Keys

Accelerated Algebra 1/Geometry A

A few good topics....

Date	Topic
Thursday January 7	Function Vs Relation Function Notation Pages 1-4
Friday January 8	Arithmetic Sequences (recursive and explicit) Pages 5-8
Monday January 11	Properties Review pgs 9-10 Quizzes
Tuesday January 12	Quiz over all three topics above

Worksheet Level 3:

Concept # _____

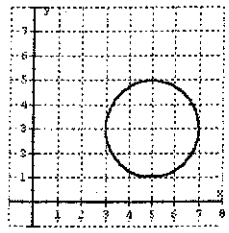
Goals:

Use the Vertical Line Test to Identify functions from a graph

Identify functions from tables and diagrams.

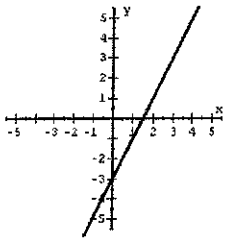
Practice #1

State whether each graph represents a function or not.



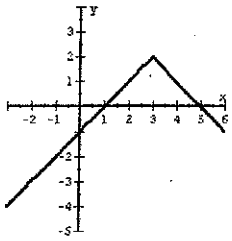
$(x-5)^2+(y-3)^2=4$

Function? NO



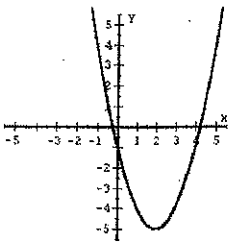
$y=2x-3$

Function? yes



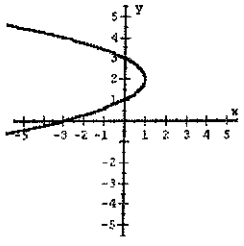
$y=-|x-3|+2$

Function? yes



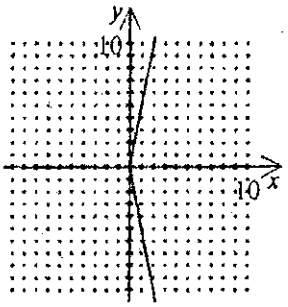
$y=(x-2)^2-5$

Function? yes



$x=-(y-2)^2+1$

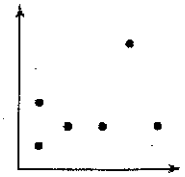
Function? NO



NO

Find whether each graph represents a function.

a.

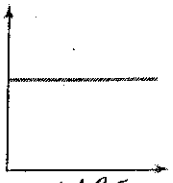


NO

b.

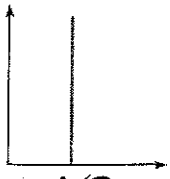
NO

c.



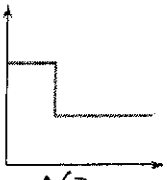
yes

d.



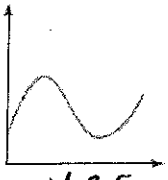
NO

e.



NO

f.



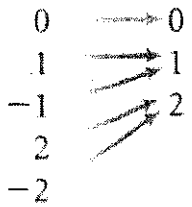
yes

Explain how you know if a graph is a function or not:

I graph is a function if it passes the vertical line test (each X has it's own y)

Level 2 Practice:

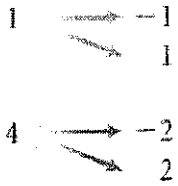
For each diagram, list the domain and range, and state whether or not it is a function.



DOMAIN:
0, 1, -1, 2, -2

RANGE:
0, 1, 2

FUNCTION
(Yes)/No



DOMAIN:
1, 4

RANGE:
-1, 1, -2, 2

FUNCTION
Yes/(No)

$(-2, 3), (3, -2), (1, 3), (0, -2)$

DOMAIN:
-2, 3, 1
0

RANGE:
3, -2

FUNCTION
(Yes)/No

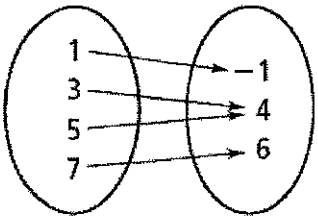
$(3, -2), (-2, 3), (3, 1), (-2, 0)$

DOMAIN:
3, -2

RANGE:
-2, 3, 1, 0

FUNCTION
Yes/(No)

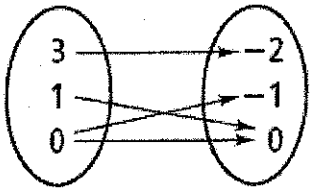
B/C 3 is going to -2 & 1



DOMAIN:
1
3
5
7

RANGE:
-1
4
6

FUNCTION
(Yes)/No



DOMAIN:
3
1
0

RANGE:
-2
-1
0

FUNCTION
Yes/(No)

