

1. All continuous functions are integrable. But some functions with discontinuities are also integrable. For example, a bounded function that has a finite number of points of discontinuity on an interval  $[a, b]$  will still be integrable on the interval if it is continuous everywhere else. Find the value of the following integrals by interpreting them geometrically.

a)  $\int_0^3 \frac{x^2 - 4}{x - 2} dx$

b)  $\int_{-1}^2 \frac{|x|}{x} dx$

2. The **greatest integer function**, denoted  $\text{int}(x)$ , is a function whose value is the greatest integer less than or equal to  $x$ .

For example,  $\text{int}(3.14159) = 3$  because 3 is the greatest integer less than or equal to 3.14159 and  $\text{int}(-2.5) = -3$  because -3 is the greatest integer less than or equal to -2.5.

a)  $\text{int}(0.2) = \underline{\hspace{2cm}}$

b)  $\text{int}(2) = \underline{\hspace{2cm}}$

c)  $\text{int}(-0.5) = \underline{\hspace{2cm}}$

d) Graph  $f(x) = \text{int}(x)$  on the interval  $[-3, 3]$ .

e) Use the graph in part (d) to find the value of  $\int_1^3 \text{int}(x) dx$