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 Class: Math 1301 Date: 2-7-13
 Topic/Section: More About Functions

Examples and Vocabulary	Notes/Comments/Questions
① Evaluate the following functions for the given inputs. Then write the domain. a. $y = g(x) = x^2 - x$ $g(4) = 4^2 - 4 = 16 - 4 = 12$ $(4, 12)$ $g(-4) = (-4)^2 - (-4) = 16 + 4 = 20$ $(-4, 20)$ $g(a+1) = (a+1)^2 - (a+1) = (a+1)(a+1) - a - 1$ $= a^2 + \cancel{a} + a + \cancel{1} - a - 1$ $= a^2 + a$ $g(x-h) = (x-h)^2 - (x-h)$ $= (x-h)(x-h) - x + h$ $= x^2 - \underbrace{hx - hx}_{2hx} + h^2 - x + h$ $= x^2 - 2hx + h^2 - x + h$ domain = all real numbers	What two types of numbers must be avoided in finding the domain of a function represented by a formula?

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$b. \quad h(x) = \frac{5}{x-2}$	$x-2=0$ $x=2$
$h(0) = \frac{5}{0-2} = \frac{5}{-2} = -\frac{5}{2} = -2.5$	
$h(2) = \frac{5}{2-2} = \frac{5}{0} \rightarrow \text{undefined}$	
$\text{domain} = \text{all real numbers except } 2$ $x \neq 2$	
$c. \quad f(x) = \frac{x-2}{5}$	
$f(2) = \frac{2-2}{5} = \frac{0}{5} = 0$	
$\text{domain} = \text{all real numbers}$	

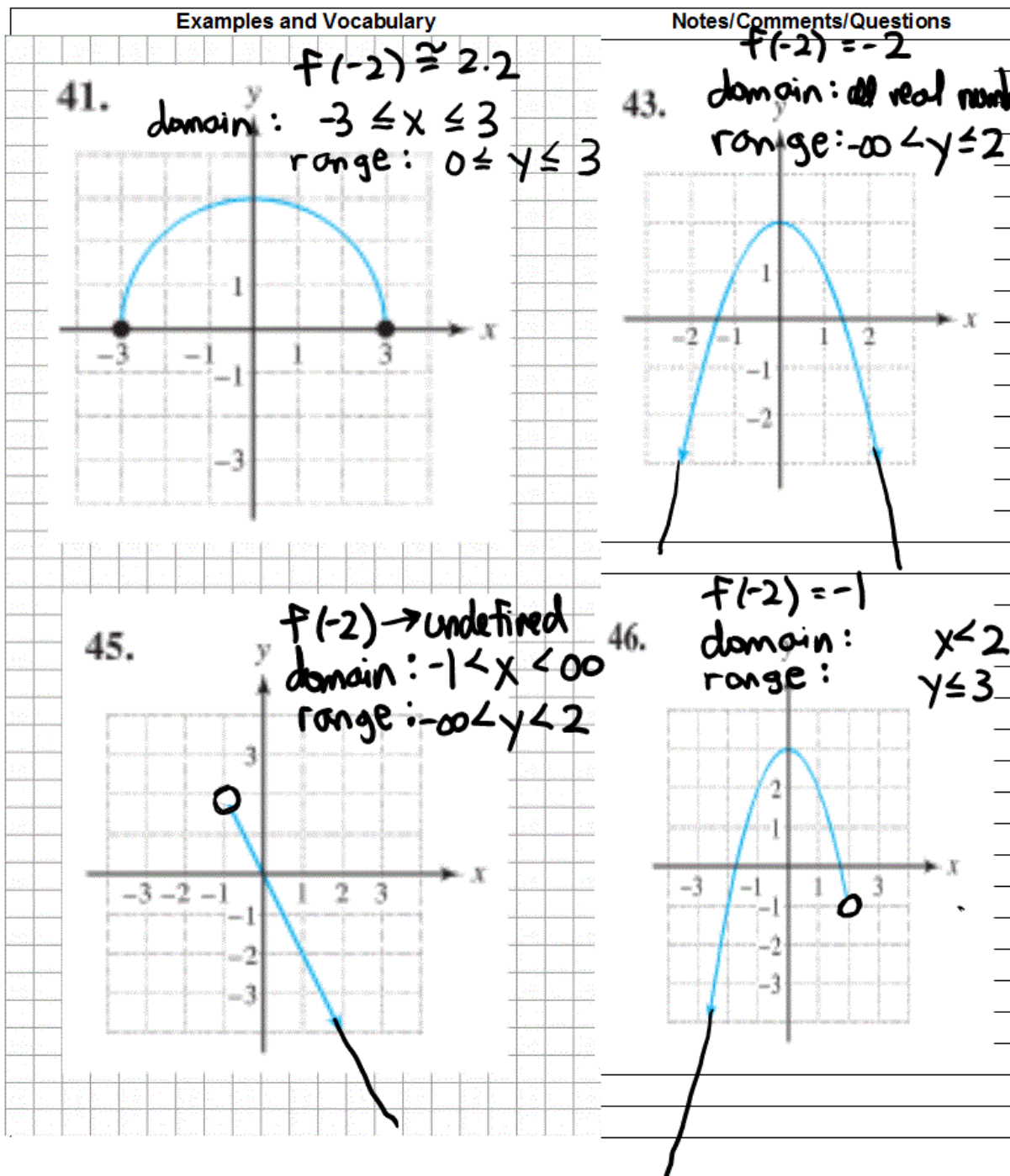
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Examples and Vocabulary	Notes/Comments/Questions
$d. \quad s(t) = \sqrt{t-2}$	$t-2 \geq 0$ $+2 \quad +2$ $t \geq 2$
$s(6) = \sqrt{6-2} = \sqrt{4} = 2$	
$s(4) = \sqrt{4-2} = \sqrt{2} \sim 1.414$	
$s(2) = \sqrt{2-2} = \sqrt{0} = 0$	
$s(0) = \sqrt{0-2} = \sqrt{-2} \rightarrow$	not a real number
domain =	all real numbers greater than or equal 2 $t \geq 2$

