Author 1 _____ ☐

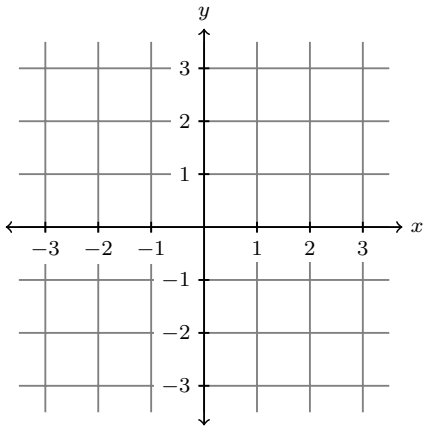
Author 2 _____ ☐

Author 3 _____ ☐

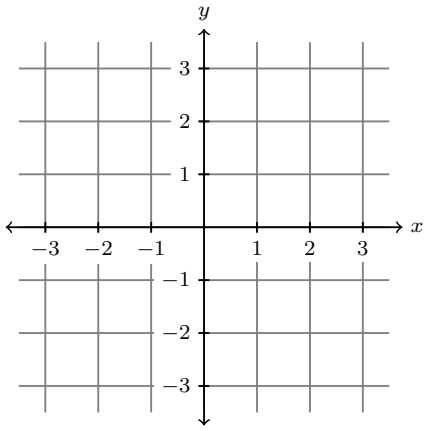
Author 4 _____ ☐

Worksheet 21

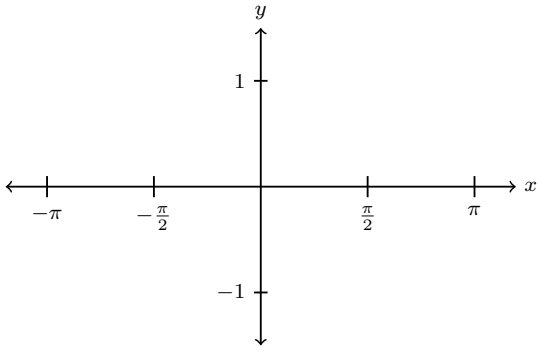
1. Graph $f(x) = x - 1$ over $[-1, 2]$, and evaluate $\int_{-1}^{2} (x-1)\,dx$ by interpreting it as (net) area.



2. Graph $f(x) = \sqrt{4 - x^2}$ over $[-2, 2]$, and evaluate $\int_{-2}^{2} \sqrt{4-x^2}\,dx$ by interpreting it as (net) area.



3. Graph $f(x) = \sin x$ over $[-\frac{\pi}{2}, \frac{\pi}{2}]$, and evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin x\,dx$ by interpreting it as (net) area.



4. Consider the integral $\displaystyle\int_1^3 \frac{1}{1+x^2}\,dx$.

(a) Express the integral as a limit of Riemann sums.

(b) Estimate the integral using 4 subintervals with midpoints as sample points.

5. The speed of a runner is recored in half-second intervals as they begin a race—assume that they are accelerating the entire time.

t in s	0	0.5	1	1.5	2
$v(t)$ in ft/s	0	6.2	10.8	14.9	18.1

(a) What is the greatest distance the runner could have traveled over the time interval $[1, 1.5]$?

(b) What is your *best* estimate of the greatest distance the runner could have traveled over $[0, 2]$?

(c) What is your *best* estimate of the least distance the runner could have traveled over $[0, 2]$?