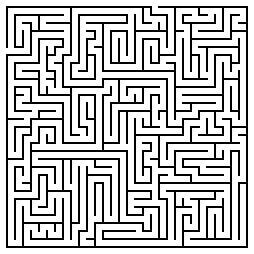
**Math 100: Class discussion**

18 October 2018

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**REVIEW**

1. What is meant by “***slope of a straight line***”?
2. Find the slope of a line that passes through the points (1, -4) and (8, -3). Plot.
3. *Sketch* the graph of a linear function that
4. passes through the points (4, 0) and (0, 8). (What is the slope of this line?)
5. passes through the points (1, 1) and (-3, -4) . (What is the slope of this line?)
6. passes through the point (1, 2) and has slope 3
7. passes through the point (0, 3) and has slope -4.
8. passes through the point (1, 2) and has slope 7/2.
9. Find the *x* and *y* intercepts of the line 3x + 8y = 3.
10. Find the x and y intercepts of the line y = 4x – 13
11. Which of the following triples of points are *collinear*? Plot each triple.
12. P = (2, 6), Q = (5, 2), R = (8, -2)
13. P = (2, 3), Q = (2, 6), R = (6, 3)
14. P = (8, 3), Q = (5, 2), R = (2, 1)
15. P = (2, 4), Q = (1, 1), R = (0, -2)
16. Find an equation of a line that is ***parallel*** to 2x + 4y = 1 and passes through (-3, -5).
17. Are the following lines ***perpendicular***? Why?

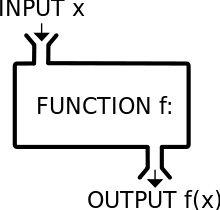
3x – 5y = 1 and 10x + 6y = 7

1. Find an equation of a line that passes through (1, ½) and is perpendicular to the line y – 3x = 4.
2. Write each of the following in ***slope-intercept*** form:
3. 1 – x – 5y = 8
4. 3(2 – y) = 1 + 4(x – 2)
5. 2(1 – 3(1 – x – y)) = x + y
6. 2y + x = -(4 – y – x) + 9
7. Use the point-slope form to find an equation of a line with the given properties:
8. slope = 7, through P = (3, 1)
9. slope = -4/5, through Q = (-1, -2)
10. through P = (1, 3) and Q = (5, 9)
11. Find *t* such that the point P = (t, 5) lies on the line of slope m = -3 that passes through the point (7, 11).
12. For each of the following linear functions, rewrite the equation in standard form and in y-intercept form.
13. y + 3x – 3 = 0
14. y + 2(x – 1) = 4 – 11
15. 3x + 6 = y
16. 1 – (x – y) = 4 + 3(1 – (x – 5))
17. Find the *x* and *y* intercepts of each of the following straight lines:
18. x + 5y = 19
19. y – x = 8
20. y = 7x + 9
21. y = 3(x – 1) + 7
22. ­­­­­­­­­­­­­­­­­­­ The town of Alphaville has a population of 20,000 people. It grows by 3,000 people each year. Since the population, *P*, is growing at a constant rate of 3,000 people per year, *P* is a linear function of time, *t*, in years.
23. What is the rate of change of *P* over every time interval?
24. Create a table that gives the town’s population every five years over a 25-year period. Graph the population.
25. Find a formula for *P* as a function of time, *t*.
26. Albertine’s new start-up company spends $40,000 on computer equipment and, for tax purposes, chooses to depreciate it to $0 at a constant rate over a five-year period.
27. Create a table and a graph showing the value of the equipment over the five-year period.
28. Find a formula for the value, *V*, of the equipment as a function of time, *t*.
29. Find the *distance* between the following pairs of points. Also plot the points.
30. P = (2018, 77), Q = (2018, 97)
31. P = (5, 44), Q = (9, 44)
32. P = (1, 1), Q = (4, 5)
33. P = (- 3, 4), Q = (4, 5)
34. P = (99, -104), Q = (100, -101)
35. Find the *perimeter* of the triangle with vértices

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

1. Odette, a woodworker, sells rocking horses. Her start-up costs, including tools, plans, and advertising, total $5,000. Labor and materials for each horse cost $350.
2. Calculate Odette’s total cost, *C*, to make 1, 2, 5, 10, and 20 rocking horses. Graph *C* against *n*, the number of rocking horses that she carves.
3. Find a formula for *C* as a function of *n*.
4. What is the rate of change of the function *C*? Interpret the meaning of this.

