MAC 2311 Sept 4, 2007
Quiz on Pre-Reqs and Key Prof. S. Hudson

The problems are worth 15 points each, except 1) is worth only 10. The quiz took about 35-40 minutes.

1) What is an equation of a line through (-4,7) and perpendicular to $y = \frac{2}{3}x + 5$?

2) Find $\cos(75°)$ using the addition formula for $\cos(a + b)$.

3) Solve for x, given that $(\ln(x))^2 = \ln(x^4)$. There may be 2 or 3 solutions.

4) Solve for x, given that $(x^2 - 5x + 4)/(x^2 - 4) \leq 0$. Answer with interval notation, if possible.

5) Solve for x, given the double inequality $x + 3 < 2x + 8 < 3x + 10$. Answer with interval notation, if possible.

6) Simplify this formula using the triangle method: $\cos(\tan^{-1}(x))$.

7) Derive the formula for the area of a sector. See the picture. Your answer should include the correct formula and a clear explanation (in words, of course) of why it is true.

Remarks and Answers: If you scored below 50/100, your chances of passing are not too good. If you plan to try, you need to bring your algebra and/or trig skills up to par before the first exam. If you scored below 40/100, you must see me about remedial work to stay in the class. Come by during office hours, or email me for an appointment. The average grade, among those over 40, was about 56/100. The scale for the quiz is approx:
A's 75-100, B's 60-75, C's 50-60, D's 40-50, F's below 40.

Problems 1, 6 and 7 came from my previous quizzes, HW1, or the lectures. Problems 2-5 came from the web site, http://www.math.ucdavis.edu/ marx/precalculus.html.

1) $y = -3x/2 + 1$

2) $(\sqrt{6} - \sqrt{2})/4$

3) $x = e^4$ or $x = 1$. You can abbreviate $L = \ln x$ and write the equation as $L^2 = 4L$. Solve for L to get $L = 0$ or $L = 4$. Then, set $x = e^L$.

4) $(-2, 1] \cup (2, 4]$. Begin by factoring, $f(x) = P(x)/Q(x) = \frac{(x-4)(x-1)}{(x-2)(x+2)}$. So, f will change sign at the roots of P and Q, which (in numerical order) are -2, 1, 2 and 4. Draw a number line, and notice that the 4 points split the line into 5 parts. Test f on each of these five intervals, for + or –, and keep the two that make it negative. Don't forget that $f = 0$ at 1 and 4, so those endpoints should be included, using square brackets.

5) $(-2, +\infty)$. The solution to the first inequality is $(-5, +\infty)$. The solution to the second inequality is $(-2, +\infty)$. We want the intersection; the numbers which make *both* inequalities true. Since the second set is contained in the first, it is the answer. I gave partial credit for $-5 < x > -2$, but this is bad notation. It's non-standard to combine $<$ with $>$, it's not in interval form, and there is no reason to include the '$-5 <$' part.

6) $\frac{1}{\sqrt{1+x^2}}$. This is Ch 1.5.41a and the method is explained on page 60.

7) $A = \theta r^2/2$. We went over the reasoning in class, but it is also explained on page A3.