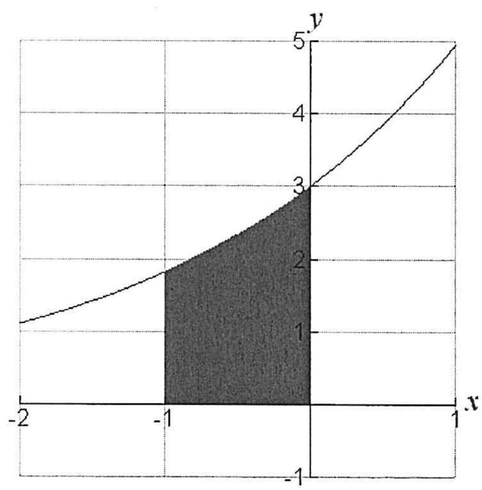
1. The functions $f(x) = 2 - x^2$ and $g(x) = -x$ are given.

a. Find the area of the region bounded by the graphs of $f(x)$ and $g(x)$. $\int_{-1}^{2}\left[(2-x^2)-(-x)\right]dx =$ $\int_{-1}^{2}(2-x^2+x)\,dx =$ $2x - \frac{x^3}{3} + \frac{x^2}{2}\Big\|_{-1}^{2} = \frac{9}{2}$	+2: integrand +1: limits & answer
b. Find the area of the region bounded by the graph of $f(x)$ and the x-axis. $\int_{-\sqrt{2}}^{\sqrt{2}}(2-x^2)\,dx = 2x - \frac{x^3}{3}\Big\|_{-\sqrt{2}}^{\sqrt{2}}$ $= 4\sqrt{2} - \frac{4\sqrt{2}}{3}$	+2: integral +1: answer
c. Find the area of the region bounded by the graph of $g(x)$, the x-axis and the line $x = 2$. $\int_{0}^{2}[0-(-x)]dx = 2$	+2 integral +1: answer

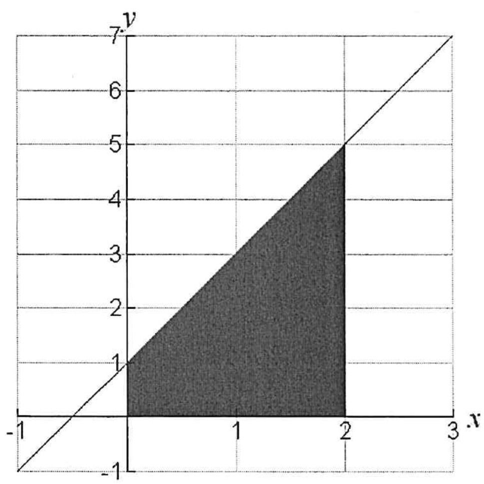
2. The functions $f(x) = x^2 - 2$ and $g(x) = x$ are given.

a. Find the area of the region(s) bounded by the graphs of $f(x)$, the y-axis and the x-axis. The area of the first region is given by $\int_0^{\sqrt{2}} \left[0 - \left(x^2 - 2\right)\right] dx = \int_0^{\sqrt{2}} \left(-x^2 + 2\right) dx$ $= -\frac{x^3}{3} + 2x \Big\|_0^{\sqrt{2}}$ $= \frac{4\sqrt{2}}{3}$ The second region, which is to the left of the y axis, has the same area. So the total area is $\frac{8\sqrt{2}}{3}$.	+2: integral +1: answer
b. Find the area of the region bounded by the graphs of $f(x)$ and $g(x)$. $\int_{-1}^{2} \left[x - \left(x^2 - 2\right)\right] dx =$ $\frac{x^2}{2} - \frac{x^3}{3} + 2x \Big\|_{-1}^{2} = \frac{9}{2}$	+2: integral +1: answer
c. Find the area of the region bounded by the graph of $g(x)$ and the x-axis between the lines $x = -2$ and $x = 1$. $\int_{-2}^{0} (0 - x) dx + \int_{0}^{1} x dx = \frac{5}{2}$	+2: integral +1: answer

