Mathematics

WARM-UPS

Grade 8

WALCH EDUCATION®

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Standards Correlations

Mathematics Warm-Ups for Common Core State Standards, Grade 8 is correlated to five domains of CCSS Grade 8 mathematics. The page numbers, titles, and standard numbers are included in the table that follows. The full text of the CCSS mathematics standards for Grade 8 can be found in the Common Core State Standards PDF at http://www.walch.com/CCSS/00001.

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(*continued*)

NAME:

THE NUMBER SYSTEM

CCSS 8.NS.1

Irrational Numbers

Use the information below and what you know about irrational numbers to answer the question that follows.

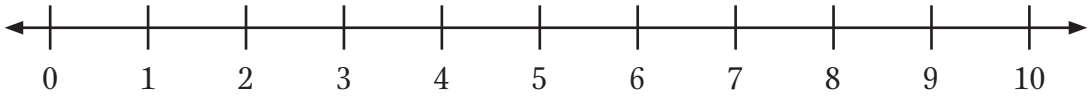
> An irrational number is a number that cannot be expressed as a fraction. Any decimals that are not terminating and do not repeat are irrational numbers. More technically, a rational number is a number that can be expressed in the form $\frac{x}{y}$, where x and y are integers and y is not 0.

Is $\sqrt{2}$ an irrational number? Why or why not? Explain your thinking.

NAME:

Where Do They Go?

Using the number line below, show approximately where each number would fall. Explain your thinking.



1. $\sqrt{96}$

2. $\sqrt{35}$

3. $\sqrt{24}$

4. $\sqrt{17}$

NAME:

Tearing and Stacking Paper

Read the scenario that follows, and then answer the questions.

> Mr. Andres poses the following problem to his math class: Take a large sheet of paper and tear it exactly in half. Then you have 2 sheets of paper. Put those 2 sheets together and tear them exactly in half. Then you have 4 sheets of paper. Continue this process of tearing and putting together for a total of 50 tears.

If the paper is only $\frac{1}{1{,}000}$ of an inch thick, how many sheets of paper would there be?

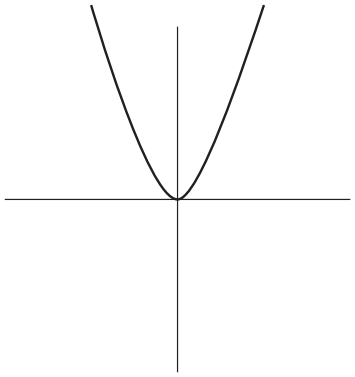
How thick or tall would the stack of paper be?

NAME:

Linear vs. Nonlinear

A linear equation is an equation that can be graphed by a straight line. A nonlinear equation is an equation that cannot be represented by a line. Determine whether the following graphs are linear or nonlinear. Write your answer on the line below each graph.

1.



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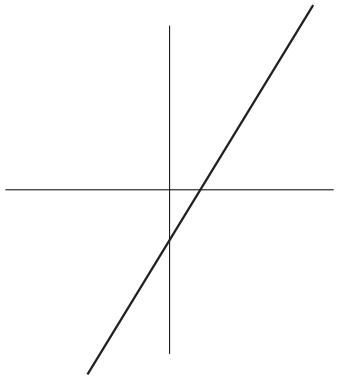

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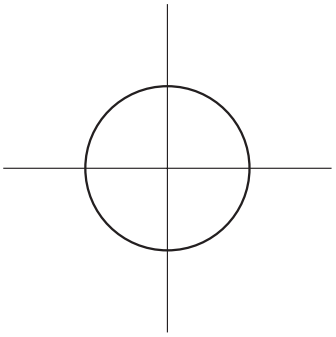

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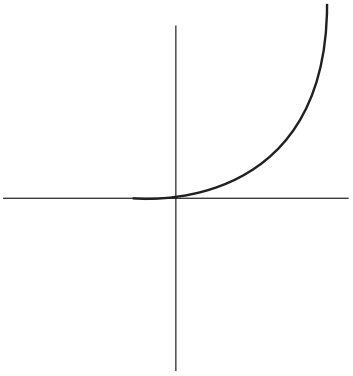

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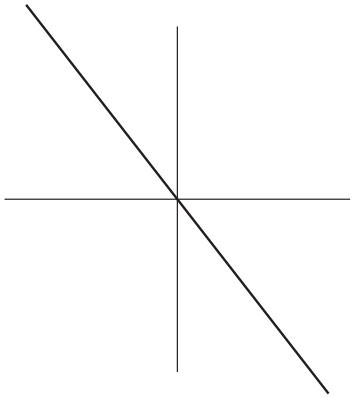

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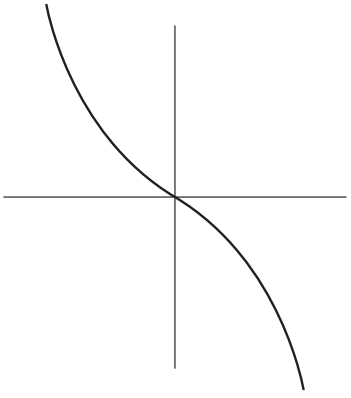


NAME:

Graphing Linear Functions

Using a function to generate output will lead to the production of a set of ordered pairs. We use ordered pairs when plotting points on a coordinate plane. For example, look at the chart below. The output can be used as the *y*-coordinate.

