

MORE ON FUNCTIONS

For problems 1-19, find the domain of the function

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

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

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

$$4) f(x) = \frac{x-1}{x^2-7x+2}$$

$$5) f(x) = \frac{-3}{x^2+1}$$

$$6) f(x) = \frac{2x+1}{x(x+1)(x-3)}$$

$$7) f(x) = \frac{4x^2}{3x^2+6x}$$

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

$$9) f(x) = \frac{1-x-x^2}{4|2x-3|+1}$$

$$10) f(x) = \sqrt{\frac{1}{3}x+2}$$

$$11) f(x) = \frac{-1}{\sqrt{3-2x}}$$

$$12) f(x) = \sqrt{6+x-x^2}$$

$$13) f(x) = \sqrt{\frac{x}{1-x}}$$

$$14) f(x) = \sqrt{x^2-4}$$

$$15) f(x) = \sqrt[3]{x+2}$$

$$16) f(x) = \sqrt{3x^2-x-2}$$

$$17) f(x) = \sqrt{\frac{x}{x^2-4x-5}}$$

$$18) f(x) = \frac{5}{\sqrt{4x+1}-2}$$

$$19) f(x) = \frac{3x-1}{\sqrt{x+5}+1}$$

For problems 20-25, find the x-intercepts, if any

$$20) f(x) = 3x^2 - 7x - 1$$

$$21) f(x) = 3(x-2) - (1-3x) - 1$$

$$22) f(x) = |2x+3| - 7$$

$$23) f(x) = \sqrt[4]{3x+1} - 2$$

$$24) f(x) = (3x-5)^{\frac{1}{2}} - 1$$

$$25) f(x) = (2x+1)^{\frac{1}{3}} + 1$$

26) Find values of x for which the graph of $f(x) = \frac{3x^2}{x^2-1}$ lies below the x-axis.

27) Find values of x for which the graph of $f(x) = |2x+3|$ lies below the graph of $g(x) = 4$.

28) Find values of x for which the graph of $f(x) = |4-2x|$ lies below the graph of $g(x) = 6$.

29) Find values of x for which the graph of $f(x) = |7-x|$ lies above the graph of $g(x) = 1$.

30) Find values of x for which the graph of $f(x) = |5x+8|$ lies above the graph of $g(x) = 2$.

ANSWERS

$$1) \{x \mid x \neq \frac{2}{3}\} = (-\infty, \frac{2}{3}) \cup (\frac{2}{3}, +\infty).$$

$$2) \{x \mid x \neq -3, -2\} = (-\infty, -3) \cup (-3, -2) \cup (-2, +\infty),$$

$$3) \{x \mid x \neq -\sqrt{3}, \sqrt{3}\} = (-\infty, -\sqrt{3}) \cup (-\sqrt{3}, \sqrt{3}) \cup (\sqrt{3}, +\infty)$$

$$4) \{x \mid x \neq \frac{7-\sqrt{41}}{2}, \frac{7+\sqrt{41}}{2}\} = (-\infty, \frac{7-\sqrt{41}}{2}) \cup (\frac{7-\sqrt{41}}{2}, \frac{7+\sqrt{41}}{2}) \cup (\frac{7+\sqrt{41}}{2}, +\infty)$$

$$5) (-\infty, +\infty)$$

$$6) \{x \mid x \neq -1, 0, 3\} = (-\infty, -1) \cup (-1, 0) \cup (0, 3) \cup (3, +\infty)$$

$$7) \{x \mid x \neq -2, 0\} = (-\infty, -2) \cup (-2, 0) \cup (0, +\infty)$$

$$8) \{x \mid x \neq -\frac{1}{3}, -1\} = (-\infty, -1) \cup (-1, -\frac{1}{3}) \cup (-\frac{1}{3}, +\infty)$$

$$9) (-\infty + \infty)$$

$$10) \{x \mid x \geq -6\} = [-6, +\infty)$$

$$11) \{x \mid x < \frac{3}{2}\} = (-\infty, \frac{3}{2})$$

$$12) \{x \mid -2 \leq x \leq 3\} = [-2, 3]$$

$$13) \{x \mid 0 \leq x < 1\} = [0, 1)$$

$$14) \{x \mid x \leq -2 \text{ or } x \geq 2\} = (-\infty, -2] \cup [2, +\infty)$$

$$15) (-\infty, +\infty)$$

$$16) \{x \mid x \leq -\frac{2}{3} \text{ or } x \geq 1\} = (-\infty, -\frac{2}{3}] \cup [1, +\infty)$$

$$17) \{x \mid -1 < x \leq 0 \text{ or } x > 5\} = (-1, 0] \cup (5, +\infty)$$

$$18) \{x \mid x \geq -\frac{1}{4}, x \neq \frac{3}{4}\} = [-\frac{1}{4}, \frac{3}{4}) \cup (\frac{3}{4}, +\infty)$$

$$19) \{x \mid x \geq -5\} = [-5, +\infty)$$

$$20) \left(\frac{7-\sqrt{61}}{6}, 0\right) \cup \left(\frac{7+\sqrt{61}}{6}, 0\right)$$

$$21) \left(\frac{4}{3}, 0\right)$$

$$22) (2, 0), (-5, 0)$$

$$23) (5, 0)$$

$$24) (2, 0)$$

$$25) (-1, 0)$$

$$26) x \text{ in } (-1, 0) \cup (0, 1)$$

$$27) x \text{ in } \left(-\frac{7}{2}, \frac{1}{2}\right)$$

$$28) x \text{ in } (-1, 5)$$

$$29) x \text{ in } (-\infty, 6) \cup (8, \infty)$$

$$30) x \text{ in } (-\infty, -2) \cup \left(-\frac{6}{5}, \infty\right)$$