From the Teacher: Mr. Haut

Class: Algebra 2

Periods: 3 and 4

Assignment: Week 1

If turning in paper packet and work, make sure to include this header information on all pages!

From the Student:
Student Name
Teacher Name
Name of class
Period #
Assignment #

Distance Learning 2020 Week 1 (April 20th-April 24th)

Assignments are accessible in Microsoft Teams on Office 365. Work can also be submitted in Teams, which I highly encourage you to do if you are able to. You can contact Mr. Haut if you need help with Teams. You must write your name in pen on each page of your assignment.

The work in this packet is not officially due until 5/8/2020. However, I have broken down the work into daily chunks to help you manage your time. I encourage you to have the work from week 1 complete by 4/24/2020. New assignments for weeks 2 and 3 will be given on that date.

My office hours are 1 pm – 3 pm, M–F. You can reach me through Remind (@haut-alg2), email (dhaut@tusd.net) or chat on Teams. Please continue to check your e-mail regularly.

*If turning in work on Teams (which I highly encourage you to do if you are able to), you can do your assignment on binder paper and then upload a picture of it. Please write your name in pen on each page before you take a picture. Make sure your picture is clear and your work is readable.

Week 1: Day 1 (turn in by May 8, 2020):

Range and End Behavior (This is review.)

Resources that can help:

- Textbook pg. 5-10
- The HMH Reteach 1.1 (attached)
- HMH Online Interactive Student Edition Lesson 1.1 (my.hrw.com)

Assignment #1 : Wrksht HMH 1.1 Practice A/B *Put all work on a separate piece of paper.*

Week 1: Day 2 (turn in by May 8, 2020):

Characteristics of Function Graphs (This is review.)

Resources that can help:

- Textbook pg. 17-21
- The HMH Reteach 1.2 (attached)
- HMH Online Interactive Student Edition Lesson 1.2 (my.hrw.com)

Assignment #2: Wrksht HMH 1.2 Practice A/B *Put all work on a separate piece of paper.*

Week 1: Day 3 (turn in by May 8, 2020):

Range and End Behavior (This is review.)

Resources that can help:

- Textbook pg. 47-51
- The HMH Reteach 1.4 (attached)
- HMH Online Interactive Student Edition Lesson 1.4 (my.hrw.com)

Assignment #3 : Wrksht HMH 1.4 Practice A/B *Put all work on a separate piece of paper.*

Week 1: Day 4 (turn in by May 8, 2020):

Solving Quadratics by taking Square Roots (This is review.)

Resources that can help:

- Textbook pg. 113-119
- The HMH Reteach 3.1 (attached)
- HMH Online Interactive Student Edition Lesson 3.1 (my.hrw.com)

Assignment #4 : Wrksht HMH 3.1 Practice A/B *Put all work on a separate piece of paper.*

Week 1: Day 5 (turn in by May 8, 2020):

Complex Solutions of Quadratic Equations (This is review.)

Resources that can help:

- Textbook pg. 139-144
- The HMH Reteach 3.3 (attached)
- HMH Online Interactive Student Edition Lesson 3.3 (my.hrw.com)

Assignment #5 : Wrksht HMH 3.3 Practice A/B *Put all work on a separate piece of paper.*

