MA 138 Exam One Review Problems

Note: This is NOT a practice exam. It is a collection of problems to help you review some of the material for the exam and to practice some kinds of problems. This collection is not necessarily exhaustive; you should expect some problems on the exam to look different from these problems.
In addition to redoing past homework problems and looking at past quizzes, consider trying the following review problems.

1. A teacher instructed one of her students as follows: "Pick any number, multiply it by 6, then subtract 8, and divide the result by 2. Now add 4 to the quotient. Tell me your answer, and I will tell you the original number." What is the teacher doing to determine the original number and why does it work?

2. Jim spent $8.70 on school supplies. He bought notebooks, which cost 45 cents each, and folders, which cost 25 cents each. He purchased 4 more folders than notebooks. Let x represent the number of notebooks that he bought.
   a. Write an algebraic expression for the total cost of the notebooks.

   b. Write an algebraic expression for the total cost of the folders.

3. Sketch an algebra-piece model for the following problem. Then explain or show how you used it to arrive at your solution. The sum of three integers is 39. The second integer is six more than twice the first. The third integer is three times the first plus 3.

4. Determine which of the following are functions with domain $D = \{0, 1, 2, 3, ...\}$. Explain why it is or is not a function.
   a. $f(x) = 5$ for all x in D

   b. $f(x) = 3$ if x is in $\{0,1,2,3\}$ and $f(x) = 0$ if x is not in $\{0,1,2,3\}$

   c. $f(x) = x$ if x is even, $f(x) = 10$ if x is a multiple of seven, and $f(x) = 13 - x$ otherwise.

5. Do the ordered pairs describe functions? If not, explain why.
   a. {(2,3), (3,4), (4,3), (5,4)}

   b. {(6,4), (4,3), (10,7), (6,3)}

   c. {(3,3), (4,3), (6,3), (7,3)}

6. Which of the following are functions from {1, 2, 3, 4, 5} to {v, w, x, y, z}
   a. {(1,w), (2, x), (4, z), (5, v), (3, x)}

   b. {(2, z), (1, y), (5, w), (4, x), (3, z)}

   c. {(5,x), (1, v), (3, w), (4, z), (2, y), (3, z)}

7. Consider the function $f(t) = 5t - 7$, with the domain $N = \{1, 2, 3,...\}$. Which of the following numbers are in the range of the function. If they are in the range, what value of t corresponds to that number?
   a. 3

   b. 14

   c. 5

   d. 13

8. Disco Dan's DJ Company charges $150 for DJ service for the first three hours of your party. He then charges $25 for every hour after that. If $D(t)$ represents the cost for Dan's DJ service for t hours at your party, write an equation for $D(t)$ in terms of t. How much would you have had to pay Dan if you picked up the bill for his DJ service at your Aunt Edna's 95th birthday party that lasted for 7 hours? (Aunt Edna still knows how to throw a party!)

9. Find a number such that 5 more than one-half the number is three times the number.

10. Solve each of the following:
    a. $2x + 5 = \frac{3}{5}x - \frac{3}{5}$

    b. $3x - 3 = \frac{3}{2}x + \frac{3}{4}$

    c. $-x - 4 > 8$

    d. $-2x + 5 < 10$

11. Which of the following are functions with domain $S = \{0, 1, 2, 3, \ldots\}$. Be prepared to explain your answer!
    a. $f(x) = 5$ if $x > 7$, $f(x) = 4$ if $x < 7$, and $f(x) = 7$ if $x = 7$.

    b. $g(x) = 2x$ if $x > 4$ and $g(x) = x$ if $x < 5$

    c. $h(x) = 10$ if x is in $\{1, 3, 5, 7,...\}$ and $h(x) = 12$ if x is in $\{0, 2, 4, 6, 8, \ldots\}$

12. Let $g(x) = 4x + 3$ with domain $D = \{0, 1, 2, 3, 4, 5, ...\}$. Determine whether the function takes on the following values. If yes, give the value of x that results in the given value. If no, explain why.
    a. 0
    b. 15
    c. 3

13. Ben's Truck Rental Company charges $45 for the rental truck plus $.50 a mile for trips over 20 miles.
    a. Find the cost for renting Ben's truck for a 40-mile trip.

    b. Write a function C where $C(n)$ gives the cost for renting a truck from Ben for an n-mile trip (Assume n is at least 20).

