

Student Name - \_\_\_\_\_

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Circle your Instructor's Name:

T. Berry

D. Trim

Values

- 9 1. Find the area bounded by the curves

$$y = -\frac{x}{\sqrt{x-1}}, \quad y = 0, \quad x = 2, \quad x = 3.$$

- 6 2. Set up, but do NOT evaluate, a definite integral to find the volume of the solid of revolution when the area bounded by the curves

$$y = \sin x, \quad y = x^2 - \pi x, \quad 0 \leq x \leq \pi,$$

is rotated around the line  $x = 2\pi$ .

- 5    3. Set up, but do **NOT** evaluate, a definite integral to find the length of the curve  $y^2 - x^2 = 4$  between the points  $(-1, \sqrt{5})$  and  $(2, 2\sqrt{2})$ .
- 7    4. An elevator with mass 5000 kg is sitting on the first floor of a building. The elevator is lifted by a cable with mass 5 kilograms per metre of length. The length of cable from elevator to pulley at the top of the elevator shaft is 90 metres. Set up, but do **NOT** evaluate, a definite integral to find the work done to lift the elevator and cable a total distance of 30 metres from its present position.

- 7 5. A plate is in the shape of an isosceles triangle with equal sides of length 5 metres and the third side of length 3 metres. It is suspended vertically in water with its shortest side in the surface of the water. Set up, but do NOT evaluate, a definite integral to find the force due to the water on one side of the plate.

- 6 6. A plate with constant mass per unit area  $\rho$  is bounded by the curves

$$x = y^2 - 4, \quad x + 2y = 4.$$

Set up, but do NOT evaluate, a definite integral to find the first moment of the plate about the  $y$ -axis.

