

GRADE 8 UNIT 4 – FUNCTIONS AND GEOMETRY

<p>Established Goals: Standards</p> <p>8.F.1: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.</p> <p>8.F.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</p> <p>8.F.3: Interpret the equation $y=mx +b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side lengths is not linear because its graph contains the points (1, 1), (2, 4), and (3, 9) which are not on a straight line.</p> <p>8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that the square root of 2 is irrational.</p> <p>8.G.6: Explain a proof of the Pythagorean Theorem and its converse.</p> <p>8.G.7: Apply the Pythagorean Theorem to determine unknown side lengths in right</p>	Transfer	
	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> define functions as a rule that assigns one output to each input and determine if data represented as a graph or in a table is a function. compare two functions each represented in a different way (numerically, verbally, graphically, and algebraically) and draw conclusions about their properties (rate of change and intercepts). utilize equations, graphs, and tables to classify functions as linear or non-linear, recognizing that $y = mx + b$ is linear with a constant rate of change. evaluate square roots and cubic roots of small perfect squares and cubes respectively and use square and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ where p is a positive rational number. Identify $\sqrt{2}$ as irrational. explain a proof of the Pythagorean Theorem and its converse. utilize the Pythagorean Theorem to determine unknown side lengths of right triangles in two and three dimensions to solve real-world and mathematical problems. use the Pythagorean Theorem to determine the distance between two points in the coordinate plane. 	
	Meaning	
	ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
	<ul style="list-style-type: none"> Relations show any correspondence between sets, while functions show <i>predictable</i> relations between sets. Linear functions are defined by constant slope. Written descriptions, tables, graphs, and equations are useful in representing and investigating relationships between varying quantities. There are many relationships between the lengths of the sides of a right triangle. 	<ul style="list-style-type: none"> How can I determine the rule that produces the output from the given input? How can I identify a function? How can I tell the difference between a relation and a function? Which tells me more about the relationship I am investigating – a table, a graph, or an equation? Why? What is the Pythagorean Theorem and when does it apply in real life?
	Acquisition	
	KNOWLEDGE	SKILLS
	<i>Students will know how to...</i>	<i>Students will be skilled at...</i>

<p>triangles in real-world and mathematical problems in two or three dimensions</p> <p>8.G.8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p>	<ul style="list-style-type: none"> • identify a relation and a function. • define a function as a rule that assigns one output to each input. • classify functions as linear and non-linear. • evaluate square roots and cube roots. • classify square and cube roots as rational and irrational. • explain a proof of the Pythagorean Theorem and its converse. • use the Pythagorean Theorem to determine unknown side lengths of right triangles. • use the Pythagorean Theorem to determine the distance between two points in the coordinate plane. 	<ul style="list-style-type: none"> • identifying relations and functions. • defining why a given relation is a function. • classifying functions as linear and non-linear. • evaluating square roots and cube roots. • classifying square roots and cube roots as rational or irrational. • explaining a proof of the Pythagorean Theorem and its converse. • using the Pythagorean Theorem to determine unknown side lengths of right triangles. • using the Pythagorean Theorem to find the distance between two points in the coordinate plane.
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Vocabulary	Instruction and Pacing	
Function Relation Mapping Diagram Vertical-Line Test Square Root Cube Root Rational Irrational Pythagorean Theorem Leg Hypotenuse	Pretest	1 day
	Functions	2 weeks
	Square and Cube Roots	1 week
	Pythagorean Theorem	2 weeks
	Post-Test	1 day

Resources
<ul style="list-style-type: none"> • <i>Course 3</i> Chapter 3: Lessons 1, 2, 3; Chapter 11: Lessons 3, 4, 5, 6, 7 • Manipulatives: <ul style="list-style-type: none"> ○ Number Line ○ Fraction Tiles • Study Island • http://phschool.com • https://www.pearsonsuccessnet.com

- Buckle Down
- Games/Centers

Differentiation and Accommodations

Provide graphic organizers
 Provide additional examples and opportunities for additional problems for repetition
 Provide tutoring opportunities
 Provide retesting opportunities after remediation (up to teacher and district discretion)
 Teach for mastery not test
 Teaching concepts in different modalities
 Adjust pace and homework assignments

ELL Modifications

21st Century Skills

Critical Thinking, Creative Thinking, Collaborating, Communicating, and Technology Literacy

Instructional Strategies

Fairfield Township School recognizes the importance of the varying methodologies that may be successfully employed by teachers within the classroom and, as a result, identifies a wide variety of possible instructional strategies that may be used effectively to support student achievement. These may include, but not be limited to, strategies that fall into categories identified by the Framework for Teaching by Charlotte Danielson:

- Communicating with students
- Using questioning and discussion techniques
- Engaging students in learning
- Using assessment in instruction
- Demonstrating Flexibility and Responsiveness

Interdisciplinary Connections

ELA, Science, and Technology

Common Misconceptions

If the y values repeat, then the relation is not a function.
 A square number means you multiply the base by 2.
 To find the leg (a) of a right triangle, you square side b and c and add their values.

Proper Conceptions

If the x values repeat, then the relation is not a function.
 When you square a number, you multiply the base by itself.
 To find the leg (a) of a right triangle, you square side b and c and subtract their values.

Performance Task

In the coordinate plane, what is the distance between the points $(-2, 3)$ and $(4, 0)$? Give the exact solution or round your answer to the nearest tenth.

- Plot the points on a coordinate plane.
- What formula can you use to find the distance between the given points in the coordinate plane?
- Use this formula to find the distance between the points in the coordinate plane. Round your solution to the nearest tenth.
- What is the maximum distance between the two points? What is the minimum distance between the two points?

Rubric

When used as a quiz grade (based on 100%), each bullet would be worth 25 points for a correct answer, with the last bullet being worth 2 points for each correct distance.

ASSESSMENTS

Suggested Formative Assessment

Problem of the Day

Lesson Quizzes

Exit Ticket

Anecdotal Records (Topic Observation Checklist)

Suggested Summative Assessment

Grade level developed Unit/Envisions Topic Tests

Ed-Connect Express Tests /State Unit Benchmark Assessment/Performance Task

