ALGEBRA: NON-LINEAR RELATIONSHIPS
8-9 ASSESSMENT

How will I determine my student's needs and how will I know which activities are appropriate for addressing those needs?

Two tools are available to help you determine the needs of your student: Assessments and Teacher Inventories.

Assessments are provided for each grade band within a content strand, for example, there is a K-2 Number & Operation Assessment, a 3-5 Number & Operation Assessment, etc. The Assessments for the 8-9 content strands are slightly different than those for the other grades. The grades 8-9 units are more geared towards a specific sequence of activities than the other grade bands are. The purpose of the Assessment is to identify whether the student is ready for that sequence or if that student needs some more work in the grades 6-8 units first. This is in contrast to the Assessments for the other grade bands, where the goal is to find the specific topics within a unit with which the student needs more help. Before beginning a new content strand in the grades 8-9 units, use the Assessment provided to see whether the student has a general grasp on most of the concepts covered in the Assessment. If the student does have an understanding of most of the Assessment items, then he or she is prepared to begin that content strand. If not, some work in the grades 6-8 units would give a good background to the student (have the 6-8 Assessments available for this situation).

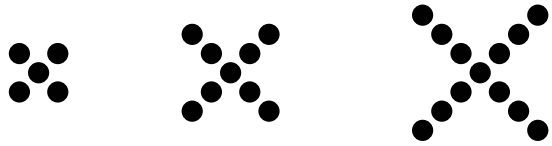
When possible, also seek the assistance of your student's classroom teacher in assessing the student's current needs. The Teacher Inventory, to be completed by the student's classroom teacher, provides another lens for determining your student's readiness. For each 8-9 algebra strand, there a Teacher Inventory, which lists the concepts that are prerequisites for that unit. Next to each concept is a place for the teacher to give information regarding the student's mastery of that concept. If the teacher marked yes for most of the concepts, the student is probably ready for the unit, but if the teacher marked no for most of the concepts, the student probably needs some work in the grades 6-8 units.

Using the information you have gathered from the Assessment, and information from the Teacher Inventory (if available), determine whether your student is ready for any of the algebra content strands for which you have used an Assessment. If so, plan your tutoring sessions around the content strand you will use first, and if your student is not yet ready for the content strands that are available, then use the grades 6-8 Assessments to choose some work in the 6-8 units to use.

Algebra: Non-Linear Relationships
8-9 Assessment

Students should have completed the Algebra: Linear Relationships unit before moving on to this unit. In order to decide if your student is ready for the Non-Linear Relationships unit, you will need to determine whether your student has already completed the Linear Relationships unit or already has a handle on the concepts covered in that unit, and you will need to check if your student can comfortably work through the questions listed below. After each question, determine whether the student seems to have a good understanding of the concept or whether they would benefit from additional help. Based on your determination, circle *yes* or *no* in the *Understands the Concept* column. The student should have a general understanding of the concepts listed here and those covered in the entire Linear Relationships unit before beginning this unit.

For the activities below, you will need:
paper and pens or pencils
cut-out graphs, tables, and expressions from a copy of this assessment

	Understands the concept
1. Draw the following pattern on a piece of paper for students:  Term 1 Term 2 Term 3 Ask the following questions: • *How many dots are in Term 1? In Term 2? In Term 3?* [5 dots, 9 dots, and 13 dots] • *What changes between terms in this pattern?* [Each term increases by 4 dots] • *What would the next term in this pattern look like?* [It would contain 17 dots in the shape of an X] • *What would the 10th term in this pattern look like?* [It would contain 41 dots in the shape of an X] • *Explain what any term in the pattern would look like, given the number of that term "n".* [Any term will look like an X, using 1 dot plus 4 dots times the number of terms] • *Write an expression for the number of dots in the term, given what number term it is.* [# of dots = 4n + 1] • *Draw a graph that shows the relationship between the number of the term and the number of dot* Mathematical concepts: growing patterns, abstraction of relationships	Yes No
2. Cut out the 5 expressions, 5 graphs, and 5 tables from a copy of the pages that follow in this assessment. Ask students to match each of the expressions with a graph and with a table, and to explain how they go about matching the	

different pieces. Mathematical concepts: graphs of linear relationships, tables for linear relationships, expressions of linear relationships	Yes No

