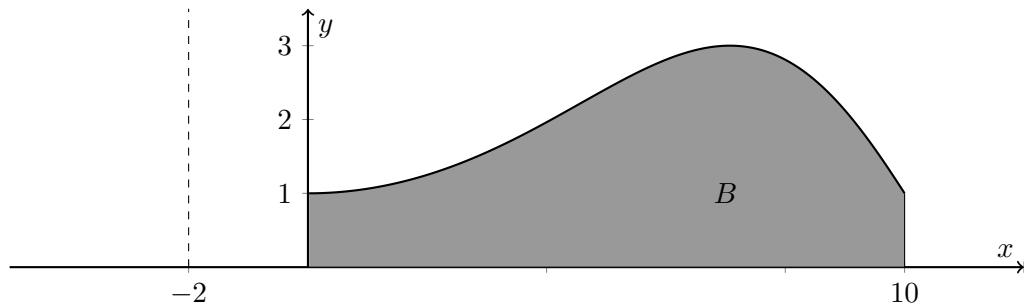


7. [9 points] Consider the region  $B$  in the first quadrant, bounded by  $x = 10$  and

$$f(x) = 1 + 2 \sin\left(\frac{\pi x^2}{100}\right), \quad 0 \leq x \leq 10$$

as shaded in the diagram below.



a. [4 points] Pianta designs a beautiful decorative urn by rotating the shaded region  $B$  around the  $x$ -axis. Write an expression involving one or more integrals for the volume of the urn. Your expression should not involve the letter  $f$ . **Do not** evaluate any integrals in your expression.

**Answer:** \_\_\_\_\_

b. [5 points] Pianta also designs a fountain basin for a city plaza by rotating the shaded region  $B$  around the line  $x = -2$  depicted above. Write an expression involving one or more integrals for the volume of the fountain basin. Your expression should not involve the letter  $f$ . **Do not** evaluate any integrals in your expression.

**Answer:** \_\_\_\_\_