

REMEMBER!

PLEASE, start each problem at the top of a NEW SIDE OF A PAGE!

ALSO, please LABEL (or underline or box in) your answers.

1. (18) Find $\frac{dy}{dx}$ for each of the following.
(a) $y = x^2 \ln(\cos^2 4x^2)$ (b) $y = e^{3 \tan 4x^3}$
2. (18) Find $\frac{dy}{dx}$ for each of the following.
(a) $y = \arcsin(\cos 3x)$ (b) $y = \sin(e^{\cos^2 3x^2})$
3. (12) Find $\frac{dy}{dx}$ if $y = (xy)^{1/3}$.
4. (12) Evaluate $\tan(\arccos(x^2))$. *NOTE*: there should not be any trig or inverse trig functions in the answer!
5. (12) Find the equation of the line tangent to the parabola $y^2 = -4x$ at $(-1, 2)$.
6. (14) The volume of a cone is $\frac{1}{3}\pi r^2 h$ (where h is height and r is the radius of the circular base). Suppose a reservoir is an inverted cone (i.e., with the point into the earth) such that the height is always one-half the radius. Suppose water is being pumped out at the rate of 5 cubic feet per minute. How fast is the water depth falling when there are 100π cubic feet in the reservoir? (P.S. You do NOT need to evaluate square roots [or any other roots] if they should occur in the answer.)
7. (14) “Take me out to the ball game . . .” A baseball diamond is a square b feet on each side (where b is usually 90). A player is running from home plate to first base at the rate of c feet per second. When he has run half of the way, at what rate is his straight line distance from third base changing?