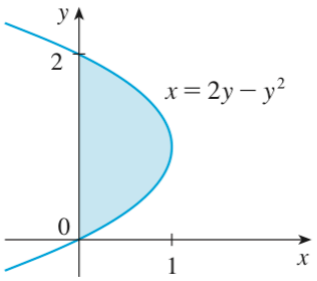
Present neatly on separate paper. Justify for full credit. No Calculators.
Name _____Score _____ <25 minutes **Weight: x8**

1)

The area of the region that lies to the right of the y-axis and to the left of the parabola $x = 2y - y^2$ (the shaded region in the figure) is given by the integral $\int_0^2 (2y - y^2)\,dy$. (Turn your head clockwise and think of the region as lying below the curve $x = 2y - y^2$ from $y = 0$ to $y = 2$.) Find the area of the region.



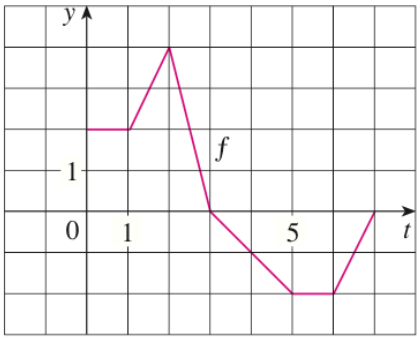
2) Evaluate the integral:

$$\int_0^1 \frac{4}{t^2 + 1}\,dt$$

3)

Let $g(x) = \int_0^x f(t)\,dt$, where f is the function whose graph is shown.

(a) Evaluate $g(0)$, $g(1)$, $g(2)$, $g(3)$, and $g(6)$.
(b) On what interval is g increasing?
(c) Where does g have a maximum value?
(d) Sketch a rough graph of g.



4) Evaluate the integral or explain why it does not exist.

$$\int_0^{\pi/2} \cos x \, \sin(\sin x)\,dx$$