

1. Find the  $x$  and  $y$  intercepts of each of the following functions.

(a)  $f(x) = \frac{x+4}{x+1}$

(b)  $f(x) = \frac{x-10}{x-1}$

(c)  $f(x) = \frac{x+21}{x-2}$

(d)  $f(x) = \frac{x^2+5x+6}{x+1}$

(e)  $f(x) = \frac{x^2-6x-7}{x-6}$

(f)  $f(x) = \frac{x^2+4x-5}{x+1}$

(g)  $f(x) = \frac{x^2-8x+7}{x+7}$

(h)  $f(x) = \frac{x^2+4x+4}{x^2+x+1}$

(i)  $f(x) = \frac{x^3-8}{x^2+1}$

(j)  $f(x) = \frac{x^2-144}{x+1}$

(k)  $f(x) = \frac{x^3+1}{x}$

(l)  $f(x) = \frac{x^2+x+1}{x-3}$

2. Find the domain of each function below. Express your answer in interval notation.

(a)  $f(x) = \frac{1}{x+6}$

(b)  $f(x) = \frac{2}{x-8}$

(c)  $f(x) = \frac{1}{2x-1}$

(d)  $f(x) = \frac{x-3}{x^2-x-42}$

(e)  $f(x) = \frac{x-5}{x^2+8x+7}$

(f)  $f(x) = \frac{x+6}{x^2-2x-8}$

(g)  $f(x) = \frac{x}{x^3-27}$

(h)  $f(x) = \frac{x+6}{x^3-x}$

(i)  $f(x) = \frac{5}{x^2+8}$

(j)  $f(x) = \frac{6}{x^3-x^2-x-2}$

(k)  $f(x) = \frac{2x+1}{x^3+2x^2+x+2}$

(l)  $f(x) = \frac{3x}{x^3-2x^2-x+2}$

## Answers

1. (a)  $x$ -intercepts:  $-4$ ;  $y$ -intercepts:  $4$  (b)  $x$ -intercepts:  $10$ ;  $y$ -intercepts:  $10$   
(c)  $x$ -intercepts:  $-21$ ;  $y$ -intercepts:  $-\frac{21}{2}$  (d)  $x$ -intercepts:  $-3, -2$ ;  $y$ -intercepts:  $6$   
(e)  $x$ -intercepts:  $-1, 7$ ;  $y$ -intercepts:  $\frac{7}{6}$  (f)  $x$ -intercepts:  $1, -5$ ;  $y$ -intercepts:  $-5$   
(g)  $x$ -intercepts:  $1, 7$ ;  $y$ -intercepts:  $1$  (h)  $x$ -intercept:  $-2$ ;  $y$ -intercept:  $4$   
(i)  $x$ -intercept:  $2$ ;  $y$ -intercept:  $-8$  (j)  $x$ -intercepts:  $12, -12$ ;  $y$ -intercept:  $-144$   
(k)  $x$ -intercept:  $-1$ ;  $y$ -intercept: none (l)  $x$ -intercept: none;  $y$ -intercept:  $-1/3$
2. (a)  $(-\infty, -6) \cup (-6, \infty)$  (b)  $(-\infty, 8) \cup (8, \infty)$   
(c)  $\left(-\infty, \frac{1}{2}\right) \cup \left(\frac{1}{2}, \infty\right)$  (d)  $(-\infty, -6) \cup (-6, 7) \cup (7, \infty)$   
(e)  $(-\infty, -7) \cup (-7, -1) \cup (-1, \infty)$  (f)  $(-\infty, -2) \cup (-2, 4) \cup (4, \infty)$   
(g)  $(-\infty, 3) \cup (3, \infty)$  (h)  $(-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, \infty)$   
(i)  $(-\infty, \infty)$  (j)  $(-\infty, 2) \cup (2, \infty)$   
(k)  $(-\infty, -2) \cup (-2, \infty)$  (l)  $(-\infty, -1) \cup (-1, 1) \cup (1, 2) \cup (2, \infty)$