

1. [4 pts] Consider the line L given by the equation $y = -3 + 0.2x$
Find the slope and both intercepts of L.

Solution: If we write the line in the form $y = mx + b$, we find that m , the slope, is 0.2 and the y -intercept is -3. To find the x -intercept, set $y = 0$ in the equation $y = -3 + 0.2x$. So $0 = -3 + 0.2x$, from which it follows that $x = 15$.

Answers: Slope = 0.2

x -intercept = 15

y -intercept = -3

2. [4 pts] Find an equation for the line that is *perpendicular* to the line $y = -13 + \frac{1}{3}x$ and passes through the point C = (4, -2).

Solution: Since the slope of the given line is $1/3$, the slope of a perpendicular curve is -3.

Thus, using point slope form, $y - (-2) = -3(x - 4)$, or equivalently: $y + 2 = -3(x - 4)$

3. [4 pts] Write an equation of the line that has x -intercept equal to 5 and y -intercept equal to -7.

Solution: Basically we are given that $P = (5, 0)$ and $Q = (0, -7)$ are points on the line.

$$\text{Thus } m = \frac{\Delta y}{\Delta x} = \frac{-7-0}{0-5} = \frac{7}{5}$$

Using point-slope form:

$$y = \frac{7}{5}x - 7$$

4. [4 pts] Write an equation of the line that is *parallel* to $4x - 3y = 1789$ and passes through the point P = (3, 4).

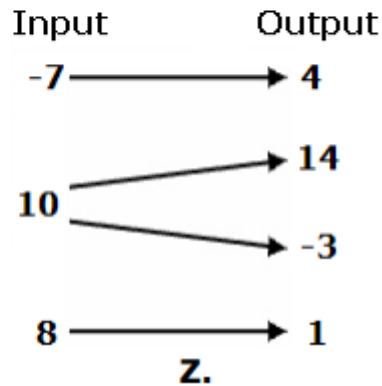
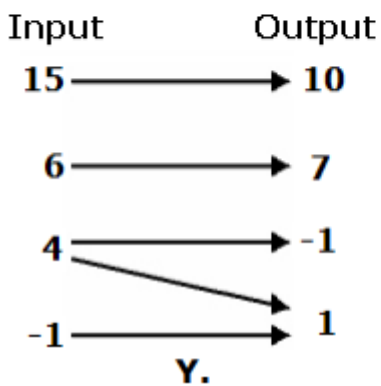
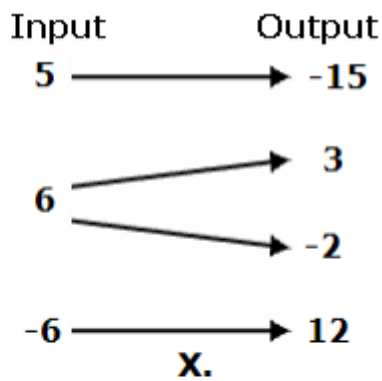
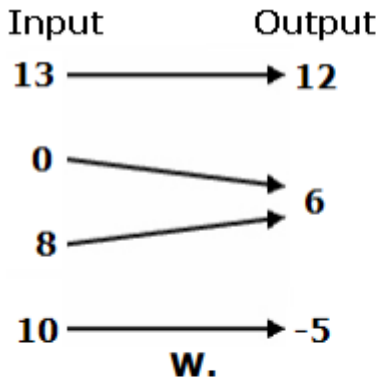
Solution: Writing the given line in slope-intercept form:

$$y = \frac{4}{3}x - \frac{1789}{3}$$

So we see that the slope of the given line is $m = \frac{4}{3}$.

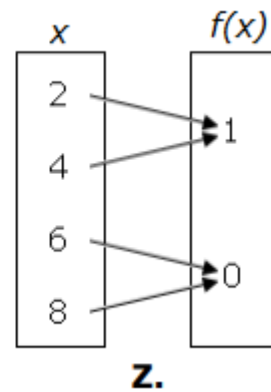
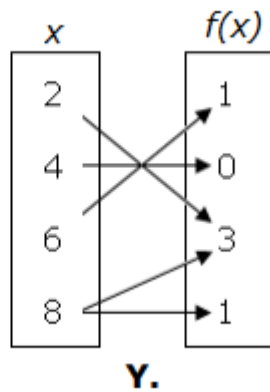
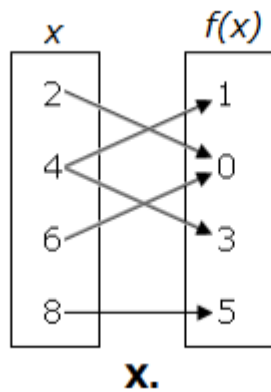
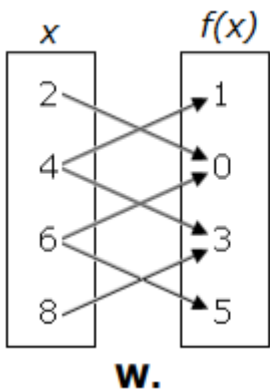
Writing the parallel line in point-slope form: $y - 4 = \frac{4}{3}(x - 3)$ or, equivalently, $y = \frac{4}{3}x$

5. [1 pt] Which (if any) of the following relations are actually functions? List all of those relations given below that are actually functions. (Note: there may be none, exactly one, or more than one.)



