

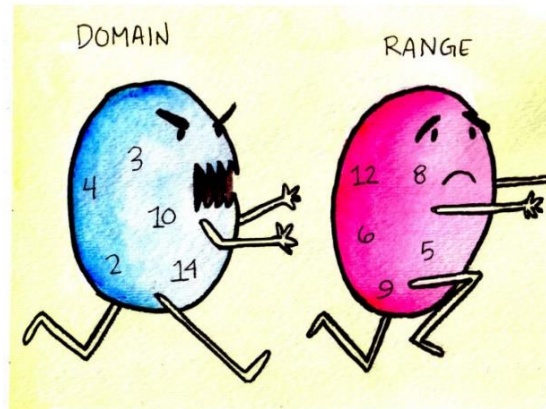
# MATH 100: CLASS DISCUSSION 16 OCTOBER

## PARALLEL, PERPENDICULAR LINES

### GRAPHING INEQUALITIES

### RELATIONS VS FUNCTIONS

### DOMAIN & RANGE



1. What is meant by **point-slope form** of a straight line? What is meant by **slope-intercept** form of a straight line?
2. Find an equation of a line that is *parallel* to  $2x + 4y = 1$  and passes through  $(-3, -5)$ .
3. Are the following lines *perpendicular*? Why?  
 $3x - 5y = 1$  and  $10x + 6y = 7$
4. Find an equation of a line that passes through  $(1, \frac{1}{2})$  and is perpendicular to the line  $y - 3x = 4$ .
5. Write the following in *slope-intercept* form:  
 $2y + x = -(4 - y - x) + 9(x - 3y)$
6. Which of the following lines (if any) are parallel?
  - (a)  $y = 5x - 3$
  - (b)  $y - x = 3(x - y) + 1$
  - (c)  $3 = 2y - (x + y)$
  - (d)  $1 - 5(x - 1) + 7(x + 5) = 8 + 2(y + x) - y + x$
7. For each problem in question (5), find the x and y-intercepts of the line.
8. Write the equation of a line that has x-intercept of 7 and y-intercept of -9.
9. Graph each of the following linear inequalities:
  - (a)  $y > x$
  - (b)  $y < x - 4$
  - (c)  $y \geq 2x + 5$
  - (d)  $x + y < 7$
  - (e)  $2x + y \geq -1$

10. Find  $t$  such that the point  $P = (t, 5)$  lies on the line of slope  $m = -3$  that passes through the point  $(7, 11)$ .

11. Find the midpoint of the line segment joining  $P = (1, 4)$  and  $Q = (-3, -9)$ .

12. If the bat population of BetaVille is currently 2300 and declining by 73 bats each year, when will the bats become extinct?

13. Find the *distance* between the following pairs of points. Also plot the points.

(a)  $P = (2017, 77)$ ,  $Q = (2017, 97)$

(b)  $P = (5, 44)$ ,  $Q = (9, 44)$

(c)  $P = (1, 1)$ ,  $Q = (4, 5)$

(d)  $P = (-3, 4)$ ,  $Q = (4, 5)$

(e)  $P = (99, -104)$ ,  $Q = (100, -101)$

(f)  $P = (3, 5)$ ,  $Q = (3, 5)$

14. Which of the following triples of points are *collinear*? Plot each triple.

(a)  $P = (2, 6)$ ,  $Q = (5, 2)$ ,  $R = (8, -2)$

(b)  $P = (2, 3)$ ,  $Q = (2, 6)$ ,  $R = (6, 3)$

(c)  $P = (8, 3)$ ,  $Q = (5, 2)$ ,  $R = (2, 1)$

(d)  $P = (2, 4)$ ,  $Q = (1, 1)$ ,  $R = (0, -2)$

15. Find the *perimeter* of the triangle with vertices

$A = (-1, -1)$ ,  $B = (0, 5)$ ,  $C = (4, 4)$ .

