Math 335 HW 12 **NAME:** _____
Due Wednesday 11/20 5:15pm

Practice Problems *(Do not turn in.)*
Sec 12.3 #11, 15, 19
Sec 13.1 #1, 3, 11, 13

Print out this page and write all answers directly on this worksheet. Show all work. Your answers must be clear and legible. All pages must be stapled.

1.) *[5 points]* Find the Fourier Sine Series on $(0, \pi)$ for the function

$$f(x) = \begin{cases} 2 & if\ x \leq 1 \\ 3 & if\ x > 1 \end{cases}$$

2.) *[5 points]* Find the Fourier Cosine Series on $(0, \pi)$ for the function

$$f(x) = \begin{cases} 2 & if\ x \leq 1 \\ 3 & if\ x > 1 \end{cases}$$

3.) *[10 points] (Sec 13.1 #11)* Use separation of variables to find product solutions $u(x,t)$ to

$$16u_{xx} = u_{tt}$$

a.) First assume the solution is separable as $u(x,t) = v(x)w(t)$. Separate the x and t functions and then set them equal to a separation constant $-\lambda$.

b.) Find the solution $u_1(x,t) = v_1(x)w_1(t)$ assuming $\lambda = 0$.

#3 continued...

c.) Find the solution $u_2(x,t) = v_2(x)w_2(t)$ assuming $\lambda = \alpha^2$ (So $-\lambda = -\alpha^2$).

d.) Find the solution $u_3(x,t) = v_3(x)w_3(t)$ assuming $\lambda = -\alpha^2$ (So $-\lambda = \alpha^2$).