DynaNotes™ Review Guide

A1 Algebra I End-of-Course

DYNA NOTES™

Category 1 – Functional Relationships

FUNCTIONS

function: relation such that each x-value (input) has just one y-value (output); for the set of ordered pairs (x, y) belonging to a function, no x-coordinate is repeated

Example: {(2, 2), (3, 2)} is a function, but {(2, 2), (2, 3)} is not.

vertical line test: a vertical line drawn on a function's graph only crosses at one point; if a vertical line crosses at more than one point, it is not a function

independent quantity: amount that can be changed or manipulated

dependent quantity: amount that changes because of another quantity

Example: A room has four chairs, c, for each table, t, and 1 chair for a teacher. Function $c = 4t + 1$ shows the value of c (dependent) depends on t (independent).

equation: describes 2 equal expressions; uses = sign; graph with solid line (——)

inequality: describes 2 unequal expressions

Symbol	<	>	≤	≥
Line	dashed	dashed	solid	solid
Shading	below	above	below	above

REPRESENTING RELATIONSHIPS

Relationships can be represented in many ways.

Example: $y = -2x$

Function Notation: $f(x) = -2x$

Verbal Description: A function in which the y-values equal the opposite of twice the x-values.

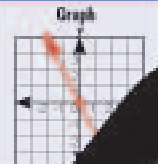
List: {(−2, 4), (0, 0), (2, −4)}

Table:

x	y
−2	4
0	0
2	−4

Map

Graph



FUNCTION INTERPRETATION AND ANALYSIS

Analyze and interpret functional relationships to make logical judgments and mathematical predictions.

Example: $y = -x^2 + 1$ is a quadratic function because it has the form $y = ax^2 + bx + c$. It is graphed using a solid line. A vertical line test shows $y = -x^2 + 1$ is a function. Point (0, 1) is a possible solution, but point (−2, 2) is not.

Category 2 – Properties and Attributes

LINEAR AND QUADRATIC PARENT FUNCTIONS

Function	Equation Notation	Function Notation	Parent Function
linear	$y = mx + b$	$f(x)$ …	
quadratic	$y = ax^2 + bx + c$	$f(x)$ …	

variable: value that can change … variable and x is independent variable …

constant: quantity or number that does not c…

degree: largest exponent of variable

coefficient: number b… the variable; if there is no numb…

Function		quadratic
Degree		2
Example	$y =$ …	… $= x^2 +$ …

DOMAIN AND …

domain: x-values; in… variable's values; "inp…

range: y-values; depend… variable's values; "output"

clo… …oint is includ…

…int is not includ…

… exclud… possible v… situation (negative area or time).

…in: $-1 < x \le 2$ … $-2 \le y \le 2$

…in: all real numbers, range: $y \ge -1$

…ATA ORG… …D IN…RETATI…N

…nalyze… …ta to interpret… understand prob…

…graph s… …w cost, c, …ses with … an equat… …scribe th… …ationship. … $c = 2b$, for d… $b \le 4$ …d range $0 \le c \le \$8$

Example 2: If the … …ds t… … $b > 4$, then how much will … Answer: … $= 2b$ … \$18 for domain $b \ge 0$

scatterplot…: trend made when ordered pairs are plotted on a graph

Correlation	positive	negat…
Trend/Direction	upward	downw…
…etch		

SYMBOLS AND PATTERNS

sequence: ordered list of quantities

pattern: relationship between quantities; can use symbols to represent them

symbol: represents a variable or unknown

Example: $3n + 2$ describ… relationship between th… position, n, in sequence 5, 8, 11, 14, …

Example: a and b in $3a = b + 2$

PROPERTIES

Property	Addition	…ication	Example
commutative	$a + b = b + a$	…ba	$3xy = 3yx$
associative	$a + (b + c) = (a +$ …	…$(c = a($…	$5x(y) = 5(xy)$
distributive		$a(b + c)$…	$x(x + 4) = x^2 + 4x$

EXPRESSION SIMPLIF… …AND E… …N EVALUATION

To simplify an expressio… common terms. Factor a…

Example: Factor. $6x + 3x^2$ …

Example: Multiply the binomials.

FOIL: First, Outer, Inner, Last

To solve an equation for one variable, use th… …ps:

1. Simpl… …e equation.
2. A… …t on both s… …iable term…
3. Simplify b… …both si… …coeffic…

Example: Solve for x

$4(x + 2) = 2x$ …
$4x + 8 = 2$…
$4x + 8 - 8$…
…$4x - 2$…

- simplify … …ributive propert…
- su… 8 from both sides
- …ct $2x$ from both sides
- … both sides by 2

Answer: $x = -7$

… – Linea… …ons

REPR… …TIONS OF LI… …R FUN… …NS

Linea… …s can be r… …d in …

…: $y = x + 1$

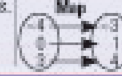
Verbal Description: A function in which the y-values a… one more th… …eir correspon… …x-values.

List: {… (0, 1), (3, 4)}

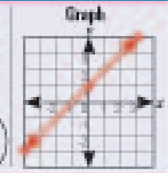
Table:

x	y
−4	−3
0	1
3	4

Map



Graph



SL… …NTERC…

slope, …: … of ch… …s the …bsolute value o… …reases, the …ets steep…

…l lines: … lines that never …ch; sa… distance apart; slopes are the…

perpe… …lar lines: two lines that cr… to form a right angle; slopes … opposite reciprocals

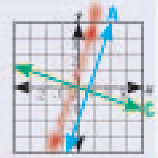
…tercept, b: point at which the …ne crosses the y-axis; to find the y-intercept look at its graph or substitute $x = 0$ into the equation and solve for y; changing the y-intercept changes the initial condition of a problem

x-intercept: point at which the line crosses the x-axis; to find the x-intercept look at its graph or substitute $y = 0$ into the equation and solve for x

Example: Find the slope, m, of a line that passes through (−2, 5) and (1, −1).

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 5}{1 - -2} = \frac{-6}{3} = -2$$

Example: Line A has a slope of 3. Parallel line B has a slope of 3, too. Perpendicular line C has a slope of $-\frac{1}{3}$ (the opposite reciprocal of 3).



CHARACTERISTICS OF LINEAR FUNCTIONS

Form	Linear Equation
slope-intercept	$y = mx + b$
point-slope	$y - y_1 = m(x - x_1)$
standard	$Ax + By = C$

Example: The table shows x-intercept and zero at (−3, 0) and y-intercept at (0, 6).

$$\text{slope} = m = \frac{12 - 6}{3 - 0} = \frac{6}{3} = 2$$

x	y
−3	0
0	6
3	12

Example: Find line's equation.

Example: Compare… positive slope, +m …

(slope); y-intercept is 0 (line passes through origin)

… how many pages does he read in 120 minutes? **Answer:** 240 pages

$k = 2$ … $p = 2(120)$ … $p = 240$

SAMPLE PAGE -- Page 1 of 2

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