Day 3

Tuesday, August 29, 2017
8:16 PM

Plan:

I. HW Check + Warm Up
II. Go over HW questions
III. Function Exploration
IV. 1.2 Analyzing Graphs - Notes
V. Review finding x- and y-intercepts
VI. Start HW

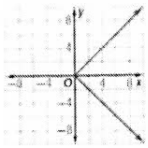
5-Minute Check (over Lesson 1-1)

Use with Lesson **1-2**

Determine whether each relation represents y as a function of x.

1. $2y + 5x = 7$ → yes, equation of a line

2.



→ no, does not pass vertical line test

Find each function value.

3. $f(-2)$ if $f(x) = 6 - x^2$ $f(-2) = 6 - (-2)^2 = 6 - 4 = 2$

4. $f(3a)$ if $f(x) = \sqrt{x^2 - 4}$ $f(3a) = \sqrt{(3a)^2 - 4} = \sqrt{9a^2 - 4}$

Standardized Test Practice

5. State the domain of $f(x) = \frac{1}{\sqrt{x-3}}$. $x - 3 > 0$, $x > 3$, $(3, \infty)$

A $[3, \infty)$ **C** $(3, \infty)$

B $(-3, 3)$ **D** $(-\infty, 3) \cup (3, \infty)$

ANSWERS

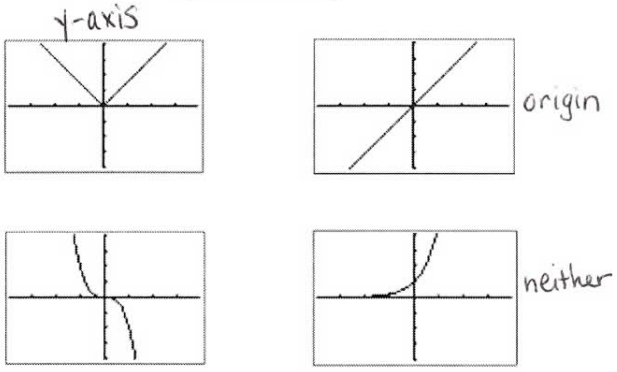
1. y is a function of x.
2. y is not a function of x.
3. 2
4. $\sqrt{9a^2 - 4}$
5. C

Chapter 1 Glencoe Precalculus

Today's Objectives:

- Use graphs of functions to estimate function values and find domains, ranges, *y*-intercepts, and zeros of functions.
- Explore symmetries of graphs, and identify even and odd functions.

Symmetry



Decide which of the following are symmetric about the origin and which are symmetric about the y-axis.

The type of symmetry will tell us if the function is even, odd, or neither.

Function Exploration

1. Plug your number into each function below. Graph the function (make an x-y table) and label your point.

$y = x^2$ $y = x^5$ $y = 3x$ $y = x^4 - x^2$

2. When directed, find your absolute x-value partner and compare your points on each graph. Then answer the discussion questions below.

Discussion:

1. When a function was even, where was your partner's point?

2. When a function was even, where was your partner's point?

What if we don't know what the graph looks like? Could we still determine if the function is even or odd?

KeyConcept Even and Odd Functions

Type of Function	Algebraic Test
Functions that are symmetric with respect to the y-axis are called **even functions**.	For every x in the domain of f, $f(-x) = f(x)$.
Functions that are symmetric with respect to the origin are called **odd functions**.	For every x in the domain of f, $f(-x) = -f(x)$.

*Found on Page 18

Let's use the algebra test to determine if a function is even, odd, or neither. We will use the graphing calculator to verify our solution.

Example 6

Analyze the graph to determine whether the function is *even*, *odd*, or *neither*. Confirm algebraically. If even or odd, describe the symmetry of the graph of the function.

A. $f(x) = x^3 - 2x$ odd B. $g(x) = x^4 + 2$ even C. $h(x) = x^3 - 0.5x^2 - 3x$ neither

What do you notice about the exponents in each equation and whether the function is even, odd, or neither?

highest exponent odd → odd function
highest exponent even → even function
> usually! ~~have to~~ confirm with algebra

Without solving or graphing, predict whether each of these functions are even, odd, or neither.