B/C
0 goes to -1 & 0

Function Notation

1. Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$ $\quad f(x) = x^2 + 7$ $\quad h(x) = \frac{12}{x}$ $\quad j(x) = 2x + 9$

a. $g(10) = -3(10) + 1$
$= \boxed{-29}$

b. $f(3) = 3^2 + 7$
$= \boxed{16}$

c. $h(-2) = \frac{12}{-2} = \boxed{-6}$

d. $j(7) = 2(7) + 9$
$= \boxed{23}$

e. $h(a) = \boxed{\frac{12}{a}}$

f. Find x if $g(x) = 16$

$-3x + 1 = 16$
$-3x = 15 \quad x = -5$

g. Find x if $h(x) = -2$

$x \cdot \frac{12}{x} = -2 \cdot x \quad 12 = -2x \quad \boxed{x = -6}$

h. Find x if $f(x) = 23$

$x^2 + 7 = 23$
$-7 \quad -7$
$x^2 = 16$
$\boxed{x = \pm 4}$

2. Translate the following statements into coordinate points:

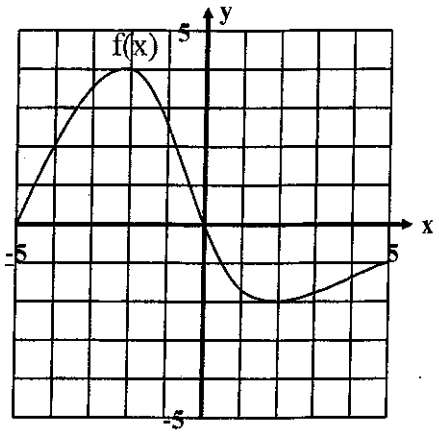
a. $f(-1) = 1$ $\quad (-1, 1)$

b. $h(2) = 7$ $\quad (2, 7)$

c. $g(1) = -1$ $\quad (1, -1)$

d. $k(3) = 9$ $\quad (3, 9)$

3. Given this graph of the function f(x):



Find:

a. f(–4) = -2 **b.** f(0) = 0 **c.** f(3) = -1.7 **d.** f(-5) = 0

e. x when f(x) = -2

X = -4

f. x when f(x) = 0

X = 0

APPLICATION

5. Swine flu is attacking Porkopolis. The function below determines how many people have swine where t = time in days and S = the number of people in thousands.

$$S(t) = 9t - 4$$

a. Find $S(4)$. = 32

b. What does $S(4)$ mean?

Day 4 has 32 people w/ the virus

c. Find t when $S(t) = 23$.

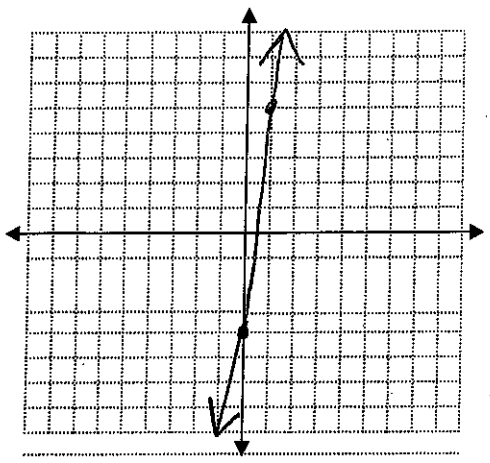
$9t - 4 = 23$

$9t = 27$ $t = 3$

d. What does $S(t) = 23$ mean?

Day 3 has 23 people

e. Graph the function



Arithmetic Sequences NOTES

Definition: Arithmetic Sequence

Common difference (+ or −)

Definition: Explicit Formula

•Finds any term $a_n = a_1 + d(n-1)$

Definition: Recursive Formula

• finds next term $a_1 =$

$a_1 = a_{n-1} + d$

Example 1: Fill in the next 3 terms. What is the common difference?

2, 5, 8, 11, 14, 17, 20, 23, 26

Example 2: Fill in the next 3 terms. What is the common difference?

55, 49, 43, 37, 31, 25

Formula for writing an EXPLICT equation of an arithmetic sequence:

The nth term of a_n of an arithmetic sequence with first term a_1 and common difference d is given by...

$a_n = a_1 + n(n-1)$

Where n is any positive integer. (**n stands for the number of terms in the sequence)

Example3: Write an equation for the arithmetic sequence 8, 17, 26, 35.....

Recursive:

$a_1 = 8$

$a_n = a_{n-1} + 9$

Explicit:

$a_n = 8 + 9(n-1)$

$a_n = 8 + 9n - 9$

$a_n = 9n - 1$

Example 4: Find the equation for the nth term of arithmetic sequence -8, -6, -4.....

