

3.2 Introduction to Functionsrelation - set of ordered pairsfunction - relation in which no two ordered pairs have the same first coordinates but different second coordinates $\{(1,2), (3,4), (5,6), (6,1), (7,2)\}$ Is this relation a function? **yes** $\{(1,2), (3,4), (1,5), (2,4)\}$ function? **no** $\{(1,2), (2,2), (3,2), (4,2), (5,2)\}$ function? **yes**

$$y = 3x^2 - 2x$$

 $(0,0), (1,1), (-1,5)$ x is the independent variable
(we can choose values to plug in) y is the dependent variable
(y values are dependent on the x values we plug in) $\Rightarrow y$ is a function of x functional notation: $y = f(x)$

"f of x"

NOT ~~f "times" x~~

Evaluating a Function

$$f(x) = 3x^2 - 2x \quad \begin{matrix} (x, y) \\ (x, f(x)) \end{matrix}$$

$$f(2) = 3(2)^2 - 2(2) = \boxed{8} \quad (2, 8)$$

$$f(-3) = 3(-3)^2 - 2(-3) = \boxed{33} \quad (-3, 33)$$

$$-9 \neq 3^2 \neq (-3)^2 = 9$$

$$h(t) = 7 - 2t$$

$$h(-5) = 17$$

$$h(4) = -1$$

$$h(x) = 7 - 2x$$

$$\begin{aligned} h(x+4) &= \\ &= 7 - 2(x+4) = \\ &= 7 - 2x - 8 \\ &= -2x - 1 \end{aligned}$$

Domain & Range

$$f(x) = \frac{1}{x}$$

Domain: the set of $x \neq 0$

real numbers for which
the function value is
a real number

(the set of numbers that
"make sense" when you
plug them into the function)

* exclude values of variable
that give us 0 in the denominator
& negative values under a radical

$$\frac{1}{0} \quad \sqrt{-5}$$

What values are not in the domain?

$$f(x) = \frac{3}{x-4}, \quad x \neq 4$$

$$f(x) = \frac{x+3}{x-7}, \quad x \neq 7$$

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

What is the domain?

$$f(x) = \sqrt{x} \quad \{x \mid x \geq 0\} \quad [0, \infty)$$

$$f(x) = \sqrt{x+2} \quad \begin{matrix} x+2 \geq 0 \\ x \geq -2 \end{matrix} \quad \{x \mid x \geq -2\}$$

$$f(x) = \sqrt{5-x} \quad \begin{matrix} 5-x \geq 0 \\ 5 \geq x \\ x \leq 5 \end{matrix} \quad \{x \mid x \leq 5\}$$

Range : output of the domain

$$\{(1,2), (3,4), (5,6), (7,8)\}$$

$$\text{domain: } \{1, 3, 5, 7\} \quad (\text{x-coord's})$$

$$\text{range: } \{2, 4, 6, 8\} \quad (\text{y-coord's})$$

$$f(x) = \frac{3x-2}{x+4}$$

$$\text{domain: } \{-1, -2, 1\}$$

$$\text{range: } \left\{-\frac{5}{3}, -7, \frac{1}{5}\right\}$$

$$f(-1) = \frac{3(-1)-2}{-1+4} = -\frac{5}{3}$$

$$f(-2) = \frac{3(-2)-2}{-2+4} = -7$$

$$f(1) = \frac{3(1)-2}{1+4} = \frac{1}{5}$$

Recommended textbook problems:

3.2 #3-16, 21-44, 49-88

Reflection after Test #1:

1. How did you prepare for the first test? Be specific.
2. What do you plan to do differently for the next test? (e.g. go to Math Lab more often, work more homework problems, take more practice tests, etc.; maybe you don't plan to do anything differently?)
3. How well-prepared did you think you were for the test before you took it? What grade did you expect to make?
4. After taking the test, how well-prepared were you actually? What grade do you think you made?
5. Do you think that you will do more homework problems from the book from now on, watch more videos on Khan Academy, work more practice problems on Khan Academy, all three, none, or some combination? Which do you think you do enough of already and which do you think you need to do more of?