Mathematical Expressions for Problem #2

$y = 2x - 3$

$y = 3x$

$y = \frac{1}{2} x$

$y = -2x - 4$

$y = x + 3$

Charts for Problem #2

X	Y
-20	-10
-12	-6
0	0
8	4
16	8
22	11
28	14
33	16.5
44	22

X	Y
-5	-2

0	3
1	4
5	8
10	13
12	15
20	23
54	57
63	66

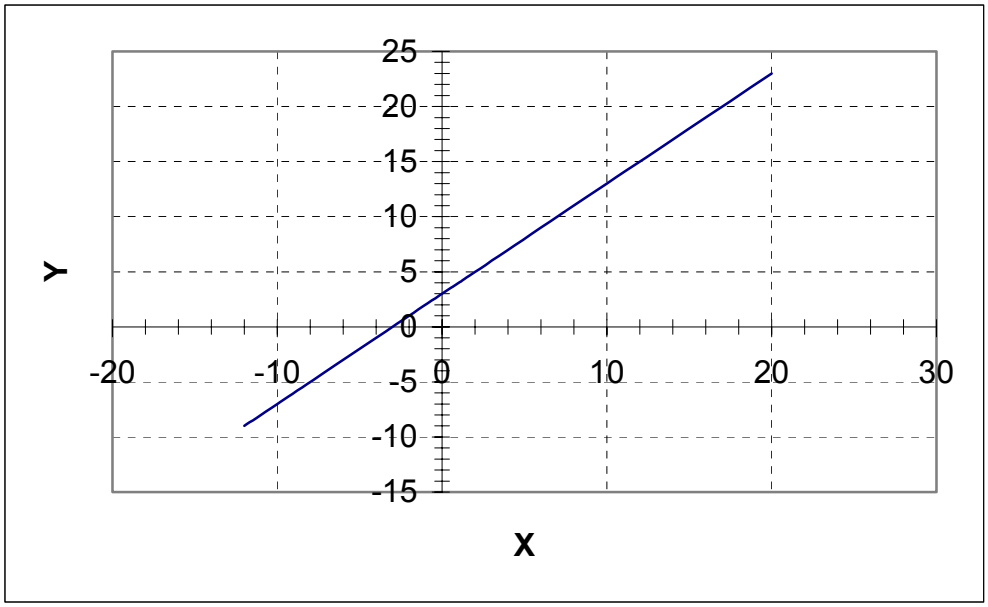
X	Y
-4	-12
1	3
3	12
8	24
13	39
25	75
30	90
34	112
40	120

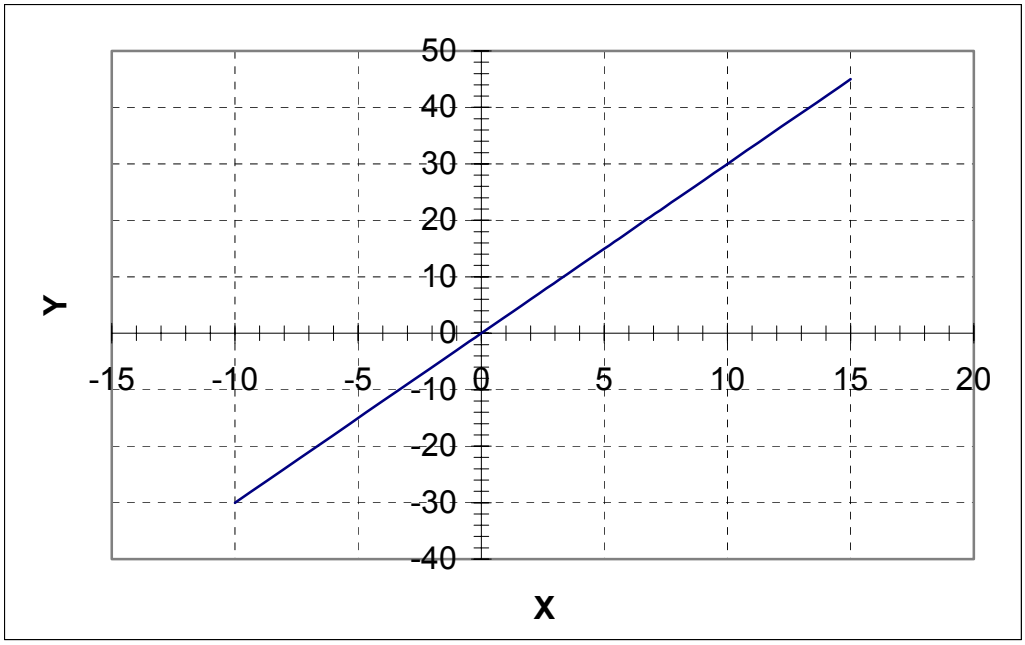
X	Y
-11	-25
-3	-9
0	-3
2	1
16	29
24	45
30	57
45	87
52	101

