

1.(2pts.)  
Griffiths Prob. 2.2

2.(3pts)  
Griffiths Prob. 2.3

3.(5pts)  
Griffiths Prob. 2.4

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1.(5pts.)  
A particle in an infinite square well  $0 \leq x \leq a$  has initial wave function,

$$\Psi(x, 0) = Ax(a - x)$$

- (a) Normalize  $\Psi(x, 0)$  and plot it. Which energy eigenstate does it most closely resemble?
- (b) Give an expression for  $\Psi(x, t)$  for general  $t$  in terms of energy eigenstates. Determine the expansion coefficients  $c_n$  for general  $n$ . Give numerical values for  $c_1$ ,  $c_2$  and  $c_3$ . Are they consistent with your answer to the last question in (a)?
- (c) Suppose that at  $t = t_0 > 0$  one measures the energy and  $E = \frac{9\pi^2\hbar^2}{2ma^2}$  is found. What can one say about  $\Psi(x, t)$  immediately after this measurement?

2.(5pts.)  
Griffiths Prob. 2.37

The trigonometric identity  $\sin(3\alpha) = 3\sin(\alpha) - 4(\sin(\alpha))^3$  could be useful.