1. Find the x and y intercepts of each radical function.

(a) $f(x) = \sqrt{x-3}$ (b) $f(x) = \sqrt{2x+4}$ (c) $f(x) = \sqrt[3]{x+7}$

(d) $f(x) = \sqrt[4]{32-8x}$ (e) $f(x) = \dfrac{\sqrt{x+5}}{x-2}$ (f) $f(x) = \dfrac{\sqrt[5]{x^2-4x-32}}{8-2x}$

(g) $f(x) = \dfrac{10-2x}{\sqrt{x-1}}$ (h) $f(x) = \dfrac{x^2+x+1}{\sqrt{7-x}}$ (i) $f(x) = \dfrac{\sqrt{x+9}}{x^2+4x+3}$

(j) $f(x) = \dfrac{\sqrt[4]{81-27x}}{x^3-8}$ (k) $f(x) = \dfrac{\sqrt{x+2}}{\sqrt{3-x}}$ (l) $f(x) = \dfrac{\sqrt[4]{x-5}}{x^2-49}$

(m) $f(x) = \dfrac{\sqrt{1-x}}{x^2+4x-5}$ (n) $f(x) = \dfrac{\sqrt[4]{x+10}}{x^3+64}$ (o) $f(x) = \dfrac{\sqrt{15-3x}}{x^2-81}$

(p) $f(x) = \dfrac{\sqrt{x-3}}{x^2-6x+9}$ (q) $f(x) = \dfrac{x^2+7x+10}{\sqrt{x+9}}$ (r) $f(x) = \dfrac{\sqrt{2x-6}}{\sqrt{x+6}}$

2. Find the domain of the following radical functions.

(Hint: consider where the radical is defined, and the denominator is zero.)

(a) $f(x) = \sqrt{x-3}$ (b) $f(x) = \sqrt{2x+4}$ (c) $f(x) = \sqrt[3]{x+7}$

(d) $f(x) = \sqrt[4]{32-8x}$ (e) $f(x) = \dfrac{\sqrt{x+5}}{x-2}$ (f) $f(x) = \dfrac{\sqrt[5]{x^2-4x-32}}{8-2x}$

(g) $f(x) = \dfrac{10-2x}{\sqrt{x-1}}$ (h) $f(x) = \dfrac{x^2+x+1}{\sqrt{7-x}}$ (i) $f(x) = \dfrac{\sqrt{x+9}}{x^2+4x+3}$

(j) $f(x) = \dfrac{\sqrt[4]{81-27x}}{x^3-8}$ (k) $f(x) = \dfrac{\sqrt{x+2}}{\sqrt{3-x}}$ (l) $f(x) = \dfrac{\sqrt[4]{x-5}}{x^2-49}$

(m) $f(x) = \dfrac{\sqrt{1-x}}{x^2+4x-5}$ (n) $f(x) = \dfrac{\sqrt[4]{x+10}}{x^3+64}$ (o) $f(x) = \dfrac{\sqrt{15-3x}}{x^2-81}$

(p) $f(x) = \dfrac{\sqrt{x-3}}{x^2-6x+9}$ (q) $f(x) = \dfrac{x^2+7x+10}{\sqrt{x+9}}$ (r) $f(x) = \dfrac{\sqrt{2x-6}}{\sqrt{x+6}}$

Answers

1. (a) x-intercepts: 3, y-intercepts: none.

   (b) x-intercepts: -2, y-intercepts: 2.

   (c) x-intercepts: -7, y-intercepts: $\sqrt[3]{7}$.

   (d) x-intercepts: 4, y-intercepts: $2\sqrt[4]{2}$.

   (e) x-intercepts: -5, y-intercepts: $-\sqrt{5}/2$.

   (f) x-intercepts: -4, 8, y-intercepts: $-1/4$.

   (g) x-intercepts: 5, y-intercepts: none.

   (h) x-intercepts: none, y-intercepts: $1/\sqrt{7}$.

   (i) x-intercepts: -9, y-intercepts: 1.

   (j) x-intercepts: 3, y-intercepts: $-3/8$.

   (k) x-intercepts: -2, y-intercepts: $\sqrt{2}/\sqrt{3}$.

   (l) x-intercepts: 5, y-intercepts: none.

   (m) x-intercepts: 1, y-intercepts: $-1/5$.

   (n) x-intercepts: -10, y-intercepts: $\sqrt[4]{10}/64$.

   (o) x-intercepts: 5, y-intercepts: $-\sqrt{15}/81$.

   (p) x-intercepts: none, y-intercepts: none.

   (q) x-intercepts: -5, -2, y-intercepts: $10/3$.

   (r) x-intercepts: 3, y-intercepts: none.

2. (a) $[3, \infty)$

   (b) $[-2, \infty)$

   (c) $(-\infty, \infty)$

   (d) $(-\infty, 4]$

   (e) $[-5, 2) \cup (2, \infty)$

   (f) $(-\infty, 4) \cup (4, \infty)$

   (g) $(1, \infty)$

   (h) $(-\infty, 7)$

   (i) $[-9, -3) \cup (-3, -1) \cup (-1, \infty)$

   (j) $(-\infty, 2) \cup (2, 3]$

   (k) $[-2, 3)$

   (l) $[5, 7) \cup (7, \infty)$

   (m) $(-\infty, -5) \cup (-5, 1)$

   (n) $[-10, -4) \cup (-4, \infty)$

   (o) $(-\infty, -9) \cup (-9, 5]$

   (p) $(3, \infty)$

   (q) $(-9, \infty)$

   (r) $[3, \infty)$