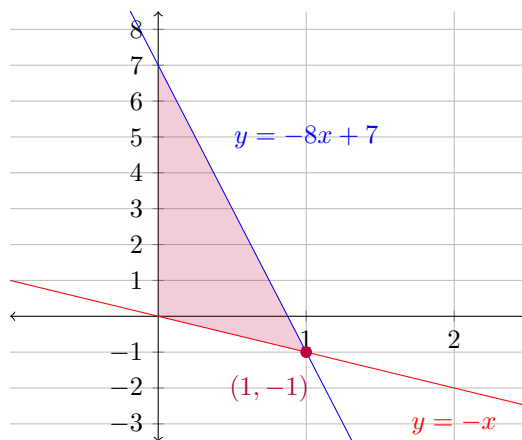Please show **all** your work! Answers without supporting work will not be given credit.
Write answers in spaces provided.

Name:

1. **[5 pts]** Compute the area of the triangular region bounded by the y-axis and the lines $y = -x$ and $y = -8x + 7$. **(EXACT VALUE ONLY!**

   (You must draw a graph with the lines corresponding to the problem for 2 pts.)

   Solution:

   [2pts for the graph]

   Set-Up:

   $$\int_0^1 (-8x + 7 - (-x))\, dx \quad \textbf{[1pt]}$$

   Now Integrate.

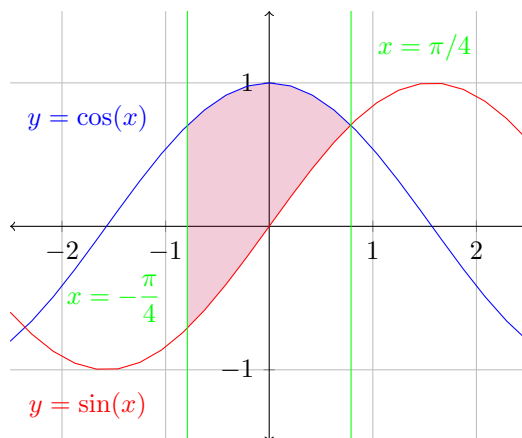 $$\int_0^1 (-7x + 7)\, dx = \left(-\frac{7}{2}x^2 + 7x \right)\Bigg]_0^1 \qquad \textbf{[1 pt]}$$

   $$= -\frac{7}{2}(1)^2 + 7(1) - \left(-\frac{7}{2}(0)^2 + 7(0) \right)$$

   $$= \frac{7}{2} \qquad\qquad\qquad \textbf{[1 pt]}$$

2. **[5 pts]** Find the area of the region bounded by $y = \sin(x)$, $y = \cos(x)$, $x = -\pi/4$ and $x = \pi/4$. **(EXACT VALUE ONLY!)**

(You must draw a graph with the lines corresponding to the problem for 2 pts.)

Solution:

[2pts for the graph]

Set-Up:

$$\int_{-\pi/4}^{\pi/4} (\cos(x) - \sin(x))\, dx \quad \textbf{[1pt]}$$

Now Integrate.

$$\int_{-\pi/4}^{\pi/4} (\cos(x) - \sin(x))\, dx = (\sin(x) + \cos(x))]_{-\pi/4}^{\pi/4} \qquad \textbf{[1 pt]}$$

$$= \sin\left(\frac{\pi}{4}\right) + \cos\left(\frac{\pi}{4}\right) - \sin\left(-\frac{\pi}{4}\right) - \cos\left(-\frac{\pi}{4}\right)$$

$$= \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}$$

$$= \sqrt{2} \qquad \textbf{[1 pt]}$$