

# Homework 12

Name:

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**P 1.** Graph the following piecewise parametric functions on the same coordinate axes.

$$f(t) = \begin{cases} \{-5, 2t\} & -\frac{1}{2} \leq t \leq \frac{1}{2} \\ \{-3, 2(t-1)\} & \frac{1}{2} \leq t \leq \frac{3}{2} \\ \{-t - \frac{5}{2}, |t - \frac{3}{2}|\} & \frac{3}{2} \leq t \leq \frac{5}{2} \\ \{t - \frac{13}{2}, |t - \frac{5}{2}|\} & \frac{5}{2} \leq t \leq \frac{7}{2} \end{cases}$$

$$g(t) = \begin{cases} \{t-2, 2t-1\} & 0 < t \leq 1 \\ \{t-2, 3-2t\} & 1 < t \leq 2 \\ \{t - \frac{7}{2}, 0\} & 2 < t \leq 3 \end{cases}$$

$$h(t) = \begin{cases} \{t+1, 1\} & -\frac{1}{2} \leq t \leq \frac{1}{2} \\ \{1, t-4\} & 3 \leq t \leq 5 \end{cases}$$

$$r(t) = \begin{cases} \{\frac{9}{4}, 2t\} & -\frac{1}{2} \leq t \leq \frac{1}{2} \\ \{\frac{15}{4}, 2(t-1)\} & \frac{1}{2} \leq t \leq \frac{3}{2} \\ \{t + \frac{3}{4}, 0\} & \frac{3}{2} < t \leq 3 \end{cases}$$

Your final graph should be completely contained in the rectangle defined by  $-5 \leq x \leq 5$  and  $-1 \leq y \leq 1$ . [Hint: If the graph is correct, you should be able to recognize it.]

**P 2.** Find the area of the surface of revolution obtained by revolving the curve defined by the parametric equations

$$x = 3 \cos \theta, \quad y = 3 \sin \theta$$

with  $0 \leq \theta \leq \pi/2$  about the  $y$ -axis.