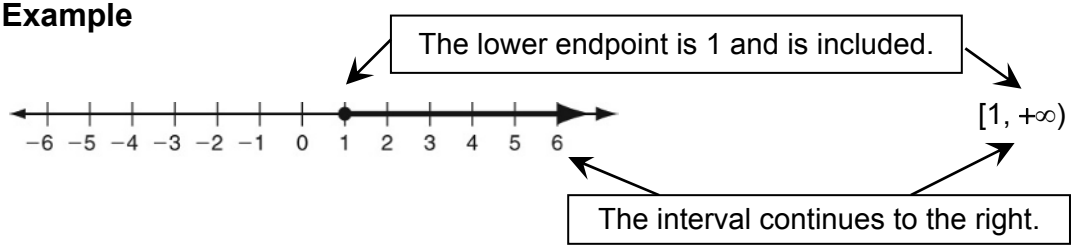
LESSON 1-1

Domain, Range, and End Behavior

Reteach

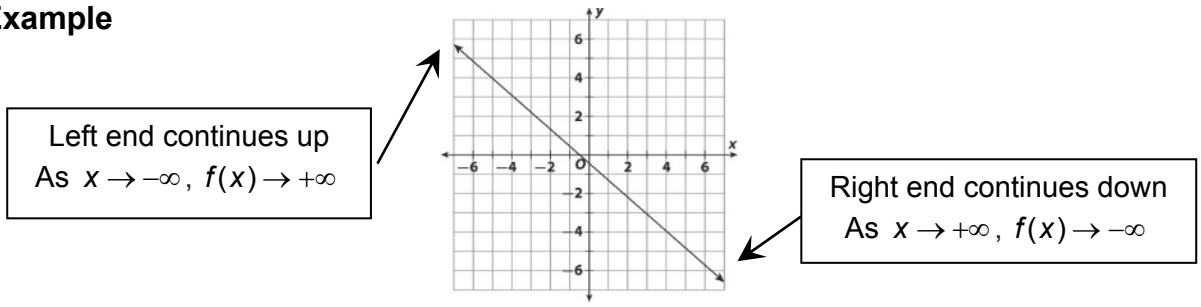
To represent part of a number line using interval notation use a square bracket if the endpoint is included, use a parenthesis if the endpoint is not included. Use $-\infty$ or $+\infty$ if the interval continues to the left or right.

Example



To find end behavior for a function, trace the graph to its left ($x \to -\infty$) and right ($x \to +\infty$) ends. If it continues up, $f(x)$ goes to $+\infty$. If it continues down, $f(x)$ goes to $-\infty$.

Example



Name _____ Date _____ Class _____

LESSON 1-1

Domain, Range, and End Behavior

Practice and Problem Solving: A/B

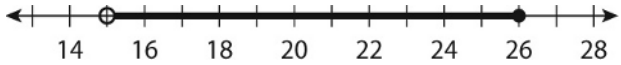
Describe the interval shown using an inequality, set notation, and interval notation.

1. 

Inequality: _____

Set Notation: _____

Interval Notation: _____

2. 

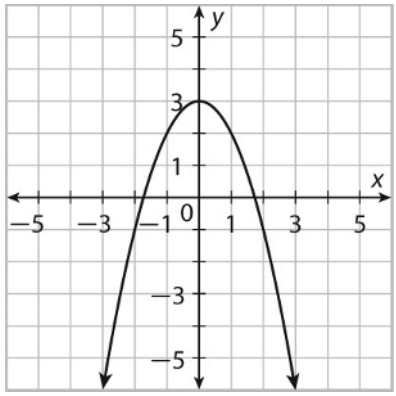
Inequality: _____

Set Notation: _____

Interval Notation: _____

Describe the domain and range of the graph using an inequality, set notation, and interval notation. Then describe its end behavior.

3. Graph of $f(x) = -x^2 + 3$:



Domain:

Inequality: _____

Set Notation: _____

Interval Notation: _____

Range:

Inequality: _____

Set Notation: _____

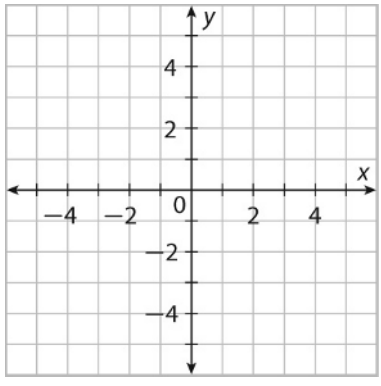
Interval Notation: _____

End Behavior:

_____

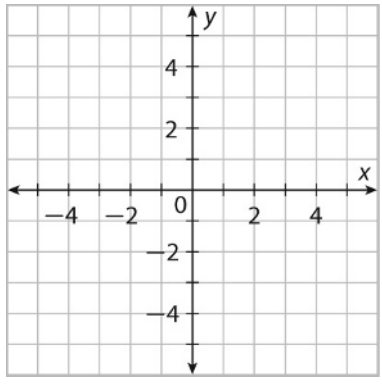
Draw the graph of the function with its given domain. Then determine the range using interval notation.