$a_n = -8 + 2(n-1)$ $\quad a_n = 2n - 10$

$a_n = -8 + 2n - 2$ ↗

Find a_{13}

$a_{13} = 2(13) - 10$

$= 16$

Find the 120th term

$a_{120} = 2(120) - 10$

$= 230$

Find the recursive formula for the sequence above:

$a_1 = -8$

$a_n = a_{n-1} + 2$

Example 5: Find the 4 arithmetic means between 16 and 91. This means find the 4 missing terms between 16 and 91.

$\frac{91-16}{6-1} = 15$

16, ___, ___, ___, ___, 91

a_1 ↓ ↓ ↓ ↓ a_6

31, 46, 61, 76

Example 6: Given $a_1 = 21$ and $a_5 = 45$, find the equation of the arithmetic sequence and find the 3 arithmetic means between them.

$\underset{a_1}{21}$, $\underset{\downarrow}{a_2}$, $\underset{\downarrow}{a_3}$, $\underset{\downarrow}{a_4}$, $\underset{a_5}{45}$ $\quad \frac{45-21}{5-1} = \frac{24}{4} = 6$

27 33 39

Example 7: The table below shows typical costs for a construction company to rent a crane for one, two, three or four months. Assuming that the arithmetic sequence continues, how much would it cost to rent a crane for 1 year?

Months	Cost
1	$75,000
2	$90,000
3	$105,000
4	$120,000

$a_n = 75{,}000 + 15{,}000(n-1)$

$a_{12} = 75{,}000 + 15{,}000(12-1)$

$a_{12} = 240{,}000$

6. Write a recursive rule and a closed rule for the sequence. **Remember to write the 1st term in the sequence for recursive rule.*

	Recursive Rule*	Explicit Rule
a) 1, -3, -7, -11…	$a_1 = 1$ $a_n = a_{n-1} - 4$	$a_n = 1 - 4(n-1)$ $a_n = -4n - 3$
b) 10, 8, 6, 4, …	$a_1 = 10$ $a_n = a_{n-1} - 2$	$a_n = 10 - 2(n-1)$ $a_n = -2n + 12$
c) -7, -2, 3, 8,…	$a_1 = -7$ $a_n = a_{n-1} + 5$	$a_n = -7 + 5(n-1)$ $a_n = 5n - 12$
d) -9, -5, -1, 3,…	$a_1 = -9$ $a_n = a_{n-1} + 4$	$a_n = -9 + 4(n-1)$ $a_n = 4n - 13$
e) 12, 5, -2, -9,…	$a_1 = 12$ $a_n = a_{n-1} - 7$	$a_n = 12 - 7(n-1)$ $a_n = -7n + 19$

7. a) Find the 20th term of the sequence in 5a. _____

b) Find the 30th term of the sequence in 5b. _____

c) Find the 50th term of the sequence in 5c. _____

d) Find the 74th term of the sequence in 5d. _____

e) Find the 38th term of the sequence in 5e. _____

$a_n = a_1 + d(n-1)$ $a_1 = ?$ $a_n = a_{n-1} + d$

Name Key Date Period

Explicit and Recursive Equations From Arithmetic Sequences
Find the next three terms of each arithmetic sequence, write the explicit and recursive formula:

1. 9, 16, 23, 30, 37, 44, 51 $a_n = 9 + 7(n-1)$
Explicit: $a_n = 7n + 2$
Recursive: $a_1 = 9$, $a_n = a_{n-1} + 7$

2. 31, 24, 17, 10, 3, -4, -11
Explicit: $a_n = 31 + -7(n-1) \rightarrow -7n + 38 =$
Recursive: $a_1 = 31$, $a_n = a_{n-1} + 31$

3. -6, -2, 2, 6, 10, 14, 18
Explicit: $a_n = -6 + 4(n-1)$, $a_n = 4n - 10$
Recursive: $a_1 = -6$, $a_n = a_{n-1} - 6$

4. -8, -5, -2, 1, 4, 7, 10
Explicit: $a_n = a_1 + 3(n-1)$, $a_n = 3n - 11$
Recursive: $a_1 = -8$, $a_n = a_{n-1} + 3$

5. 12, 16, 20, 24, 28, 32, 36
Explicit: $a_n = 12 + 4(n-1) = 12 + 4n - 4$, $a_n = 4n + 8$
Recursive: $a_1 = 12$, $a_n = a_{n-1} + 4$

6. 3, 1, -1, -3, -5, -7, -9
Explicit: $a_n = 3 + -2(n-1)$, $a_n = -2n + 5$
Recursive: $a_1 = 3$, $a_n = a_{n-1} - 2$

7. 14, 12, 10, 8, 6, 4, 2
Explicit: $a_n = 14 - 2(n-1)$, $a_n = -2n + 16$
Recursive: $a_1 = 14$, $a_n = a_{n-1} + -2$

8. 17, 14, 11, 8, 5, 2, -1
Explicit: $a_n = 17 + -3(n-1)$, $a_n = -3n + 20$
Recursive: $a_1 = 17$, $a_n = a_{n-1} - 3$

Name_____Date_____Period_____

KEY 6.1A Algebraic Properties

Write an equivalent expression using the property stated.

