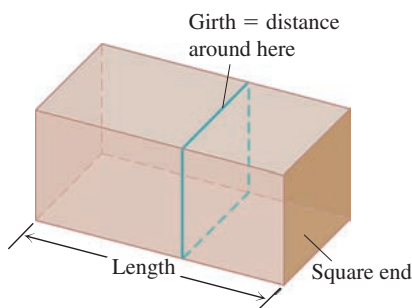


Name: _____

Show all work, simplify, and box your answers. If you do the problem incorrectly, or don't show sufficient work, you will be asked to rewrite the problem for full credit.

Due next class. Students who turn assignments in late (or do not attempt a problem) forfeit their ability to rewrite those problems for credit.

1. What is the smallest perimeter for a possible rectangle whose area is 16 in^2 , and what are its dimensions?
2. Your iron works has contracted to design and build a 500 ft^3 , square-based, open-top, rectangular steel holding tank for a paper company. The tank is to be made by welding thin stainless steel plates together along their edges. As the production engineer, your job is to find dimensions for the base and height that will make the tank weigh as little as possible. What dimensions do you tell the shop to use?
3. The U.S. Postal Service will accept a box for domestic shipment only if the sum of its length and girth (distance around) does not exceed 108 in. What dimensions will give a box with a square end the largest possible volume?



4. What are the dimensions of the lightest **open-top** (i.e. there is no material on top) right circular cylindrical can that will hold a volume of 1000 cm^3 ?
5. Find the linearization $L(x)$ of $f(x)$ at $x = a$: $f(x) = x^3 - 2x + 3$, $a = 2$
6. Find the linearization $L(x)$ of $f(x)$ at $x = a$: $f(x) = \tan x$, $a = \pi$
7. Find dy of $y = x^3 - 3\sqrt{x}$
8. Find dy of $y = \cos(x^2)$