

MATH 1101/24
Practice Test #2
Fall 2009

Instructions: In most of the following questions, if you simply answer with a number or an algebraic expression, that will be insufficient and points will be deducted. As has been told to you in class: A number without any words to describe its meaning is, for the most part, meaningless and worthless! Better yet, you should put the words into complete sentences that appropriately communicate the full meaning of an answer. Write neatly in an organized manner. You must show the calculations that support your answers; drawing and labeling a picture can be helpful.

1. (6) You are standing at the center of a circular circus tent, where the height is 26 feet. The slope of the tent's roof is -0.6 . If you walk 10 feet straight toward the outer wall of the tent and stop, how high is the roof of the tent at that spot?

2. (6) To conform with the requirements of the Americans with Disabilities Act (ADA), a building which has steps up to its front door (the land in front of the building is perfectly flat) also has a straight ramp that permits easy access to the building for those confined to wheelchairs. The slope of the wheelchair ramp is $1/12$. If the steps up to the front door are 4 feet high, how far away from the building is the start of the ramp?

3. (6) Suppose that f is a linear function such that $f(3) = 5$ and $f(7) = -4$. Find the equation for f .

4. (8) One rule of thumb that relates weight to height for adult males says that a man who is 1 inch taller than another is expected to be heavier by 5 pounds. Another rule of thumb says that a man who is 70 inches tall should weight 170 pounds. On the basis of these two rules of thumb, state a formula that expresses weight as a linear function of height. Be sure to identify the meaning of the letters you use.

5. (9) One of these tables has data that is linear:

Table A

t	0	2	4	6	8	10
$f(t)$	6.7	7.77	9.02	10.46	12.13	14.07

Table B

t	0	2	4	6	8	10
$g(t)$	5.8	7.53	9.26	10.99	12.72	14.45

(a) Is the data in Table A linear? Explain why it is or isn't.

(b) Is the data in Table B linear? Explain why it is or isn't.

(c) For the data that is linear, find a formula for the linear function.

8. (8) The following table gives the percentage of American homes with cable TV. Find the equation of a linear regression model, and write the model with appropriate descriptors.

Year	Percent of homes with cable TV
1985	46.2
1986	48.1
1987	50.5
1988	53.8

9. (6) Solve the following linear system:

$$-6.6x - 26.5y = 17.1$$

$$6.9x + 5.5y = 8.4$$

10. (12) The table below shows the average salaries, in thousands of dollars, of elementary and secondary classroom teachers in public schools in the given years.

Year	Elementary	Secondary
1994	35.2	36.6
1995	36.2	37.5
1996	37.3	38.4
1997	38.2	39.1
1998	39.1	39.9

a. Using your calculator, create a linear regression model for the salaries of elementary classroom teachers as a function of time, and another linear regression model for the salaries of secondary classroom teachers as a function of time. Write down both linear models, correctly annotated with words that clearly and unambiguously explain the meanings of the variable names you have chosen to use.

b. On the basis of the two regression lines, and assuming that the trends continue, in what year will the average salary of elementary classroom teachers in public schools be the same as that for secondary classroom teachers?

11. (24) The number of tourists visiting a certain country is a *linear* function of time.

(a) Using this fact, fill in the blanks in the following table. Be sure to show your work.

Date	1979	1983	1987	1991	1995
Number of tourists (in thousands)	103	93.4	83.8		

(b) Find a formula for a linear function that models the data in the table. (You need to choose variable and function names. Be sure to state what the units are.)

(c) Explain in practical terms the meaning of the slope of the function you found in Part (b).

(d) Use your formula from Part (b) to predict the date when the number of tourists will drop to 57.4 thousand.