16. Using a table, graph each of the following:

(a)  $y = |x|$

(b)  $y = |x - 1|$

(c)  $y = |x| + 1$

(d)  $y = |2x - 1|$

17. Find the *domain* of each of the following functions:

(a)  $y = 7x + 19$

(b)  $y = 1 + \frac{1}{x}$

(c)  $y = 12(x + 3)^5$

(d)  $y = \frac{x}{x-3}$

(e)  $y = 5|2x - 1|$

(f)  $y = \sqrt{1 - 4x}$

(g)  $y = \sqrt[3]{1 - 4x}$

(h)  $y = \frac{(x+1)(x+2)}{(x+3)(x+4)(x+5)}$

(i)  $y = \sqrt{x^2 + 1}$

18. Find the *range* of the functions (a), (c), and (i) above

## Additional exercises from text:

In Exercises 1–4, find the domain and the range of the relation. Then draw a graphical representation of the relation. *See Example 1.*

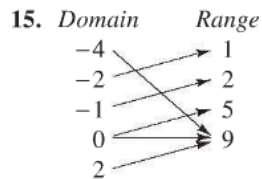
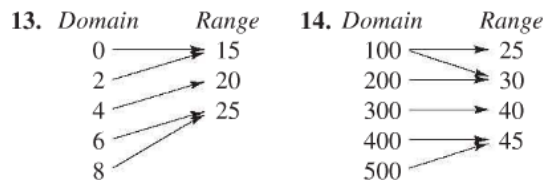
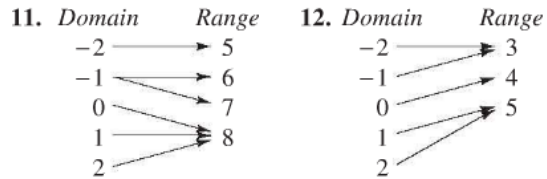
1.  $\{(-2, 0), (0, 1), (1, 4), (0, -1)\}$
2.  $\{(3, 10), (4, 5), (6, -2), (8, 3)\}$
3.  $\{(0, 0), (4, -3), (2, 8), (5, 5), (6, 5)\}$
4.  $\{(-3, 6), (-3, 2), (-3, 5)\}$

In Exercises 5–10, write a set of ordered pairs that represents the rule of correspondence. *See Example 2.*

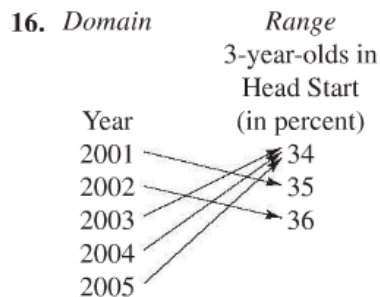
5. The cubes of all positive integers less than 8
6. The cubes of all integers greater than  $-2$  and less than 5
7. The winners of the World Series from 2004 to 2007
8. The men inaugurated as president of the United States in 1989, 1993, 1997, 2001, and 2005.
9. The fuel used by a vehicle on a trip is a function of the driving time in hours. Fuel is used at a rate of 3 gallons per hour on trips of 3 hours, 1 hour, 2 hours, 8 hours, and 7 hours.

10. The time it takes a court stenographer to transcribe a testimony is a function of the number of words. Working at a rate of 120 words per minute, the stenographer transcribes testimonies of 360 words, 600 words, 1200 words, and 2040 words.

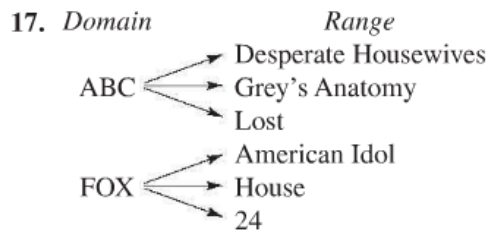
In Exercises 11–22, determine whether the relation is a function. *See Example 3.*

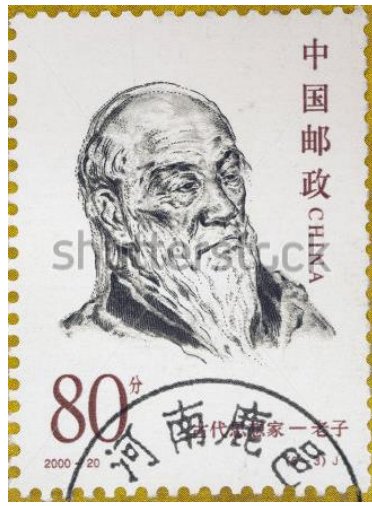


19. For each of the following, determine if the relation is a function:



(Source: U.S. Administration for Children and Families)





*Life and death are one thread, the same line viewed from different sides.*

**- Lao Tzu**