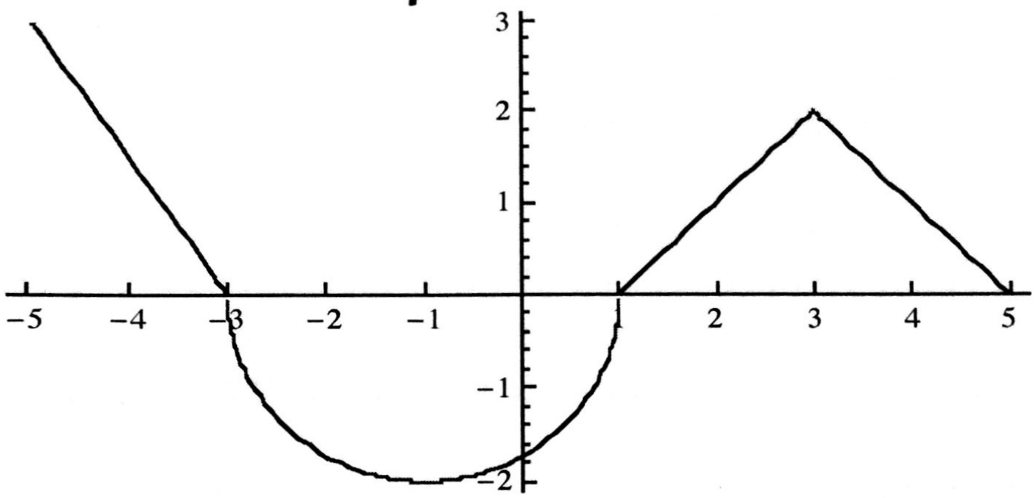
Accumulators – Graphical



(2) Let $G(x) = \int_{-3}^{x} f(t)\,dt$ and $H(x) = \int_{2}^{x} f(t)\,dt$ where f is the function shown with straight line segments and a semicircle.

(a) How are the values of $G(x)$ and $H(x)$ related?

differ by a constant $\int_{-3}^{2} f(t)\,dt$

(b) On which subintervals of [-5, 5], if any, is H increasing?

$H' = f > 0$ $(-5, -3)$, $(1, 5)$

(c) Explain why why G has a local minimum at $x = 1$.

$G' = f$ changes from neg to pos at $x = 1$

(d) Where in the interval [-5, -2] does G achieve its minimum value? Its maximum value? What are these values?

$G(-5) = -3$ ~~$G(1) = -2\pi$~~ min = -3

$G(-3) = 0$ ~~$G(2) > -2\pi, < 0$~~ max = 0 at $x = -2$

$G(-2)$

(e) Where in the interval [-5, 5] does H achieve its minimum value? Its maximum value? What are these values?

$H(-5) = -\frac{1}{2} + 2\pi - 3$ $H(1) = \frac{-1}{2}$ = min

$H(-3) = -\frac{1}{2} + 2\pi$ = max $H(2) = 0$, $H(5) = \frac{3}{2} + 2 = \frac{7}{2}$

(f) On which subintervals of [-5, 5], if any, is G concave down?

$\Rightarrow G' = f$ dec $\Rightarrow (-5, -1)$, $(3, 5)$

(g) Where does H have points of inflection?

max/min of $H' = f \Rightarrow x = -1, 3$