

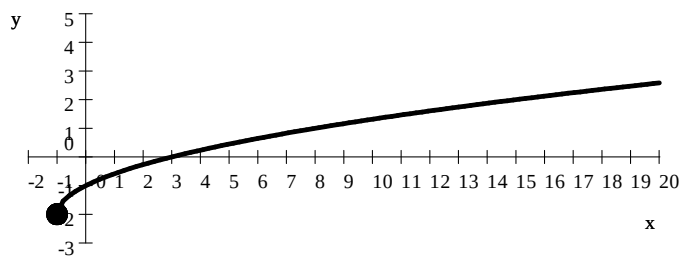
Sketch the graph and give a complete analysis for each of the following functions.

1. $f(x) = \sqrt{x+1} - 2$
2. $f(x) = 10x - x^2 + 11$ where the domain is the closed interval $[3, 8]$
3. $f(x) = 10x - x^2 + 11$ where the domain is the open interval $(3, 8)$

Answers

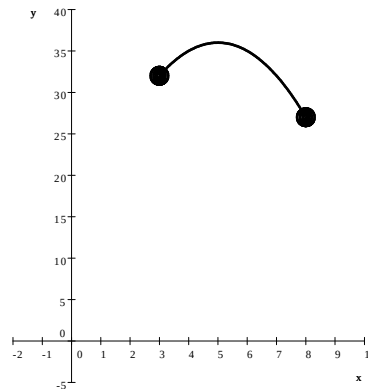
1. $f(x) = \sqrt{x+1} - 2$

domain: $[-1, \infty)$	one-to-one	no point of inflection
range: $[-2, \infty)$	no relative maximum	concave down on $(-1, \infty)$
no asymptotes	no absolute maximum	continuous on $(-1, \infty)$
y -intercept: $(0, -1)$	no relative minimum	even/odd: neither
x -intercept: $(3, 0)$	absolute minimum: $(-1, -2)$	end-behavior:
bounded from below	increasing on $(-1, \infty)$	$\lim_{x \rightarrow -\infty} f(x) = \text{undefined}$
		$\lim_{x \rightarrow \infty} f(x) = \infty$



2. $f(x) = 10x - x^2 + 11$ where the domain is the closed interval $[3, 8]$.

domain: $[3, 8]$	not one-to-one	no point of inflection
range: $[27, 36]$	relative maximum: $(5, 36)$	concave down on $[3, 8]$
no asymptotes	absolute maximum: $(5, 36)$	continuous on $(3, 8)$
no intercepts	no relative minimum	even/odd: neither
bounded	absolute minimum: $(8, 27)$	end-behavior:
	increasing: on $(3, 5)$	$\lim_{x \rightarrow -\infty} f(x) = \text{undefined}$
	decreasing: on $(5, 8)$	$\lim_{x \rightarrow \infty} f(x) = \text{undefined}$



3. $f(x) = 10x - x^2 + 11$ where the domain is the open interval $(3, 8)$

domain: $(3, 8)$	not one-to-one	no point of inflection
range: $(27, 36]$	relative maximum: $(5, 36)$	concave down on $(3, 8)$
no asymptotes	absolute maximum: $(5, 36)$	continuous on $(3, 8)$
no intercepts	no relative minimum	even/odd: neither
bounded	no absolute minimum	end-behavior:
	increasing: on $(3, 5)$	$\lim_{x \rightarrow -\infty} f(x) = \text{undefined}$
	decreasing: on $(5, 8)$	$\lim_{x \rightarrow \infty} f(x) = \text{undefined}$

