EXERCISE 8.1

A 1. State whether the given function is constant, linear, quadratic, polynomial, rational, or a root function.

(a) $f(x) = x^2 + 2x - 2$
(b) $g(x) = -1$
(c) $h(x) = \sqrt[4]{x}$
(d) $F(x) = 17x + 6$
(e) $G(x) = \dfrac{1 + x + x^2}{1 - x + x^2}$
(f) $H(t) = 12t^4 - t + 37$
(g) $R(t) = 1 - 2t$
(h) $S(x) = \sqrt{2}$
(i) $y = 1 + x^5$
(j) $y = \dfrac{x + 3}{2x + 4}$

B 2. Find the domains of the following functions.

(a) $f(x) = 2x + 7$
(b) $f(x) = x^4 - x^2 + 1$
(c) $f(x) = \dfrac{1}{x - 4}$
(d) $f(x) = \dfrac{x - 2}{x + 2}$
(e) $f(x) = \dfrac{3}{x(x - 1)}$
(f) $f(x) = \dfrac{x}{(x - 4)(x + 3)}$
(g) $g(x) = \dfrac{4}{x^2 + 6x + 5}$
(h) $g(x) = \dfrac{x^2}{x^2 - 1}$
(i) $h(x) = \dfrac{x^2}{x^2 + 1}$
(j) $h(x) = \dfrac{x^2 + x + 1}{x^2 - 3x + 2}$
(k) $y = \sqrt[3]{x}$
(l) $y = \sqrt[4]{x}$
(m) $y = \sqrt{x - 1}$
(n) $y = \dfrac{1}{\sqrt{x + 1}}$

3. Sketch the graphs of the following functions.

(a) $f(x) = 4 - 3x, \ -1 \leq x \leq 6$
(b) $f(x) = -1$
(c) $f(x) = \pi$
(d) $f(x) = 2x - 1, \ -2 \leq x \leq 2$

EXERCISE 8.1

1. (a) quadratic (b) constant (c) root (d) linear (e) rational (f) polynomial (g) linear (h) root (i) polynomial (j) rational

2. (a) $x \in \mathbb{R}$
(b) $x \in \mathbb{R}$
(c) $\{x \mid x \neq 4\}$
(d) $\{x \mid x \neq -2\}$
(e) $\{x \mid x \neq 0, x \neq 1\}$
(f) $\{x \mid x \neq 4, x \neq -3\}$
(g) $\{x \mid x \neq -1, x \neq -5\}$
(h) $\{x \mid x \neq \pm 1\}$
(i) $x \in \mathbb{R}$
(j) $\{x \mid x \neq 2\}$
(k) $\{x \mid x \geq 0\}$
(l) $\{x \mid x \geq 0\}$
(m) $\{x \mid x \geq 1\}$
(n) $\{x \mid x > -1\}$