3. $F(y) = \int_{-1}^{y} 3e^{x/2}\,dx$

a. Find the accumulation function *F*. $\int_{-1}^{y} 3e^{x/2}\,dx = 6e^{x/2}\Big\|_{-1}^{y}$ $= 6e^{y/2} - 6e^{-1/2}$	+2: antiderivative +1: answer
b. Evaluate *F(-1)*, *F(0)*, and *F(4)*. $F(-1) = 0$ $F(0) = 6 - 6e^{-1/2}$ $F(4) = 6e^{2} - 6e^{-1/2}$	+1 for 0 +1 for $6 - 6e^{-1/2}$ +1 for $6e^{2} - 6e^{-1/2}$
c. Graphically show the area given by the value *F(0)*. 	+2: graph of $3e^{x/2}$ +1: shaded area

4. $F(x)=\int_0^x (2t+1)\,dt$

a. Find the accumulation function *F*. $\int_0^x (2t+1)\,dt =$ $t^2+t\Big\vert_0^x = x^2+x$	+2: antiderivative +1: answer
b. Evaluate *F(0)*, F(2), and *F(6)*. $F(0)=0$ $F(2)=6$ $F(6)=42$	+1: 0 +1: 6 +1: 42
c. Graphically illustrate the area given by the value *F(2)*. 	+2: graph of $y=2t+1$ +1: shaded area

5. Consider the region bounded by the graphs of $f(x)=\sqrt{x}$, $y=0$, and $x=2$.

a. Find the volume of the solid formed by rotating the region about the *x*-axis. $\pi\int_0^2 \left(\sqrt{x}\right)^2 dx =$ $\pi\frac{x^2}{2}\Big\vert_0^2 = 2\pi \approx 6.283$	+2: integral +1: limits, constant, answer
b. Find the volume of the solid formed by rotating the region about the *y*-axis. $\pi\int_0^{\sqrt{2}} \left(4-y^4\right)dy =$ $\pi\left(4y-\frac{y^5}{5}\right)\Big\vert_0^{\sqrt{2}} = \frac{16\sqrt{2}}{5}\pi \approx 14.217$	+2: integral +1: limits, constant, answer
c. Find the volume of the solid formed by rotating the region about the line $y=-2$. $\pi\int_0^2 \left[\left(\sqrt{x}+2\right)^2-4\right]dx =$ $\pi\int_0^2 \left(x+4\sqrt{x}+4-4\right)dx =$ $\pi\left(\frac{x^2}{2}+\frac{8}{3}x^{3/2}\right)\Big\vert_0^2 =$ $\left(2+\frac{16}{3}\sqrt{2}\right)\pi \approx 29.979$	+2: integral +1: limits, constant, answer

6. Consider the region bounded by $y = x^3$, $y = 8$, and $x = 0$.

a. Find the volume of the solid formed by rotating the region about the *y*-axis $\pi\int_0^8 \left(\sqrt[3]{y}\right)^2 dy =$ $\pi\left(\frac{3}{5}y^{5/3}\right)\Big\|_0^8 = \frac{96}{5}\pi \approx 60.319$	+2: integrand +1: limits, constant, answer
b. Find the volume of the solid formed by rotating the region about the *x*-axis. $\pi\int_0^2 \left(8^2 - \left(x^3\right)^2\right) dx =$ $\pi\int_0^2 \left(64 - x^6\right) dx =$ $\pi\left[64x - \frac{x^7}{7}\right]_0^2 = \frac{768}{7}\pi \approx 344.678$	+2: integrand +1: limits, constant, answer
c. Find the volume of the solid formed by rotating the region about the line $x = 2$. $\pi\int_0^8 \left(2^2 - \left(2 - \sqrt[3]{y}\right)^2\right) dy =$ $\pi\int_0^8 \left(4y^{1/3} - y^{2/3}\right) dy =$ $\pi\left[3y^{4/3} - \frac{3}{5}y^{5/3}\right]_0^8 =$ $\pi\left[3(16) - \frac{3}{5}(32)\right] = \frac{144}{5}\pi \approx 90.478$	+2: integrand +1: limits, constant, answer