1. Identity Property of Addition: $c + 0 =$ ____c_____
2. Identity Property of Multiplication: $22b \cdot 1 =$ _____22b_____
3. Multiplicative Property of Zero: $40{,}286 \cdot 0 =$ _____0_____
4. Commutative Property of Addition: $x + z =$ _____z + x_____
5. Commutative Property of Multiplication: $k \cdot 6 =$ _____6 · k_____
6. Associative Property of Addition: $(1 + 3) + 9 =$ ___1 + (3 + 9)_____
7. Associative Property of Multiplication: $(w \cdot h) \cdot l =$ __w · (h · l)_____
8. Symmetric Property: x > 3=__3 < x_____
9. Exponential Property of Equality: $3^3=3^x$ therefore___3 = x_____
10. Multiplication Property of Equality: if x = 4, then 2 · x = __2 · x_____
11. Addition Property of Equality: if x = 4, then x + 3 = ___4 + 3_____
12. Additive Identity: a + (-a) =____0_____
13. Multiplicative Inverse: 4/5·5/4=___1_____
14. A football team is on the 35-yard time. The quarterback is sacked at the line of scrimmage. The team gains 0 yards. Which identity or property does this represent? Explain

35 + 0 = 35 Additive Inverse

15. Write two equations demonstrating two properties of your choosing.

    a.

    b.

16. Does that Commutative Property sometimes, always, or never hold for subtraction? Explain your reasoning. Never, for example 30 – 3 = 27 but 3 – 30 = -27

17. Identify the sentence that does not belong with the other three. Explain your reasoning.

x+12=12+x	7h=h·7	1+a=a+1	(2j)k=2(jk)

The last box doesn't belong. The order is staying the same, it's just re-associating.

18. Write a real-life example in which the Distributive Property would be useful. Write an expression that demonstrates this example. Three envelopes can be mailed using three $.24 stamps and three $.17 stamps, one of each on each envelope. What would you need if you just used one stamp on each envelope instead of two? 3(24 + 17) = 3(41) You would need $.41

19. Nate lives 32 miles away from the mall. The distance from his house to the mall is the same as the distance from the mall to his house. Which property to this represent? Explain
Commutative Prop of Addition

Name the property demonstrated by each statement.

20.	$9 \cdot 7 = 7 \cdot 9$	Commutative Prop
21.	$2 \cdot (3 \cdot 4) = (2 \cdot 3) \cdot 4$	Associative Prop
17.	$37 \cdot 0 = 0$	Multiplicative Prop of Zero
18.	$1 \cdot 87 = 87$	Multiplicative Identity
19.	$14 + 6 = 6 + 14$	Commutative Prop
20.	$3(6a) = (3 \cdot 6)a$	Associative Prop
21.	$2b + 0 = 2b$	Additive Identity
22.	$55 + 6 = 6 + 55$	Commutative Prop
23.	If $2^4 = 2^x$ then $4 = x$	Exponential Equality
24.	$(x + 3) + y = x + (3 + y)$	Associative Prop
25.	$1 \cdot mp = mp$	Multiplicative Identity
26.	$9 + (5 + 35) = (9 + 5) + 35$	Associative Prop
27.	$6b + 0 = 6b$	Additive Identity
28.	$7x \cdot 0 = 0$	Multiplicative Prop of Zero
29.	$4(3 \cdot z) = (4 \cdot 3)z$	Associative Prop
30.	If $4^x = 4^5$ then $x = 5$	Exponential Equality
31.	$14 \cdot 1 = 14$	Multiplicative Identity
32.	$6 + (5 + m) = (6 + 5) + m$	Associative Prop
33.	$4 < x = x > 4$	Symmetric Prop
34.	$3/4 \cdot 4/3 = 1$	Multiplicative Inverse
35.	$-14+14=0$	Additive Inverse
36.	If $10=10$ then $10+13 = 10+13$	Addition Property of Equality
37.	If $x=5$, then $3x = 15$	Multiplication Property of Equality
38.	If $x=12$ then $x-7 = 12-7$	Subtraction Property of Equality
39.	If $30=30$ then $30/5 = 30/5$	Division Property of Equality
40.	If $x=6$ then $6=x$	Symmetric Prop