MATH 205   L01   Winter 2002
Quiz 6   B02   30 Minutes

NAME: _____ KEY _____   ID: _____

No Calculators

1. Solve the inequality $2x > 3 - 5(2 - x)$.   [20]

$$2x > 3 - 10 + 5x$$

$$7 > 3x$$

$$\boxed{x < \frac{7}{3}} \quad \text{or} \quad \boxed{x \in \left(-\infty, -\frac{7}{3}\right)}$$

2. Answer T or F only for (a)-(h). In (a)-(d), $a, b, c \in \mathbb{R}$.   [30]

(a) If $ab > ac$ then $b > c$.   __F__

(b) If $a < b$, $c < d$, then $a - c < b - d$.   __F__

(c) If $a < b$, $c \leq d$, then $a - c < b - d$.   __F__

(d) If $a < b$, $c < d$, then $a/c < b/d$.   __F__

(e) Using the complex numbers $\mathbb{C}$, all the roots can be found (at least in theory) for any polynomial equation $p(x) = 0$.   __T__

(f) The theorem mentioned in (e), known as the Fundamental Theorem of Algebra, was first proved by N.H. Abel.   __F__

(g) The mathematician al-Khwârizmî, in the 9th century, would have been able to solve the equation $x^2 + 6x - 11 = 0$.   __T__

(h) The quartic equation was first solved by Ferrari.   __T__

(i) Name a famous mathematician of the 1700's. _____

(j) Name a famous mathematician of the 1900's. _____

1

3. Using the binomial theorem, expand $(1-x)^5$. [25]

$$(1-x)^5 = 1 + 5(-x) + 10(-x)^2 + 10(-x)^3 + 5(-x)^4 + (-x)^5$$
$$= \boxed{1 - 5x + 10x^2 - 10x^3 + 5x^4 - x^5}$$

4. Solve the equation $x^2 - 4x + 5 = 0$, and simplify the answer as far as possible. [25]

$$x = \frac{4 \pm \sqrt{16 - 20}}{2}$$
$$= \frac{4 \pm 2i}{2}$$
$$= \boxed{2 \pm i}$$