MATH 8150 Homework 2

Dahlen Elstran

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Problem 1. Prove that

$$\int_0^\infty \sin(x^2)dx = \int_0^\infty \cos(x^2)dx = \frac{\sqrt{2\pi}}{4}.$$

Proof. First note that

$$\int_0^\infty e^{ix^2} = \int_0^\infty \cos(x^2)dx + i\int_0^\infty \sin(x^2)dx.$$

Then by the hint, we know that $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\square$