x}\right)$
 - $f(x) = \ln\left(\frac{x+1}{4-x}\right)$
- A rectangle has one side of 10 cm. How fast is the area of the rectangle changing at the instant when the other side is 12 cm and increasing at 3 cm per minute?
- A right triangle has one leg of 7 cm. How fast is its area changing at the instant that the other leg has length 10 cm and is decreasing at 2 cm per second?
- When the growth of a spherical cell depends on the flow of nutrients through the surface, it is reasonable to assume that the growth rate, dV/dt , is proportional to the surface area, S . Assume that for a particular cell $dV/dt = 13S$. At what rate is its radius r increasing?
- The length of each side of a cube is increased at a constant rate. Which is greater, the relative rate of change of the volume of the cube, $(1/V)dV/dt$, or the relative change of the surface area of the cube, $(1/A)dA/dt$?
- A potter forms a piece of clay into a cylinder. As he rolls it, the length, L , of the cylinder increases and the radius, r , decreases. If the length of the cylinder is increasing at 0.1cm per second, find the rate at which the radius is changing when the radius is 1cm and the length is 5cm.