Write legibly, clearly indicate the question you are answering, and put a box or circle around your final answer. If you do not clearly indicate the question numbers, I will take off points. Write as much work as you need to demonstrate to me that you understand the concepts involved. If you have any questions, raise your hand and I will come over to you.

1. [5 pts] Find the area bounded by the y-axis and the curves
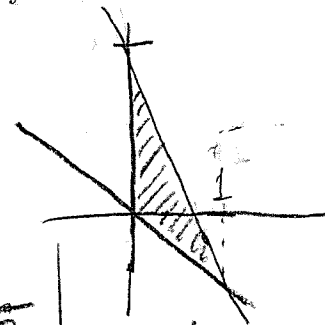
$$y = -x \text{ and } y = -7x + 6.$$

Round your answer to 2 decimal places.

$-x = -7x + 6$

$\Rightarrow 6x = 6$

$\Rightarrow x = 1$

Since $x \geq 0$, we consider the interval

$[0, 1]$

When $x = \frac{1}{2}$,

$-x: -\frac{1}{2}$, $-7x + 6: -\frac{7}{2} + 6 = 2.5$

So $-7x + 6$ is larger on this interval

$Area = \int_0^1 [-7x + 6 - (-x)] dx$

$= \int_0^1 [-7x + 6 + x] dx$

$= \int_0^1 [-6x + 6] dx$

$= -3x^2 + 6x \big|_0^1$

$= -3 + 6 = \boxed{3}$

2. [5 pts] Find the area bounded by the curves

$$x = 3y^3 \text{ and } x = 21y^2.$$

Round your answer to 2 decimal places.

$3y^3 = 21y^2$

$\Rightarrow 3y^3 - 21y^2 = 0$

$\Rightarrow 3y^2(y - 7) = 0$

$\Rightarrow y = 0, y = 7$ as solutions

We are considering the interval $[0, 7]$

At $y = 1$,

$3y^2: 3$, $21y^2: 21$

So $21y^2$ is larger on $[0, 7]$

$Area = \int_0^7 [21y^2 - 3y^3] dy$

$= \frac{21}{3} y^3 - \frac{3}{4} y^4 \big|_0^7$

$= 7(7)^3 - \frac{3}{4}(7)^4$

$= 7^4 - \frac{3}{4}(7)^4$

$= \frac{1}{4}(7)^4$

$= \boxed{600.25}$