Input (x)	Function ($2x + 1$)	Output (y)
1	2(1) + 1	3
2	2(2) + 1	5
3	2(3) + 1	7
4	2(4) + 1	9

The ordered pairs created are (1, 3), (2, 5), (3, 7), and (4, 9). They all lie on a straight line. You can connect the points to see all the other points on the line.

Graph the line generated by each function below. Use *x*-values from at least 0 to 5.

1. $y = 2x - 2$

2. $y = x + 1$

EXPRESSIONS AND EQUATIONS

CCSS 8.EE.7b

The Seesaw Problem

Read the information in each problem, and then answer the questions.

1. Caleb and his friend Alex are playing on the seesaw at the playground. Alex weighs 70 pounds. Caleb and Alex balance perfectly when Alex sits about 3 feet from the center and Caleb sits about $2\frac{1}{2}$ feet from the center. About how much does Caleb weigh?

2. Alex's identical twin brother Samuel joins them and sits next to Alex. Can Caleb balance the seesaw with both Alex and Samuel on one side, if Samuel weighs about the same as Alex? If so, where should Caleb sit? If not, why not?

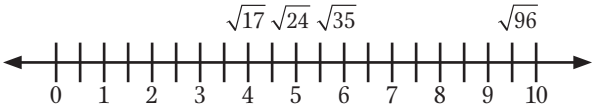
Answer Key

The Number System

Irrational Numbers, p. 1

Yes, it's irrational. It's a decimal that continues without repeating.

Where Do They Go?, p. 2



Expressions and Equations

Tearing and Stacking Paper, p. 3

$2^{50} = 1.125899907 \times 10^{15}$ sheets of paper /1,000 = $1.125899907 \times 10^{12}$ inches /12 = $9.382499224 \times 10^{10}$ feet /5,280 = 17,769,884.89 miles

Linear vs. Nonlinear, p. 4

1. nonlinear
2. linear
3. nonlinear
4. nonlinear
5. linear
6. nonlinear

Graphing Linear Functions, p. 5

1. graph of ordered pairs (0, –2), (1, 0), (2, 2), (3, 4), (4, 6), (5, 8)
2. graph of ordered pairs (0, 1), (1, 2), (2, 3), (3, 4), (4, 5), (5, 6)

The Seesaw Problem, p. 6

1. Caleb weighs about 84 pounds.
2. If Alex and Samuel continue to sit at 3 feet, then $140 \times 3 = 84 \times D$, and $D = 5$ feet. If the seesaw is long enough, then Caleb can balance them. Otherwise, he cannot.

Systems of Linear Equations, p. 7

Answers will vary.

1. Sample answer: to find an ordered pair that satisfies both equations
2. Sample answer: Graph both lines on the same set of axes, and locate the intersection point of the two lines.
3. Sample answer: Substitute values of x into both equations. Look for identical y values for the same value of x.
4. Sample answer: solve algebraically by substitution or elimination
5. Sample answer: If the values in the table have the same constant rate of change, if the lines are parallel, or if the slopes are the same but have different y-intercepts, then there is no solution.

Exploring Systems of Equations, p. 8

1. a. Check graphs for accuracy.

   b.

x	0	1	2	3	4	5
y	–3	–1	1	3	5	7

2. a. Check graphs for accuracy.

   b.

x	0	1	2	3	4	5
y	12	9	6	3	0	–3

3. (3, 3)
4. (3, 3)
5. The point satisfies both equations.
6. The point only works in the first equation.
7. Any other point chosen will only work in one of the equations, not in both equations.

Nathan's Number Puzzles I, p. 9

Word puzzles will vary.

1. (2, 1)
2. (–2, 4)
3. not possible

Understanding Systems of Linear Equations, p. 10

Students' choices and rationales may vary.

1. (–4, –5)
2. (–6, 4)
3. (–20, 10)
4. (3.6, 2.4)

Nathan's Number Puzzles II, p. 11

1. $x + y = 10$; $x + 2y = 8$; (12, –2)
2. $x + 2y$; $x + y = 15$; (10, 5)
3. $x - y = 2$; $2x - 2y = 4$; Any values for x and y that differ by 2 will work in this puzzle. There are infinite solutions.

Functions

Contaminated Drinking Water, p. 12

1. 24,975; 20,350; 15,725