

8. [7 points] Consider functions f and g that satisfy all of the following:

- $f(x)$ is defined, continuous, and positive for all $x > 1$.
- $\lim_{x \rightarrow 1^+} f(x) = \infty$ (so $f(x)$ has a vertical asymptote at $x = 1$).
- $g(x)$ is defined and differentiable for all real numbers, and $g'(x)$ is continuous.
- $F(x) = \frac{g(x)}{x^2 - 1}$ is an antiderivative of $f(x)$ for all $x > 1$,
- Some values of the functions g and g' appear in the below table.

x	1	5
$g(x)$	0	-3
$g'(x)$	-8	2

Compute the value of the following improper integral if it converges. If it does not converge, use a **direct computation** of the integral to show its divergence. Be sure to show your full computation, and be sure to use **proper notation**.

$$\int_1^5 f(x) \, dx$$

Circle one: **Diverges** **Converges to** _____