Algebra 1 Unit 4: Functions
Lessons 1–5: Functions and Their Representations

Note that the focus for this unit is primarily on this first section. If additional time is needed, consider cutting from the later sections and leaving most of the first section intact.

<table>
<tr>
<td rowspan="2">Explore, Play, and Discuss</td>
<td colspan="2">

I can explain when a relationship between two quantities is a function.
I can identify independent and dependent variables in a function, and use words and graphs to represent the function.
I can make sense of descriptions and graphs of functions and explain what they tell us about situations.
I understand what function notation is and why it exists.

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Activity Suggestions:

➢ Lesson 1 can be completed in an online or paper journal. Activity 3 benefits from a worked example to support problem 2.
➢ Lesson 2 Can be completed in an online or paper journal. Activities 2 and 3 benefit from a worked example.

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Assessment Suggestions:

➢ Check Your Readiness assessment: Administer items 1, 2, 3, 4, 8 and 9. Use the guidance provided with each problem to adjust instruction so that students can access the math in this unit.
➢ Lesson 1 cool-down
➢ Journal Entry: What is function notation and why does it exist? What is a question you have about function notation?

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<td rowspan="2">Deep Dive</td>
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When given a statement written in function notation, I can explain what it means in terms of a situation.
I can describe the connections between a statement in function notation and the graph of the function.
I can use function notation to efficiently represent a relationship between two quantities in a situation.
I can use statements in function notation to sketch a graph of a function.
I can write equations that represent the rules of functions

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Activity Suggestions:

➢ Lesson 2 synthesis: sync discussion
➢ Lesson 3: sync discussion
➢ Lesson 4: Activities 1 and 3, sync discussion

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Assessment Suggestions:

➢ Lesson 2 cool-down
➢ Lesson 3 cool-down

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Synthesize and Apply	- I know different ways to find the value of a function and to solve equations written in function notation. - I can make sense of rules of functions when they are written in function notation, and create tables and graphs to represent the functions. - I know what makes a function a linear function.

Activity Suggestions:	**Assessment Suggestions:**
➢ Lesson 4, Activity 2 ➢ Lesson 5: Activities 1 and 2	➢ Revise work from Lessons 1 and 2 based on feedback. ➢ Lesson 4 cool-down ➢ Lesson 5 cool-down

Ongoing Practice	- Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. - These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. - Specify which problems students should submit, or let them choose. - Note: Several existing platforms already have IM's practice problems loaded so that students can complete and submit them online. Some can be autoscored.

Anytime Resources	- Lesson 5, Activity 3. - Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.

Lessons 6–9: Analyzing and Creating Graphs of Functions

<table>
<tr>
<td rowspan="2">Explore, Play, and Discuss</td>
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I can identify important features of graphs of functions and explain what they mean in the situations represented.
I understand and can use the terms "horizontal intercept," "vertical intercept," "maximum," and "minimum" when talking about functions and their graphs.

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Activity Suggestions:

Lesson 6 can be completed in an online or paper journal. Activity 3 benefits from a worked example.
Lesson 7, Activity 1 can be completed in an online or paper journal.

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Assessment Suggestions:

Check Your Readiness assessment: Administer items 5–7. Use the guidance provided with each problem to adjust instruction so that students can access the math in this unit.
Lesson 6 cool-down

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<td rowspan="2">Dive Deep</td>
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I understand the meaning of the term "average rate of change."
When given a graph of a function, I can estimate or calculate the average rate of change between two points.
I can make sense of important features of a graph and explain what they mean in a situation.
When given a description or a visual representation of a situation, I can sketch a graph that shows important features of the situation.

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Activity Suggestions:

Lesson 7: Activities 2 and 3.
Lesson 8, Activities 1–3: sync discussion

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Assessment Suggestions:

Lesson 7 cool-down
Lesson 8 cool-down

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<td rowspan="2">Synthesize and Apply</td>
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I can compare the features of graphs of functions and explain what they mean in the situations represented.
I can make sense of an equation of the form $f(x) = g(x)$ in terms of a situation and a graph, and know how to find the solutions.
I can make sense of statements about two or more functions when they are written in function notation

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Activity Suggestions:

Lesson 9, Activities 1, 2 and 4 can be completed in an online or paper journal.

