Name: _____   Date: 3-10-2020

1) Find the exact area of the surface obtained by rotating the curve about the x-axis:

$$y = \frac{x^3}{6} + \frac{1}{2x} \quad \frac{1}{2} \le x \le 1$$

Chapter 8 and 9 Test

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2) A swimming pool is 20ft wide and 40 feet long and its bottom is an inclined plane, the shallow end having a depth of 3 ft and the deep end 12 ft. If the pool is full of water, find the hydrostatic force on (a) the shallow end side, (b) the deep end side, (c) the side of the pool, and (d) the bottom of the pool.

Name: _____

3) Find the centroid of the region bounded by the given curves

$$x + 2y = 4 \ \ and \ x = y^2$$

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4) A vat with 500 gallons of beer contains 3% alcohol (by volume). Beer with 7% alcohol is pumped into the vat at a rate of five gal/min and the mixture is pumped out at the same rate. What is the percentage of alcohol after an hour? How long will it take to have a beer with 6.5% alcohol?

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5) Find the orthogonal trajectories of the family of curves.

$$y = \frac{1}{2x + k}$$