

**Math 335 HW 12**

**Due Wednesday 11/20 5:15pm**

**NAME:** \_\_\_\_\_

**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

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

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

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



**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  $-\lambda = \alpha^2$ ).