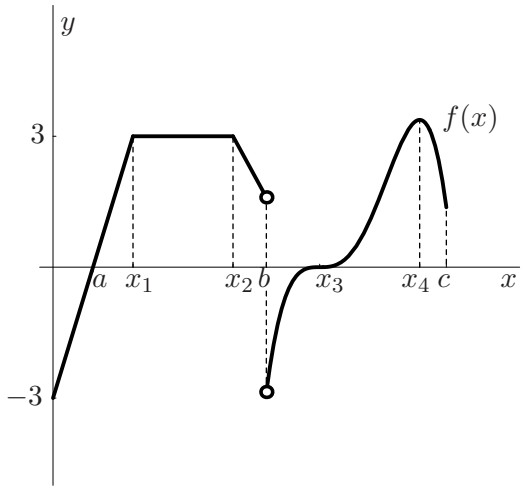
8. (17 points) Consider the graph of the function f given below. Your answers in parts (i) through (iv) may contain some of the constants a, x_1, x_2, b, x_3, x_4, or c.



(i) (2 pts.) Consider just the interval (b, c). Find all the x-values which are critical points of f on this interval (if any).

Critical points: _____.

(ii) (6 pts.) Determine the following and briefly justify your answers.

- The *value* of $\int_{x_2}^{x_1} f(x)\,dx$: _____

JUSTIFICATION:

- The *sign* of $\int_{b}^{c} f(x)\,dx$: _____

JUSTIFICATION:

(iii) (5 pts.) If: $F'(x) = f(x)$ and $F(0) = \pi$, estimate $F(x_2)$. Show step-by-step work.

(iv) (4 pts.) If F (from part (iii)) is a continuous function, determine the x-values of all the critical points of F on the interval $(0, c)$.

Critical points: _____.