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Assessment Suggestions:

Lesson 9 cool-down
Revise activities from Lessons 6–8 based on feedback.

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Ongoing Practice	- Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. - These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. - Specify which problems students should submit, or let them choose. - Note: Several existing platforms already have IM's practice problems loaded so that students can complete and submit them online. Some can be autoscored.

Anytime Resources	- Lesson 8, Activities 4 and 5. - Lesson 9, Activity 3 - Teach and encourage students to study the lesson summaries (at the end of every lesson) and refer back to them.

Lessons 10–14: Inputs and Outputs

<table>
<tr>
<td rowspan="2">Explore, Play, and Discuss</td>
<td colspan="2">● When given a description of a function in a situation, I can determine reasonable inputs and outputs for the function.</td>
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<td>Activity Suggestions:
➢ Lesson 10 Activity 1: Can be completed in an online or paper journal.
➢ Lesson 10 Activity 2: Can be completed as an online card sort.</td>
<td>Assessment Suggestions:
➢ Journal prompt: Reflect on the card sort: How did you make decisions about possible inputs and outputs? Which cards were you unsure about and why?</td>
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<td rowspan="2">Dive Deep</td>
<td colspan="2">● I know what is meant by the "domain" and "range" of a function.
● When given a description of a function in a situation, I can determine reasonable domain and range for the function.</td>
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<td>Activity Suggestions:
➢ Lesson 10, Activity 2 synthesis and Activity 3: sync discussion.
➢ Lesson 11: sync discussion.
➢ Lesson 14 Activity 2, #1: After students complete the question, define the distance function as the absolute value function including the notation |x|.</td>
<td>Assessment Suggestions:
➢ Lesson 10 cool-down
➢ Lesson 11 cool-down</td>
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<tr>
<td rowspan="2">Synthesize and Apply</td>
<td colspan="2">● I can describe the effects of adding a number to the expression that defines an absolute value function.</td>
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<td>Activity Suggestions:
➢ Lesson 14: Activity 3 Can be completed in an online or paper journal. Benefits from a worked example.</td>
<td>Assessment Suggestions:
➢ Lesson 14, Activity 4.
➢ Practice problems from Lessons 10 and 11 focusing on domain and range</td>
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Ongoing Practice	• Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. • These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. • Specify which problems students should submit, or let them choose. • Note: Several existing platforms already have IM's practice problems loaded so that students can complete and submit them online. Some can be autoscored.

Anytime Resources	• Lesson 12 • Lesson 13 • Lesson 14, Activities 1 and 2.

Lessons 15–18: Inverse Functions

<table>
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<td rowspan="2">Explore, Play, and Discuss</td>
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I understand the meaning of "inverse function" and how it could be found.
When given a linear function that represents a situation, I can use words and equations to describe the inverse function.

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Activity Suggestions:

Lesson 15: Students can complete in an online or paper journal. Activity 3 benefits from a worked example.
Lesson 16: Activities 1 and 2 can be completed in an online or paper journal. Activity 2 benefits from a worked example.

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Assessment Suggestions:

Lesson 15 cool-down

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<td rowspan="2">Dive Deep</td>
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I can explain the meaning of an inverse function in terms of a situation.

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Activity Suggestions:

Lesson 16 Activity 3: sync discussion
Lesson 17, Activities 1 and 2: sync discussion
If time allows, consider discussing Lesson 18, Activities 1 and 2

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Assessment Suggestions:

Lesson 16 cool-down

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<tr>
<td rowspan="2">Synthesize and Apply</td>
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I can write a linear function to model given data and find the inverse of the function.

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Activity Suggestions:

Lesson 17, Activity 3: Can be completed in an online or paper journal.
Lesson 18 Activity 3

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Assessment Suggestions:

Lesson 17 cool-down

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Ongoing Practice	- Assign one or more of the distributed practice problem sets from Lessons 1–6 to be completed over the time period that the section is being worked on. - These could also be lagging, so that students are working on practice problems from the previous section or unit during this section or unit. - Specify which problems students should submit, or let them choose. - Note: Several existing platforms already have IM's practice problems loaded so that students can complete and submit them online. Some can be autoscored.

Anytime Resources	- Lesson 15: Are You Ready for More? - Lesson 16: Are You Ready for More? - Lesson 16 Activity 4