

PHYSICS 404 –Fall 2017  
2<sup>nd</sup> HOMEWORK  
Dr. V. Lempesis

Hand in: Sunday 29<sup>th</sup> of October 2017

1. Using the result of problem 6 of handout 5 to show that:

$$(a) \cos x = J_0(x) + 2 \sum_{n=1}^{\infty} (-1)^n J_{2n}(x),$$

$$(b) \sin x = 2 \sum_{n=1}^{\infty} (-1)^{n+1} J_{2n+1}(x).$$

2. You are given that  $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \sin x$  and  $J_{-1/2}(x) = \sqrt{\frac{2}{\pi x}} \cos x$ . Find  $J_{5/2}(x)$ .

3. Use the result of problem 4 of handout 6 and calculate the integral  $\int_0^1 x J_{1/2}^2\left(\frac{\pi}{2}x\right) dx$ .

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