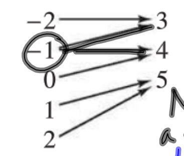
PreCalculus - Warm Up - 8/23/17

Let $f(x) = x^2 - 2$ and find the following:

1. f (2) $= 2$
2. f (-4) $= 14$
3. f (x - 1) $x^2 - 2x - 1$

Do the relation or ordered pairs in the sets shown represent a function? Explain.

4. *Domain* *Range*



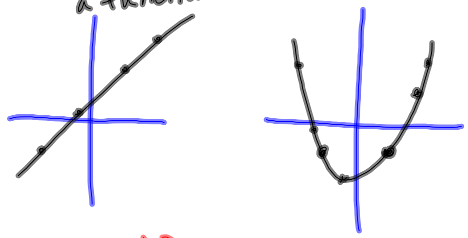
NOT a function

5. $A = \{a, b, c\}$ and $B = \{0, 1, 2, 3\}$

(a) $\{(a, 1), (c, 2), (c, 3), (b, 3)\}$ NO

(b) $\{(a, 1), (b, 2), (c, 3)\}$ YES

(c) $\{(1, a), (0, a), (2, c), (3, b)\}$ YES



NO repeated inputs

↓

IS a function

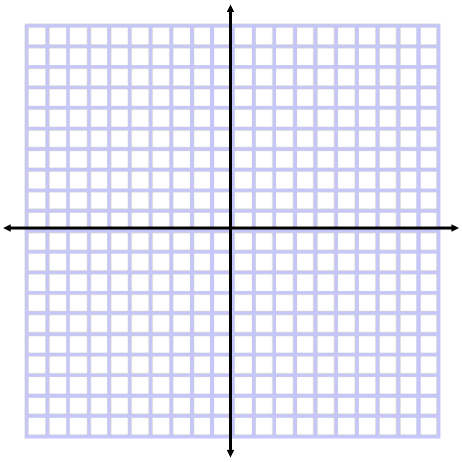
Functions

Section 1.2

Evaluate the following function when x = -1 and when x = 1.

$$f(x) = \begin{cases} 3, x \le 1 \\ -2, x > 1 \end{cases}$$

Graph the piecewise defined function.



Part 1: Piecewise Functions

Evaluate the function when $x = -1$ and $x = 0$.

$$f(x) = \begin{cases} x^2 + 1, & x < 0 \\ x - 1, & x \ge 0 \end{cases}$$

(0,1) open circle

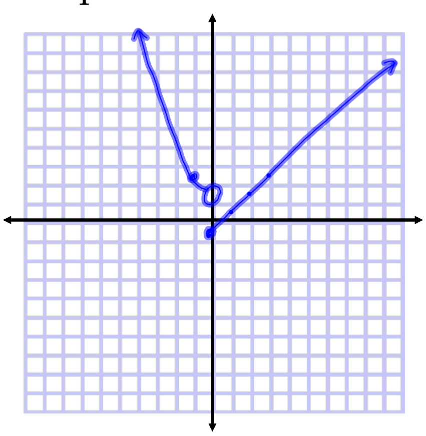
$f(-1) = 2$

(-1, 2)

$f(0) = -1$

(0, -1) closed circle

Graph the piecewise-defined function.



① $f(x) = \begin{cases} 3x+2 & x \le -4 \\ -4 & x > -4 \end{cases}$

$f(-2) = -4 \quad f(10) = -4$

⑥ $f(x) = \begin{cases} -3x+1 & x \le 6 \\ \frac{2}{3}x+3 & x > 6 \end{cases}$

$f(-2) = 7 \quad f(10) = \frac{2}{3}\left(\frac{10}{1}\right)+3$

$\frac{20}{3} + \frac{\cancel{3}\,9}{\cancel{1}\,3}$

$\boxed{\frac{29}{3}}$

If g(x) = $x^2 + 4x + 1$, find the following values:

a) g(2) = 13

b) g(x + 2) = $(x+2)^2 + 4(x+2) + 1$

$x^2 + 4x + 4 + 4x + 8 + 1$

$\boxed{x^2 + 8x + 13}$

c) g(x + h)

$(x+h)^2 + 4(x+h) + 1$

$(x+h)(x+h)$

$x^2 + 2hx + h^2 + 4x + 4h + 1$

Part 3: Difference Quotients

One of the basic definitions in calculus employs the ratio

$$③ \; ② \; ① \; \frac{f(x+h)-f(x)}{h}, \quad h \neq 0.$$

For $f(x) = x^2 - 4x + 7$, find:

① $f(x+h) = (x+h)^2 - 4(x+h) + 7$

$x^2 + 2hx + h^2 - 4x - 4h + 7$

② $f(x+h) - f(x) = \cancel{x^2} + 2hx + h^2 \cancel{-4x} - 4h \cancel{+7} - (\cancel{x^2} \cancel{-4x} \cancel{+7})$

③ $$\frac{2hx + h^2 - 4h}{h}$$

$$\frac{\cancel{h}(2x + h - 4)}{\cancel{h}}$$

$$\boxed{2x + h - 4}$$

Attachments

Function definition