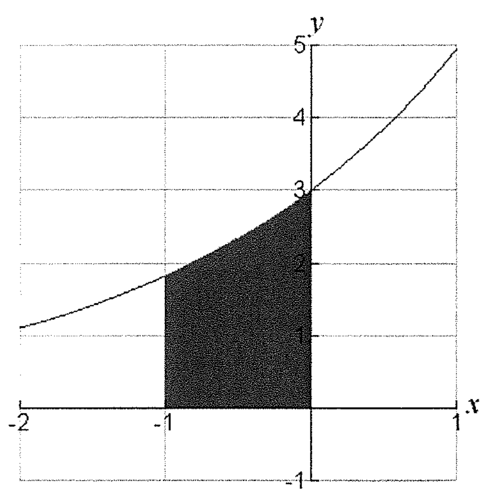
1. The functions $f(x)=2-x^2$ and $g(x)=-x$ are given.

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

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

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 $\pi\int_0^8 \left(\sqrt[3]{y}\right)^2 dy =$ $\pi\left(\frac{3}{5}y^{5/3}\right)\Big\vert_0^8 = \frac{96}{5}\pi \approx 60.319$	+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

7. Do the following:

a. Find the distance between the points (1, 2) and (7, 10) using integration. $\int_1^7 \sqrt{1+\left(\frac{4}{3}\right)^2}\,dx =$ $\int_1^7 \frac{5}{3}\,dx = \frac{5}{3}x\Big\vert_1^7 = 10$	+2: integral +1: answer
b. Find the length of the curve $y = 1 + 6x^{3/2}$ on the interval [0, 1]. $\int_0^1 \sqrt{1+\left(9x^{1/2}\right)^2}\,dx = \int_0^1 \sqrt{1+81x}\,dx =$ $\frac{1}{81}\left(\frac{2(1+81x)^{3/2}}{3}\right)\Bigg\vert_0^1 = \frac{2}{243}\left(82^{3/2}-1\right)$	+2: integral +1: answer
c. Find the length of the curve $y = \frac{x^3}{6} + \frac{1}{2x}, \frac{1}{2} \le x \le 1$ $\int_{1/2}^1 \sqrt{1+\left(\frac{x^2}{2}-\frac{1}{2x^2}\right)^2}\,dx =$ $\int_{1/2}^1 \sqrt{\frac{x^4}{4}+\frac{1}{2}+\frac{1}{4x^4}}\,dx = \int_{1/2}^1 \sqrt{\left(\frac{x^2}{2}+\frac{1}{2x^2}\right)^2}\,dx = .$ $\left(\frac{x^3}{6}-\frac{1}{2x}\right)\Bigg\vert_{1/2}^1 = \frac{31}{48}$	+2: integral +1: answer

9. Let $\boldsymbol{R}$ be the region bounded by the graph of $y = x^2 - 1$ and the graph of $x = y^2$.

$x^2 - 1 = \pm\sqrt{x}$ when $x = 0.52489$ and 1.49022. Let $A = 0.52489$ and $B = 1.49022$.
Let $S = -\sqrt{A} = -0.72449$ and $T = \sqrt{1.49022} = 1.22074$

a. Find the area of $\boldsymbol{R}$. Area = $\int_S^T \left(\sqrt{y+1} - y^2\right) dy = 1.377$	+1: integrand +1: limits +1: answer
b. Find the volume of the solid generated when $\boldsymbol{R}$ is rotated about the vertical line $x = 2$. V = $\pi \int_S^T \left(\left(2 - y^2\right)^2 - \left(2 - \sqrt{y+1}\right)^2 \right) dy = 11.501$	+2: integrand +1: limits, constant, answer
c. Write, but do not evaluate, an integral expression that can be used to find the volume of the solid generated when $\boldsymbol{R}$ is rotated about the line $y = -1$. V = $\pi \int_0^A \left(\left(\sqrt{x}+1\right)^2 - \left(-\sqrt{x}+1\right)^2 \right) dx + \pi \int_A^B \left(\left(\sqrt{x}+1\right)^2 - \left(x^2\right)^2 \right) dx$	+2: integrand +1: limits & constant