X	Y
-10	16
0	-4

6	-16
9	-22
12	-28
20	-44
23	-50
30	-64
42	-86

Graphs for Problem #2

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0
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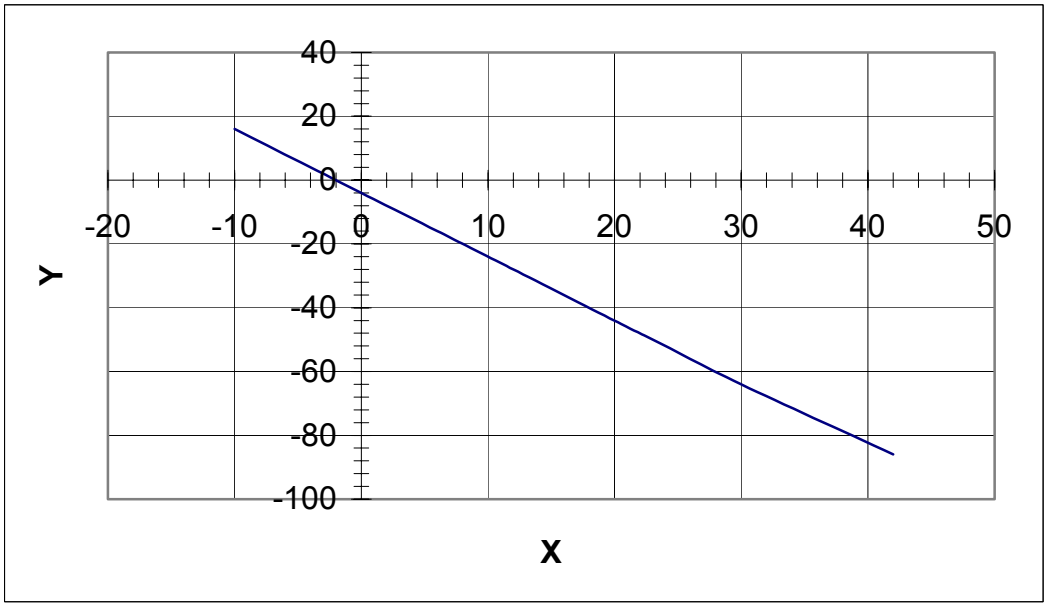
15
20
Y
X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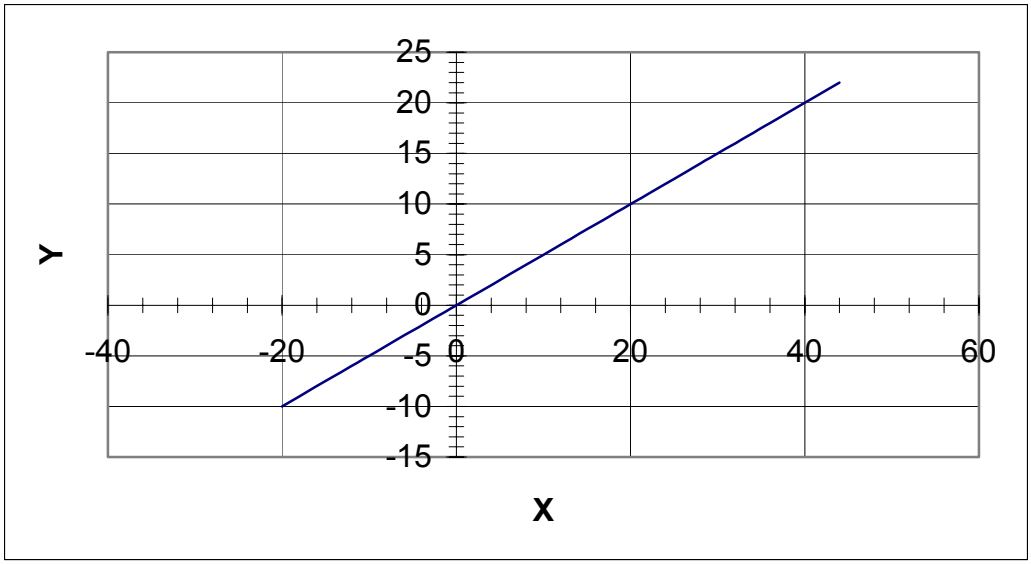
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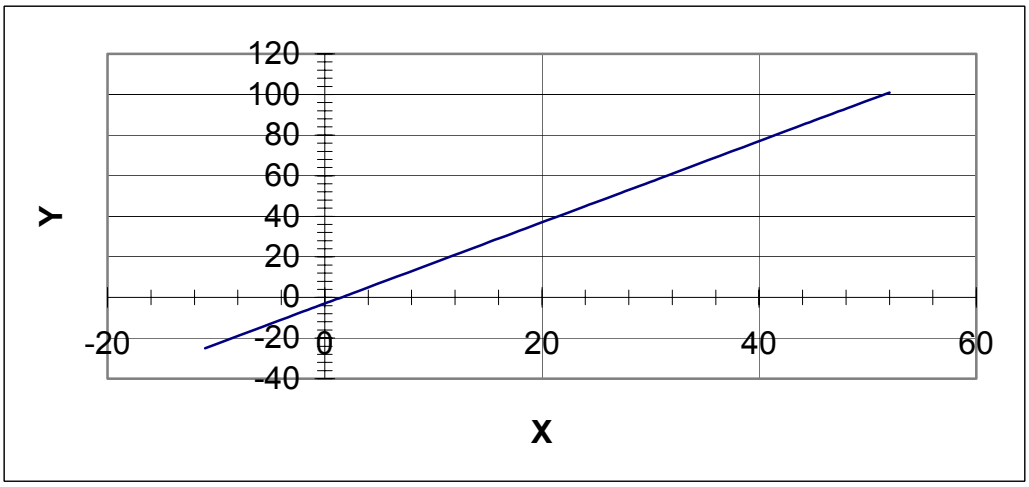
-40
-20
0
20
40
60
Y
X