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Examples and Vocabulary	Notes/Comments/Questions
e. $y = \frac{4x}{x^2 - x - 2}$ $y(0) = \frac{4 \cdot 0}{0^2 - 0 - 2} = \frac{0}{-2} = 0$ domain = all real numbers except -1 and 2 $x \neq -1, x \neq 2$	$x^2 - x - 2 = 0$ $(x+1)(x-2) = 0$ $x+1=0$ or $x-2=0$ $x=-1$ $x=2$
f. Section 1.3, # 41, 43, 45, 46 ; $f(-2)$	What is the purpose of open and closed dots on the graph of a function?

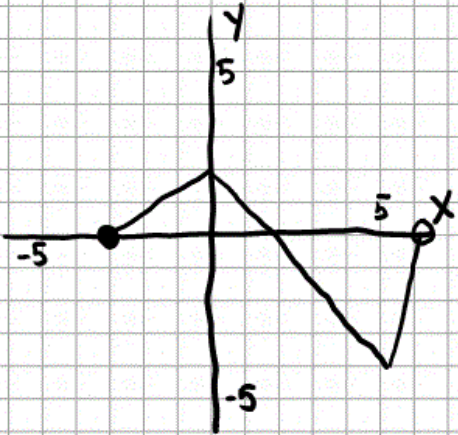
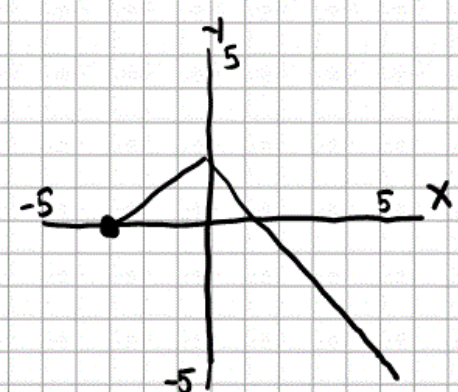
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Examples and Vocabulary	Notes/Comments/Questions
② For the function in part 1c, is -2 in the range? Yes! When $x=2$ or $x=-1$, $y=-2$ ✓ $y = \frac{4x}{x^2 - x - 2} \quad (x^2 - x - 2)(-2) = \frac{4x}{x^2 - x - 2} (x^2 - x - 2)$ $-2x^2 + 2x + 4 = 4x$ $0 = 4x + 2x^2 - 2x - 4$ $0 = 2x^2 + 2x - 4$ $0 = 2(x^2 + x - 2) = 2(x+1)(x-2)$ Yes! Is 3 in the range? Yes or $x+1=0 \rightarrow x=-1$ or $x-2=0 \rightarrow x=2$	How do we determine if a number is in the range of a function represented by a formula?
③ For part 1f #43, find all inputs x such that $f(x) = 1$. $x=1$ or $x=-1$ Find all x such that $f(x) = -2$.	$x=2$ or $x=-2$

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Examples and Vocabulary	Notes/Comments/Questions
1. 	domain: $-3 \leq x < 6$ range: $-4 \leq y \leq 2$
2. 	domain: $-3 \leq x$ the rest of the line range: $-\infty < y \leq 2$