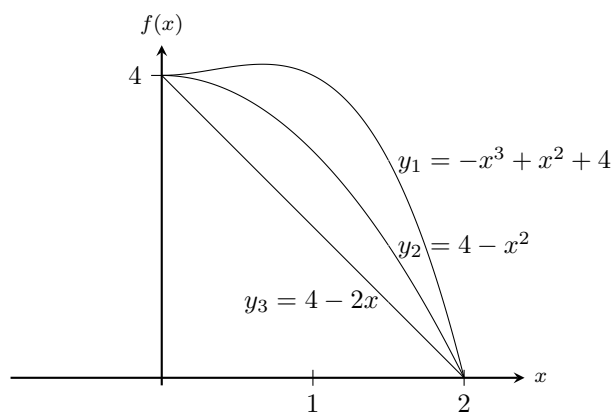


**Written Homework 1**

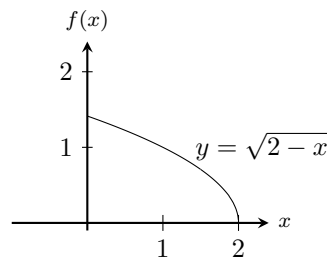
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**Problem 1:** Here is a picture containing the graphs of three functions.

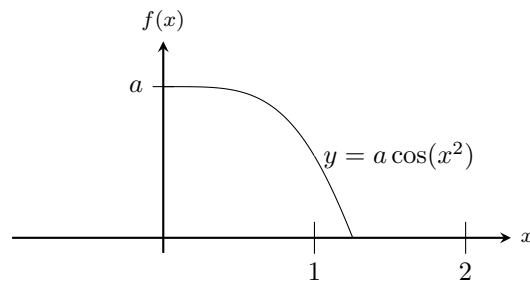
Which is larger, the area between the curves  $y = -x^3 + x^2 + 4$  and  $y = 4 - x^2$ , or the area between the curves  $y = 4 - x^2$  and  $y = 4 - 2x$ ?

**Problem 2:** Here is a graph of the function  $y = \sqrt{2 - x}$ .



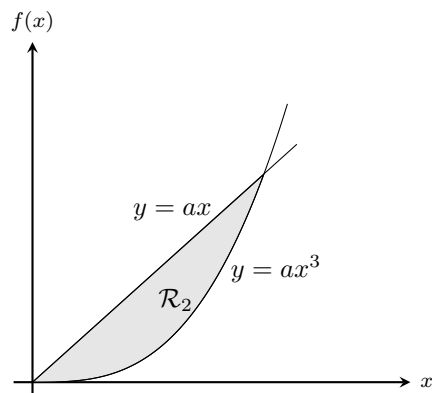
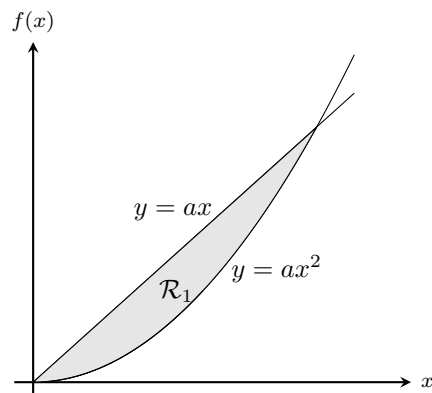
The region between this curve and the coordinate axes in the first quadrant is used to create a solid of revolution by revolving about the  $x$ -axis. Assuming that  $x$  and  $y$  are being measured in centimeters ( $cm$ ), if someone intends to manufacture this solid using cherry wood (density =  $0.5 \text{ g/cm}^3$ ), what is the mass (in grams,  $g$ ) of the solid.

**Problem 3:** Here is a graph of the function  $y = a \cos(x^2)$ , where  $a > 0$  is a parameter.



Find the value of the parameter  $a$  for which the solid generated by revolving the region bounded by  $y = a \cos(x^2)$ , the  $x$ -axis,  $x = 0$ , and  $x = \sqrt{\frac{\pi}{2}}$  about the  $y$ -axis has a volume equal to 5.

**Problem 4:** Consider the following graphs. The symbols  $\mathcal{R}_1$  and  $\mathcal{R}_2$  refer to the shaded regions indicated in the pictures.



Determine the value of the parameter  $a > 0$  for which the volume of the solid obtained when  $\mathcal{R}_1$  is revolved about the  $x$ -axis is equal to the volume of the solid obtained when  $\mathcal{R}_2$  is revolved about the  $y$ -axis.

**Written Homework 1**

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