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EXAM 1, MATH 114: ALGEBRA AND TRIGONOMETRY

OCTOBER 3, 2005

No books, calculators or papers may be used, other than
a hand-written note card at most $5'' \times 7''$ in size.

This examination consists of six long-answer questions. Each problem is worth sixteen points, with four points granted to everyone. Partial credits will be given only when a substantial part of a problem has been worked out. Merely displaying some formulas is not sufficient ground for receiving partial credits.

PLEASE BOX YOUR ANSWERS.

• YOUR NAME, PRINTED:

• YOUR LECTURE SECTION (CIRCLE ONE):

NETT

RAGHAVAN

FANG

1	2	3	4	5	6	Total

Name: _____

1. (a) Express without negative powers and simplify the expression

$$\frac{(x+1)^{-1}(x+2) - (x+2)^{-1}(x-1)}{(4x+5)(x+1)^{-1}}$$

- (b) Rationalize the denominator in the following expression

$$\frac{1}{\sqrt{x+2} + \sqrt{x}}$$

Name: _____

2

2. Factor completely the following expressions:

(a) $x^3 - 5x^2 + 6x.$

(b) $-x^4 + 3x^3 + x - 3.$

Name: _____

3

3. Find the equation of the circle whose center is at the point of coordinates $(2, 4)$ and which passes through the point of coordinates $(3, 7)$.

Name: _____

4

4. Air temperature on a given day is measured at an altitude of 1000 feet to be 48°F , and at 4000 feet to be 39°F . Assume that the temperature varies linearly with altitude.

(a) Find an expression for the temperature as a function of altitude.

(b) At what altitude should we expect the freezing level to be?

Name: _____

6

6. An object is thrown upwards from a certain height. The height of the object as a function of time is given by

$$h(t) = -16t^2 + 20t + c$$

for a certain c . The object hits the ground 2 seconds after it has been thrown.

(a) Determine c .

(b) Find what height the object was thrown from.