$f(x) = \frac{2}{x^2}$ $(2x^{-2})$ even $g(x) = 4\sqrt{x}$ $(4x^{\frac{1}{2}})$ neither $h(x) = x^5 - 2x^3 + x$ odd

Algebraically

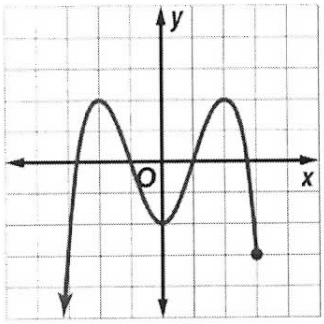
A. $f(1) = (1)^3 - 2(1) = -1$
$f(-1) = (-1)^3 - 2(-1) = 1$
$f(-x) = -f(x)$ odd

B. $g(1) = (1)^4 + 2 = 3$
$g(-1) = (-1)^4 + 2 = 3$
$g(-x) = g(x)$ even

C. $h(1) = (1)^3 - 0.5(1)^2 - 3(1)$
$= 1 - 0.5 - 3 = -2.5$
$h(-1) = (-1)^3 - 0.5(-1)^2 - 3(-1)$
$= -1 - 0.5 + 3 = 1.5$
neither

Review key features of graphs: Domain, Range, and x & y intercepts

Using the given graph, identify the domain and range using interval notation and the x and y intercepts using set notation.



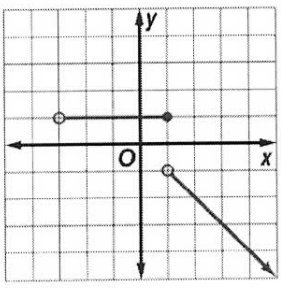
Domain $(-\infty, 3]$

Range $(-\infty, 2]$

x-intercepts $\{x \mid x = -2.8, x = -1, x = 1, x = 2.8\}$ or $\{-2.8, -1, 1, 2.8\}$

y-intercept $\{y \mid y = -2\}$ or $\{-2\}$

Using the given graph, identify the domain and range using interval notation and the x and y intercepts using set notation.



Domain $(-3, 1] \cup (1, \infty)$

Range $(-\infty, -1) \cup [1, 1]$

x-intercepts $\{\emptyset\}$ (empty set)

y-intercept $\{1\}$

How can we algebraically find the y-intercepts of the function $f(x) = \frac{-2x^3+4}{3}$?

y-intercept means $x = 0$

$y = \frac{-2(0)^3 + 4}{3}$

$y = \frac{4}{3}$

You Try: find the y-intercepts of the function $g(x) = |x - 5| - 1$

$y = |0 - 5| - 1$

$y = |-5| - 1$

$y = 5 - 1$

$y = 4$

Review: To find the y-intercept of a graph of a function f algebraically, find $f(0)$.

How can we algebraically find the x-intercepts of the function $f(x) = \frac{-2x^3+4}{3}$?

$y = \frac{-2x^3+4}{3}$

$0 = \frac{-2x^3+4}{3}$

$0 = -2x^3 + 4$

x-int means $y = 0$

$-4 = -2x^3$

$2 = x^3$

$\sqrt[3]{2} = x$

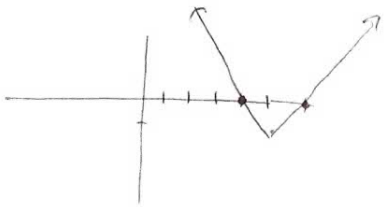
You Try: find the x-intercepts of the function $g(x) = |x - 5| - 1$

$0 = |x - 5| - 1$

$1 = |x - 5|$

$1 = x - 5$ $\quad -1 = x - 5$

$6 = x$ $\quad 4 = x$



Review: To find the x-intercept of a graph of a function f algebraically, find the values of x for which $f(x) = 0$.

Re-Cap Today's Objectives:

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