Math 19 Review Problems 12/10/14

(1) Find the Taylor series of $\frac{1}{1+2x^2}$ with center $x=0$.
What is its radius of convergence?

(2) Find the quadratic approximation of $\sqrt{1+\sin x}$ around $x=0$.

(3) Find a series (of rational numbers) whose sum converges to

$$\int_0^2 \sin(x^2)\,dx$$

(4) Find the Taylor series of $f(x) = \frac{1}{2}(e^x + e^{-x})$.

(5) Find the Fourier series (2π-periodic) of $f(x)$, where:

$$f(x) = \begin{cases} 1 & -\pi/2 \le x < \pi/2 \\ 0 & -\pi \le x < -\pi/2 \text{ or } \pi/2 \le x < \pi \end{cases}$$

$$f(x+2\pi) = f(x).$$

(6) Find the real & complex Fourier coeffs. of $\sin^2 x$.
(hint. find a way to avoid taking any integrals).

(7) Find the steady-state (2π-periodic) solution to

$$f''(t) + 10f(t) = \cos t + \cos(3t)$$