MATH 222 — THE SECOND MIDTERM

November 3, 2004, 12:05–12:55am

Your Name:

Your TA: (circle one)

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Score				
1:	2:	3:	4:	5:
				Total:

1 Compute $\lim_{x\to 0} \dfrac{e^{x^2}\cos x - 1 - \frac{1}{2}x^2}{1-\cos(x^2)}$

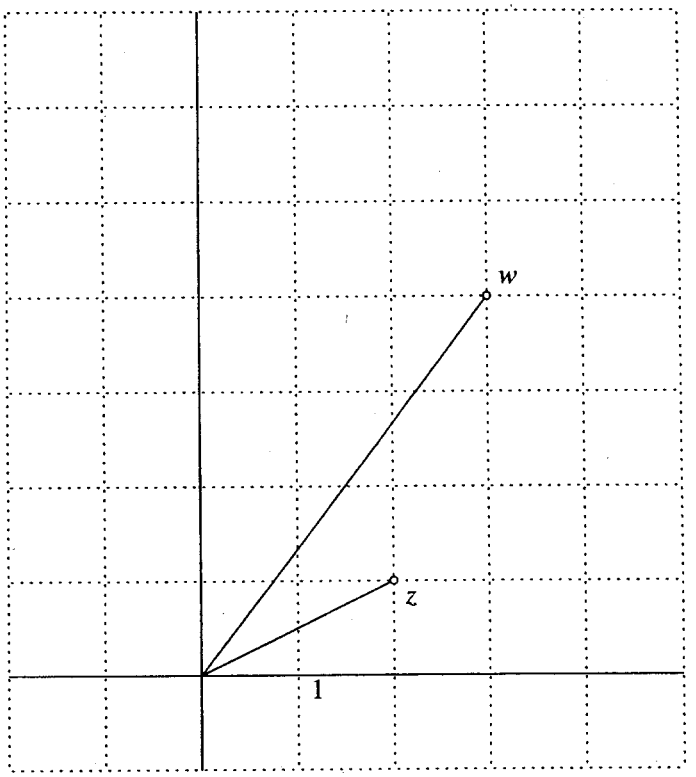
[Hint: For partial credit first compute the Taylor expansion up to $o(x^4)$ of $e^{x^2}\cos x$ and of $\cos x^2$.]

2 Show that the Taylor series for

$$f(x) = \cos(3x - 2)$$

converges for ***all*** real numbers x.

3 The following figure shows two complex numbers z and w.



(*i*) Draw $(1 + 3i)z$ in the same figure.

(*ii*) Compute $\frac{w}{z}$.

4 Find

$$\mathfrak{Re}\left\{\frac{e^{(1-i)x}}{1+2i}\right\}$$

5 You are given an angle x whose Cosine and Sine are given by

$$\sin x = A, \text{ and } \cos x = \sqrt{1 - A^2}.$$

Compute $\cos 6x$.