4. $g(x) = -3x + 2$ with domain $(-1, 2]$:



Range: _____

5. $h(x) = 0.5x - 1$ with domain $(-\infty, 4)$:



Range: _____

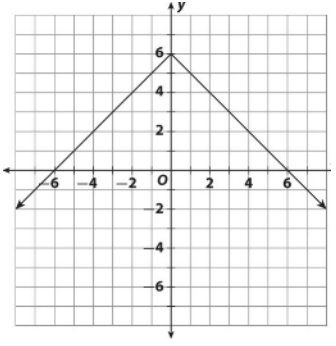
LESSON 1-2

Characteristics of Function Graphs

Reteach

Example

Attribute of Function	Graph Characteristic	Interval
Positive	Above *x*-axis	$(-6, 6)$
Negative	Below *x*-axis	$(-\infty, -6) \cup (6, +\infty)$
Zero(s)	Crosses *x*-axis	$x = -6$, $x = 6$
Increasing	Uphill (from left–right)	$(-\infty, 0)$
Decreasing	Downhill (from left–right)	$(0, +\infty)$
Local Maximum	Top of "peak"	$f(x) = 6$ at $x = 0$
Local Minimum	Bottom of "valley"	None



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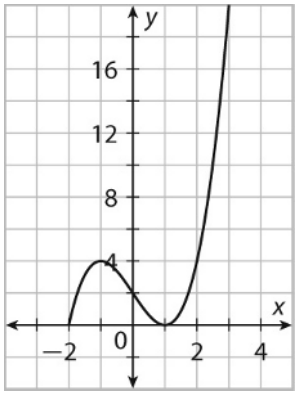
LESSON 1-2

Characteristics of Function Graphs

Practice and Problem Solving: A/B

Use the graph to answer Problems 1–4.



1. On which intervals is the function increasing and decreasing?

_____

_____

2. What are the local maximum and minimum values?

_____

_____

3. What are the zeros of the function?

_____

4. What is the domain and range?

_____

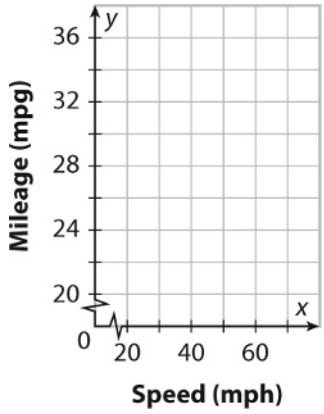
_____

Shelley is studying the relationship between her car's mileage (miles per gallon) and speed (miles per hour). The table shows the data Shelley found. Use the table for Problems 5–7.

Speed (miles per hour)	30	40	50	60	70
Mileage (miles per gallon)	34.0	33.5	31.5	29.0	27.5

5. Make a scatter plot of the data. Then use a calculator to find an equation for the line of best fit. Sketch the line.

   Equation of line: _____



6. Use the equation found in Problem 5 to predict the miles per gallon of Shelly's car for a speed of 55 miles per hour.

_____

7. Is the prediction found in Problem 6 an example of interpolation or extrapolation? Explain.

_____

_____

_____

LESSON 1-4

Inverses of Functions

Reteach

To find the inverse of a function:

1. Substitute y for $f(x)$.
2. Solve for x in terms of y.
3. Switch x and y.
4. Replace y with $f^{-1}(x)$.

Example: $f(x) = 6x - 1$

$$y = 6x - 1$$

$$y + 1 = 6x$$

$$\frac{y+1}{6} = x$$

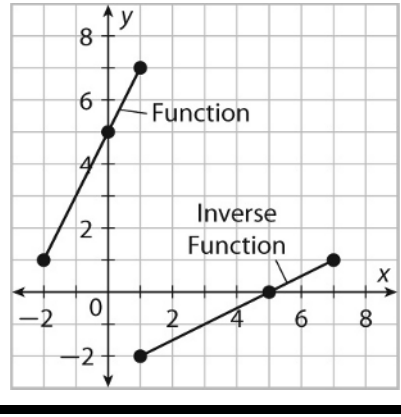
$$y = \frac{x+1}{6}$$

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

The inverse of a function switches the xs and ys, causing each point on the graph to reflect across the diagonal line $y = x$.