**Introduction to Functions**



1.  Write each of the following relationships using function notation:

(a) Weight, *w*, is a function of caloric intake, *c*.

(b) The number of molecules, *m*, in a gas, is a function of the volume of the gas, *v*.

(c) The final exam grade, *G*, of a student is a function of the number of hours, *t*, of sleep s/he has the night before the final.

2. Let f(t) be the number of people in the U.S., in millions, who own cell phones *t* years after 1990. Explain the meaning of each of the following statements:

(a) f(9) = 100.3; (b) f(a) = 20; (c) f(25) = b; (d) n = f(t)

3. Suppose that you ride on a Ferris wheel beginning at time zero, and remain on the wheel for three complete revolutions before exiting.   Draw a graph of your *height above the ground* as a function of time.  Be certain to label the axes, and to define the units.

4.   Sketch a curve of the height of a person from time of birth until time of death.  What is the independent variable?  the dependent variable?

5. The population, *P*, of the land of Oz in millions, is a function of *t*, the number of years since 1980; so P = f(t). Explain the meaning of the statement f(45) = 12

6.  Let g(x) = 3x + 5 be a function. Compute and simplify each of the following:

(a) g(3)

(b) g(-9)

(c) g(3x)

(d) g(x3)

(e) g(5 + z)

(f) {g(x + h) – g(x)} / h

7. Let f (x) = x2 – 4x + 5 be a function.

(a)  Find  f (-1), f (0), f (3), and f (0.1).

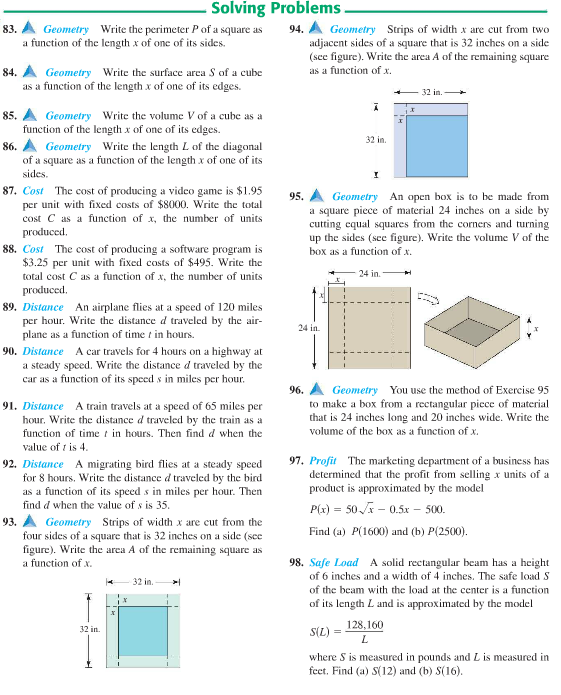
(b)  Find f(2b)

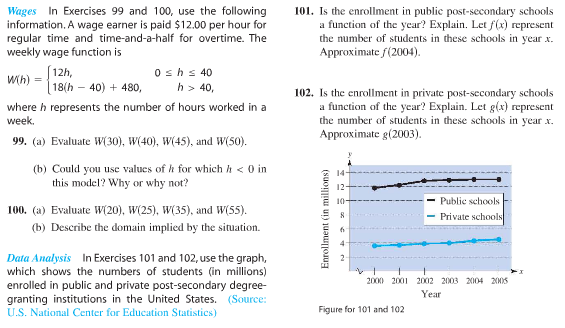
(c) Find f(c – 1)

(d) Find f(x2)

(e)  Find f(1+h) – f(1)

(f) Simplify {f(1 + h) – f(1 – h)}/h





*Vocabulary:* function, independent variable, dependent variable, domain, range, vertical line test

[*Life and death are one thread, the same line viewed from different sides.*](http://www.brainyquote.com/quotes/quotes/l/laotzu163064.html)

**-** [**Lao Tzu**](http://www.brainyquote.com/quotes/authors/l/lao_tzu.html)