14. Given the equation $y = 2x + 4$, find the slope of the line, the y-intercept, and sketch the graph of the line.

15. For each of the following, write the equation of the line determined by the given pair of points in slope-intercept form:
    a. (1,0) and (4, 7)

    b. (0,0) and (3,8)

16. A taximeter starts at $1.60 and increases at the rate of $1.20 for every minute. Let x represent the number of minutes and $f(x)$ represent the total cost. Write an equation for the total cost as a function of the number of minutes.

17. Write the equation of the line which passes through the point (–3, 0) and whose slope is 4.

18. Find the slope of each line:
    a. A line through the points (–1, 2) and (2, –7)

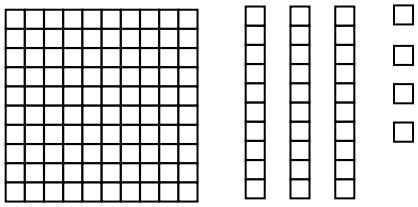
    b. A line through the point (–17, 63) and parallel to the x-axis.

19. Determine what number is represented by the base-ten pieces below if each:

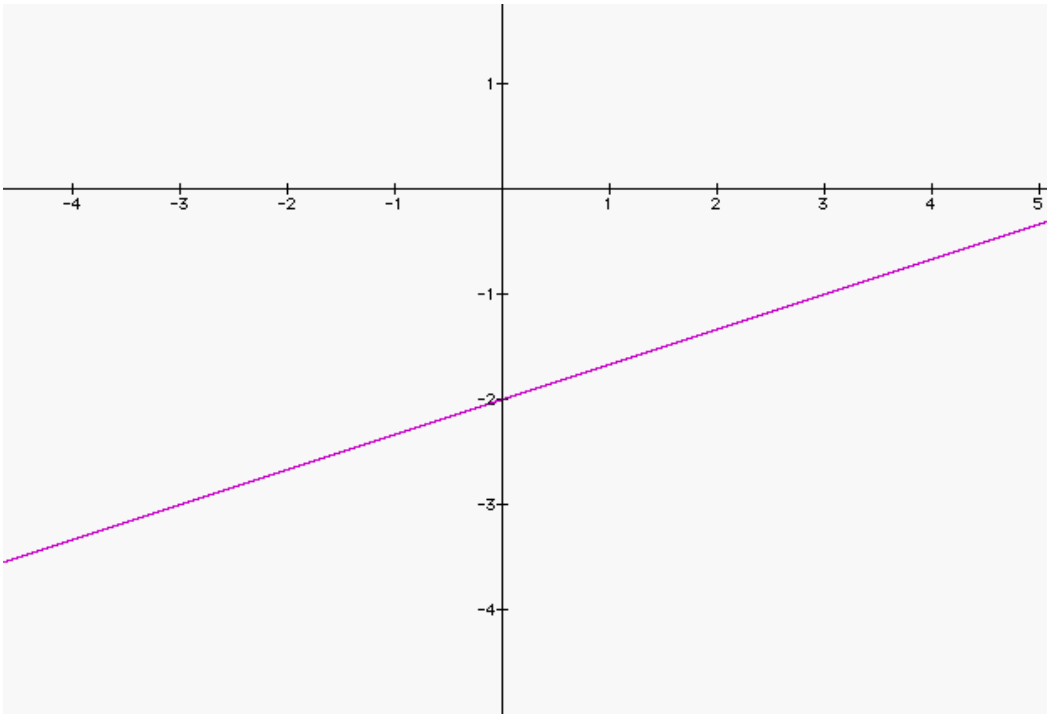
    a. Long represents one unit

    b. Flat represents one unit

    c. Small square represents one tenth



20. Examine the following graph:



For each equation below, state whether the equation *might be* that of the graph given above or whether the equation *cannot be* that of the graph above. Most importantly, **you must** state a reason for your answer.

a. $y = -\frac{1}{2}x + 3$

b. $y = \frac{1}{3}x - 2$

c. $y = 3x - 2$