Week 2 in Review

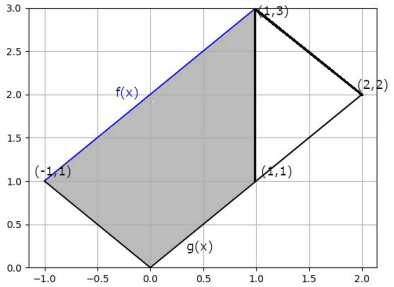
courtesy: David J. Manuel

(covering 6.1 and 6.2)

(Problems with a * beside them will also be done in Python)

1 Section 6.1

1. Find the area of the region(s) enclosed by the following curves:
   (a) $f(x) = x^2 + 1$, $g(x) = 3 - x^2$, $x = 0$, $x = 2$
   (b) $x = 0$, $x = 1 + y^2$, $y = 1$, $y = 3$
   (c) The parabola $f(x) = x^2$, the x-axis, and the line tangent to f at the point $(1, 1)$. *
   (d) $y = \sin(x)$, $y = \cos(x)$, $x = 0$, $x = \pi$
   (e) $y = \ln(x)$, the x-axis, the y-axis, and $y = 2$
2. Write an integral which represents the area shaded in the figure below. Use actual functions for f and g.



2 Section 6.2

1. Find the volume of the solid formed by rotating the given region about the given line:
   (a) $y = x^2, y = 4$, about the x-axis
   (b) $x = 2y^3, x = 4y^2$, about the y-axis
   (c) $x = 2y^3, x = 4y^2$, about the line $y = -2$ (SET UP the integral only!) *
   (d) $x = 0$, $y = 2\sin(x)$, $y = \sec(x)$ about the x-axis *
   (e) The region described in #1e in the section above about the line $x = -1$
2. Find the volume of the solid whose base is the ellipse $x^2 + \dfrac{y^2}{4} = 1$ and whose cross-sections perpendicular to the x-axis are squares.
3. DERIVE the formula for the volume of a cone of radius R and height H.

