Unit 3: Relations, functions, and graphs

Table, Graph, Formula

(Chapter 3, page 104)

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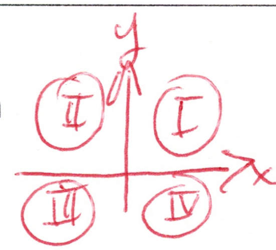
☐	Relation is set of ordered pairs. Domain: Possible inputs Range: Possible outputs. ---- Examples: (Monday, Pizza) (Wednesday Tuna) (Tuesday Taco) (Wednesday, Salmon)	Definition Page 107
☐	**Graph** Terms to know: ---- Cartesian coordinate system; Origin  ---- Quadrants ---- x-axis, y-axis ---- Coordinate of a point ---- x-coordinate, abscissa ; y-coordinate, ordinate ab'sisə ôrd(ə)nət	Page 110
☐	**Function** Relation in which each input has exactly one output. ---- Vertical line test	Page 117 (plot examples in the next table cell)
☐	**One-to-One function** Function in which each output originated from exactly one input. ---- Horizontal line test	

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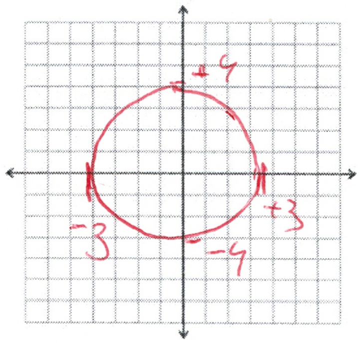
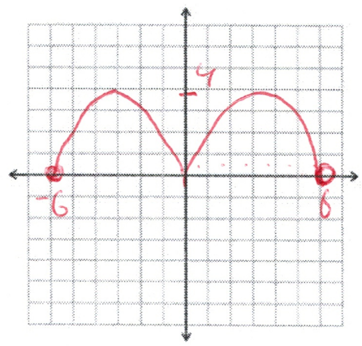
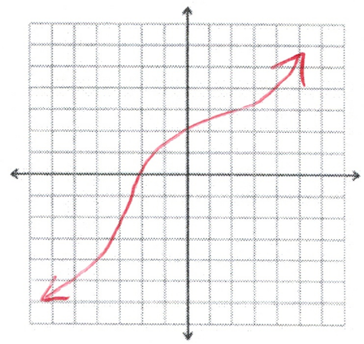
☐ Plot an example of a relation, a function, and one-to-one function.

Relation	Function	One-to-one function
		

	Relation	Function	One-to-one function
Domain:	$[-3,3]$	$[-6,6)$	$(-\infty,\infty)$
Range:	$[-4,4]$	$[0,4]$	$(-\infty,\infty)$
Vertical line test:	-	✓	✓
Horizontal line test:	-	—	✓

☐ Function composition

Definition Page 149

$f(x) = 3x + 5$; $g(x) = x + 2$

$f(g(x)) = f(x+2) = 3(x+2)+5 = \boxed{3x+11}$

(Hint: $f(\blacksquare) = 3\blacksquare + 5$, and $\blacksquare = x + 2$)

$g(f(x)) = g(3x+5) = (3x+5)+2 = \boxed{3x+7}$

Notation: $f(g(x)) = f \circ g$

Unit 3: Lines

(Chapter 3, page 104)

Graphs of Lines (Linear equations)

Page 122

☐ Graph of a line.

Theorem 3-1

---- General line equation: $y = mx + b$

---- x-intercept ; y-intercept (indicate on graph)

---- Slope of a line $m = \frac{rise}{run}$

---- Vertical line slope: "∞" undefined

---- Horizontal line slope: 0 $\boxed{eg: y = 5}$

---- Line that goes through the origin $y = mx$ no b

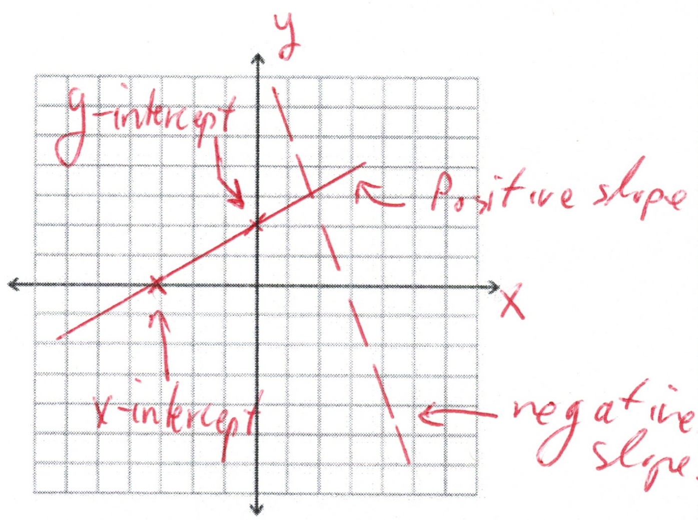
---- Parallel lines m_1, m_2 : $\boxed{m_1 = m_2}$

---- Perpendicular lines m_1, m_2 : $\boxed{m_1 \cdot m_2 = -1}$

Theorems 3-9 and 3-10

---- Positive slope, negative slope (indicate on graph)

---- Examples



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Lines

☐ <u>Slope-intercept form</u>

Theorem 3-7

You are given: $m =$ slope, and y-intercept $= b$

Formula: $y = mx + b$

<u>Point-slope form</u>

Theorem 3-5

You are given: (x_1, y_1) and m

Formula: $(y - y_1) = m(x - x_1)$

<u>Two-point form</u>

Theorem 3-6

You are given: (x_1, y_1) and (x_2, y_2)

Formula: $(y - y_1) = \frac{(y_2 - y_1)}{(x_2 - x_1)}(x - x_1)$

<u>Standard form</u>

Theorem 3-8

Formula: $Ax + By + C = 0$

☐ <u>Intersection of two lines</u>

When their x and y coordinates are the same.

Line 1: $y = 2x + 3$

Line 2: $y = -x + 6$

$2x + 3 = -x + 6$

$3x = 3$

$\boxed{x = 1,\ y = 5}$