120
100
80
60
40
20
0
-20
-40
-20
0
20
40
60
Y
X

Teacher Inventory: Algebra: Non-Linear Relationships (Grades 8-9)

Concept		**Teacher Rating:** Has the student mastered the concept? (circle yes, no, or unknown for each topic)
Numbers	Order of operations	Yes No Unknown
	Addition, subtraction, multiplication, and division	Yes No Unknown
	Evaluating numeric expressions	Yes No Unknown
	Writing numeric expressions	Yes No Unknown
	Distributive property	Yes No Unknown
	Commutative property of addition and multiplication	Yes No Unknown
	Inverse operations	Yes No Unknown
Patterns	Visual patterns	Yes No Unknown
	Describing pattern generation	Yes No Unknown
	Determining next element in pattern	Yes No Unknown
	Rules to describe patterns	Yes No Unknown
Expressions with variables	Simplification of expressions	Yes No Unknown
	Understanding variables in expressions	Yes No Unknown
	Writing expressions with variables	Yes No Unknown
	Solving single-variable equations	Yes No Unknown
Ways to Represent Functions	Input-output charts	Yes No Unknown
	Graphs (plotting points, interpreting graphs, slopes, y-intercepts)	Yes No Unknown
Linear Functions	Tables as representations of the linear functions	Yes No Unknown
	Graphs of linear functions	Yes No Unknown
	Mathematical expressions for linear functions	Yes No Unknown

Additional Comments:

Mentoring Plan

Based on your assessment of your student's needs, and the teacher's assessment (if available), decide whether the student is ready to explore the Algebra: Non-Linear Relationships unit. If not, then decide whether to use the 8-9 Algebra: Linear Relationships unit or whether to use the grades 6-8 assessments to decide what background work the student needs first.