ANSWER: Only W is a function

6. [1 pt] Which (if any) of the following relations are actually functions? List all of those relations given below that are actually functions. (Note: possibly none, possibly only 1, possibly 2, ...)



ANSWER: Only Z is a function

7. [1 pt] Which (if any) of the following relations are actually functions? List all of those relations given below that are actually functions. (Note: possibly none, possibly only 1, possibly 2, ...)

x	$f(x)$
0	-1
-1	0
0	1
3	2

W.

x	$f(x)$
-1	0
0	1
1	0
0	-1

X.

x	$f(x)$
-1	3
0	1
1	3
2	5

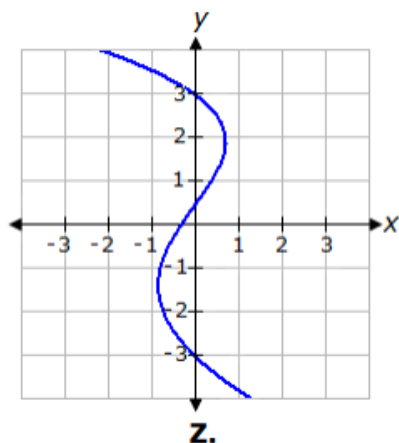
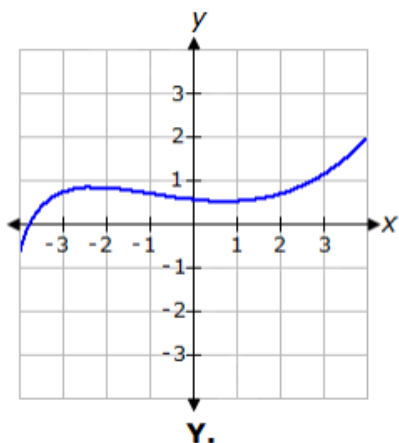
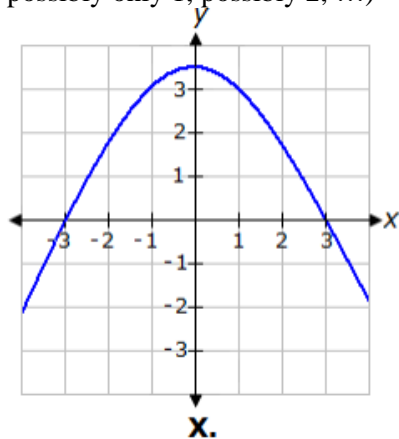
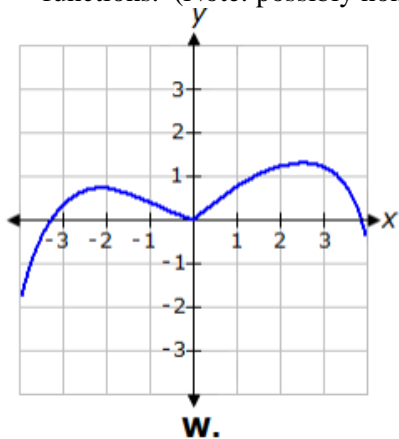
Y.

x	$f(x)$
3	-1
1	0
3	1
5	2

Z.

ANSWER: Only Y is a function

8. [1 pt] Which (if any) of the following graphs represent functions? List all of the graph given below that are actually functions. (Note: possibly none, possibly only 1, possibly 2, ...)



ANSWERS: W, X, and Y are functions

Extra Credit [4 pts]

The following curve is actually a straight line “in disguise.” Find its slope.

$$2(1-x) + 3(x + 5(x - 2)) = (x + 1)^2 - (x + x^2) + 1 + y$$

Solution:

Simplifying the left-hand side:

$$2(1-x) + 3(x + 5x - 10) = (x + 1)^2 - (x + x^2) + 1 + y$$

$$2(1-x) + 3(6x - 10) = (x + 1)^2 - (x + x^2) + 1 + y$$

$$2 - 2x + 18x - 30 = (x + 1)^2 - (x + x^2) + 1 + y$$

$$2 - 2x + 18x - 30 = (x + 1)^2 - (x + x^2) + 1 + y$$

$$16x - 28 = (x + 1)^2 - (x + x^2) + 1 + y$$

Expanding $(x + 1)^2$:

$$16x - 28 = x^2 + 2x + 1 - (x + x^2) + 1 + y$$

Simplifying the right-hand side:

$$16x - 28 = x^2 + 2x + 1 - x - x^2 + 1 + y$$

$$16x - 28 = x + 2 + y$$

Solving for y:

$$15x - 30 = y$$

$$y = 15x - 30$$

Since the equation is now in slope-intercept form, we see that its slope is 15.

The supreme accomplishment is to blur the line between work and play.

- Arnold J. Toynbee