Example

Function		Inverse Function	
x	y	x	y
−2	1	1	−2
0	5	5	0
1	7	7	1



Name _____ Date _____ Class _____

LESSON 1-4

Inverses of Functions

Practice and Problem Solving: A/B

Find the inverse of each function.

1. $f(x) = 10 - 4x$ _____

2. $g(x) = 15x - 10$ _____

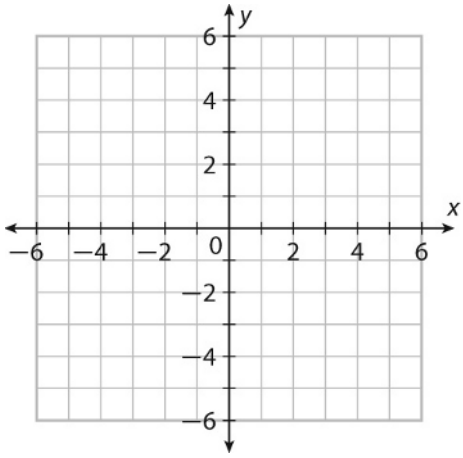
3. $h(x) = \frac{x - 12}{4}$ _____

4. $j(x) = \frac{3x + 1}{6}$ _____

Find the inverse of each function. Then graph the function and its inverse.

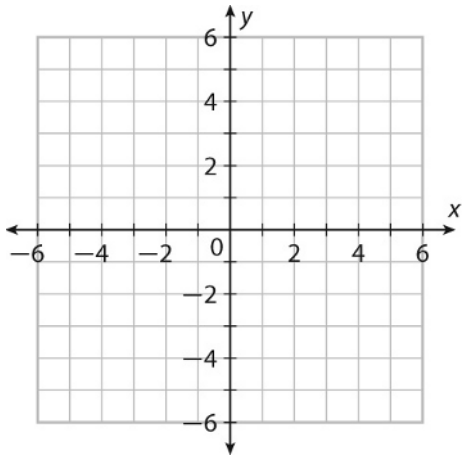
5. $f(x) = 5x + 10$

$f^{-1}(x) =$ _____



6. $f(x) = \frac{9}{2}x - 5$

$f^{-1}(x) =$ _____



Use composition to determine whether each pair of functions are inverses.

7. $g(x) = -5 - \frac{7}{2}x$ and $f(x) = -\frac{2}{7}x - \frac{10}{7}$ _____

8. $s(x) = 7 - 2x$ and $t(x) = \frac{1}{2}x + \frac{7}{2}$ _____

9. $h(x) = \frac{1}{3}x + 4$ and $j(x) = 3x - 12$ _____

LESSON 3-1

Solving Quadratic Equations by Taking Square Roots

Reteach

Imaginary numbers are the square roots of negative numbers. You can use the following information to simplify the square root of a negative number.

Product Property of Square Roots

$\sqrt{ab} = \sqrt{a}\sqrt{b}$

$(a \geq 0, b \geq 0)$

Quotient Property of Square Roots

$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

$(a \geq 0, b > 0)$

Definition of *i*

$i = \sqrt{-1}$

Square Root of a Negative Number Property

$\sqrt{-r} = i\sqrt{r} \qquad (r > 0)$

Example Simplify $\sqrt{-32}$.

Rewrite using the Square Root of a Negative Number Property and the Product Rule of Square Roots; then simplify.

$\sqrt{-32}$

$i \cdot \sqrt{16} \cdot \sqrt{2}$

$4i\sqrt{2}$

Example Simplify $\sqrt{-\frac{3}{4}}$.

Rewrite using the Square Root of a Negative Number Property and the Quotient Rule of Square Roots; then simplify.

$\sqrt{-\frac{3}{4}}$

$i \cdot \frac{\sqrt{3}}{\sqrt{4}}$

$i \cdot \frac{\sqrt{3}}{2}$, or $\frac{i}{2}\sqrt{3}$

To solve simple quadratic equations of the form $x^2 = a$, use the method of taking square roots.

Example Solve $x^2 - 28 = 0$.

Add 28 to both sides. $x^2 = 28$

Take the square root. $x = \pm\sqrt{28}$

Simplify the square root. $x = \pm\sqrt{4} \cdot \sqrt{7}$

$x = \pm 2\sqrt{7}$

Example Solve $x^2 + 45 = 0$.

