Math 275 **Functions of two variables**

September 9, 2014 Name: _____

1. The table below gives the cost, C (in dollars), of driving 500 miles as a function of the price, y (in dollars per gallon), and the fuel economy, x (in miles per gallon or mpg), of the car. Sketch contours for $C = 45$, 55, 65, and so on, up through 105, directly on the table.

Cost of Driving 500 miles

Miles per gal, y \ Gas prices per gal, x	2.85	3.00	3.05	3.10	3.15	3.30	3.45	3.60	3.75	3.90	4.05
16	89.06	93.75	95.31	96.88	98.44	103.13	107.81	112.50	117.19	121.88	126.56
18	79.17	83.33	84.72	86.11	87.50	91.67	95.83	100.00	104.17	108.33	112.50
20	71.25	75.00	76.25	77.50	78.75	82.50	86.25	90.00	93.75	97.50	101.25
22	64.77	68.18	69.32	70.45	71.59	75.00	78.41	81.82	85.23	88.64	92.05
24	59.38	62.50	63.54	64.58	65.63	68.75	71.88	75.00	78.13	81.25	84.38
26	54.81	57.69	58.65	59.62	60.58	63.46	66.35	69.23	72.12	75.00	77.88
28	50.89	53.57	54.46	55.36	56.25	58.93	61.61	64.29	66.96	69.64	72.32
30	47.50	50.00	50.83	51.67	52.50	55.00	57.50	60.00	62.50	65.00	67.50
32	44.53	46.88	47.66	48.44	49.22	51.56	53.91	56.25	58.59	60.94	63.28
35	40.71	42.86	43.57	44.29	45.00	47.14	49.29	51.43	53.57	55.71	57.86
36	39.58	41.67	42.36	43.06	43.75	45.83	47.92	50.00	52.08	54.17	56.25

(a) If the cost, C, of driving 500 miles is given by $C(x, y)$ according to the above table, find $C(3.60, 26)$ and interpret it.

i. Value:

i. _____

ii. Interpretation:

(b) Regular unleaded gasoline costs about \$3.85/gallon this week. Find a formula for $C(3.85, y)$. Use your formula to plot this function in Sage. Write down the Sage command you used below.

(c) Explain the significance of $C(x,26)$ in terms of driving costs. Find a formula for $C(x,26)$.

(d) Use Sage to plot $C(x,26)$. Write the Sage command(s) you used below.

2. Label the local extrema on the following contour plots. Say whether each extreme point is a maximum or a minimum.