

## Math 142 Quiz 2

Names: \_\_\_\_\_

1. How much more work is done when pulling a spring  $2x$  meters as opposed to  $x$  meters? That is, find

$$\frac{(\text{the work needed to pull a spring from rest to a distance of } 2x \text{ units})}{(\text{the work needed to pull a spring from rest to a distance of } x \text{ units})}.$$

2. Find the value of  $t$  which makes the surface area of the solid created by spinning the graph of  $x^3$  on  $[0, t]$  around the  $x$  axis equal to  $\pi/27$ .

**3.** A chain lying on the ground is 10m long and its mass is 50 kg. How much work is required to raise one end of the chain off the ground to a height of 10m (so that one end of the chain is skimming the ground)?

**4.** Let  $X$  be the collection of all current Cal Poly students and let  $Y$  be the set of numbers  $1, 2, \dots, 100$ . Give an example of a function  $f$  from  $X$  to  $Y$  that has an inverse or explain why this cannot be done.

**5 (Bonus).** (Attempt on a separate page only when done with all other problems.) Find the value of  $t$  such that the average value of the function  $f(x) = x - x^2$  on the interval  $[0, t]$  is as large as possible.