Subtract 45 from both sides. $x^2 = -45$

$x = \pm\sqrt{-45}$

Take the square root. $x = \pm i\sqrt{9} \cdot \sqrt{5}$

Simplify the square root. $x = \pm 3i\sqrt{5}$

Name _____ Date _____ Class _____

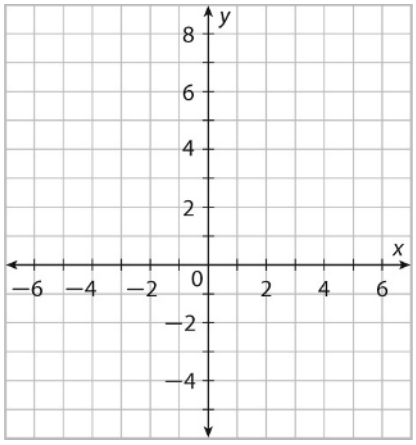
LESSON 3-1

Solving Quadratic Equations by Taking Square Roots

Practice and Problem Solving: A/B

For Problems 1–3, solve the equation $-2x^2 + 7 = -1$ using the indicated method. Show your work.

1. Solve by graphing.



2. Solve by factoring.

3. Solve by taking square roots.

Find the square of each imaginary number.

4. $4i$

5. $i\sqrt{11}$

6. $\frac{i\sqrt{7}}{3}$

Determine whether each equation has real or imaginary solutions by solving.

7. $7x^2 - 12 = 0$

8. $x^2 + 9 = 3$

9. $2\left(x^2 - 1\right) = \left(x^2 - 3\right)$

Recall the equation for falling objects: $h(t) = h_0 - 16t^2$, where h is the height of the object, in feet, at any time t, in seconds, and h_0 is the object's initial height in feet. Use this equation for Problems 10–11.

10. A carpenter dropped a hammer from a rooftop 48 feet above ground. How long did it take the hammer to hit the ground?

11. An acorn fell from a branch 20 feet high and landed on a branch 7 feet high. How long did it take the acorn to fall?

LESSON 3-3

Finding Complex Solutions of Quadratic Equations

Reteach

One way to solve quadratic equations of the form $ax^2 + bx + c = 0$ is to use the

Quadratic Formula $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Example Solve. $2x^2 + 5x + 5 = -1$

Step 1 Write in the form $ax^2 + bx + c = 0$. $2x^2 + 5x + 6 = 0$

Step 2 Write the Quadratic Formula. $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Step 3 Substitute values.
$$= \frac{-5 \pm \sqrt{5^2 - 4(2)(6)}}{2(2)}$$
$$= \frac{-5 \pm \sqrt{25 - 48}}{2(2)}$$

Step 4 Simplify.
$$= \frac{-5 \pm \sqrt{-23}}{4}$$
$$= \frac{-5 \pm i\sqrt{23}}{4}$$

So, the two solutions are $\frac{-5 + i\sqrt{23}}{4}$ and $\frac{-5 - i\sqrt{23}}{4}$.

Name _____ Date _____ Class _____

LESSON 3-3

Finding Complex Solutions of Quadratic Equations

Practice and Problem Solving: A/B

Solve using the quadratic formula.

1. $x^2 + 10x = -9$

2. $x^2 + 2x = -4$

3. $x^2 + 5x = 3$

4. $2x^2 + 7x + 10 = 0$

Find the discriminant of each equation. Then determine the number of real or nonreal solutions.

5. $x^2 - 3x = -8$

6. $x^2 + 4x = -3$

7. $2x^2 - 12x = -18$

Complete the square for each expression. Write the resulting expression as a binomial squared.

8. $x^2 - 4x + \square$

9. $x^2 + 12x + \square$

10. $25x^2 - 10x + \square$

Solve each equation by completing the square.

11. $x^2 + 2x = 3$

12. $2x^2 = 8 + 10x$

13. $-3x^2 + 18x = -30$

14. $4x^2 = -12x + 4$

15. The height in meters of a baseball t seconds after it is hit straight up in the air with a velocity of 45 m/s is given by $h = -9.8t^2 + 45t + 1.2$. Will a baseball hit straight up with this velocity hit the roof of a batting cage with a maximum height of 64.5 m? Use the discriminant to explain your answer.