MR3252: Tropical Meteorology
Homework 1

Name:_____

1. Use a Skew T-log P chart to fill in the table below.

P (mb)	T (°C)	T_d (°C)	θ (K)	θ_e (K)	θ_{es} (K)	w (g/kg)	RH (%)
	0	-5	309				
1000	28	23					
			305	335	360		
			325			6	80
750		16			370		

2. On the 1000–400 mb Skew T-log P chart, **use a <u>pencil</u>** to draw the temperature and dew point profiles for the following sounding.

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot
1010.0	12	21.6	18.6	83	13.54	205	2
1002.0	84	23.0	18.1	74	13.22	165	6
1000.0	102	23.8	18.9	74	13.94	155	7
995.0	146	24.4	19.8	76	14.84	155	8
977.1	305	23.4	18.6	74	13.97	155	10
966.0	405	22.8	17.8	73	13.45	162	10
943.4	610	20.9	17.1	79	13.17	175	9
925.0	781	19.4	16.5	83	12.93	165	8
910.8	914	18.2	16.1	87	12.78	155	8
898.0	1036	17.2	15.7	91	12.65	153	9
880.0	1210	17.8	11.8	68	9.97	150	10
879.0	1219	17.7	11.8	68	10.01	150	10
864.0	1367	16.4	12.5	78	10.65	173	8
856.0	1446	16.4	10.4	68	9.33	186	7
850.0	1506	15.8	10.8	72	9.66	195	6
845.0	1556	15.4	10.5	73	9.52	193	6
819.0	1821	14.0	11.8	87	10.73	180	3
818.2	1829	14.1	11.8	86	10.70	180	3
816.0	1852	14.2	11.6	84	10.62	174	3
799.0	2031	17.0	-13.0	12	1.77	130	3
789.3	2134	17.1	-13.6	11	1.70	105	3
786.0	2170	17.2	-13.8	11	1.68	108	3
761.5	2438	15.8	-10.0	16	2.36	130	2

MR3252: Tropical Meteorology
Homework 1

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot
749.0	2579	15.0	-8.0	20	2.81	118	3
743.0	2647	14.2	1.2	41	5.65	113	3
734.5	2743	13.3	1.8	46	5.97	105	4
732.0	2772	13.0	2.0	47	6.08	107	4
712.0	3005	12.6	-9.4	21	2.65	124	3
700.0	3147	12.2	-9.8	21	2.61	135	3
688.0	3291	11.2	-8.8	24	2.87	148	3
658.2	3658	8.2	-8.8	29	3.00	180	4
658.0	3661	8.2	-8.8	29	3.00	180	4
645.0	3825	7.0	-5.0	42	4.11	191	5
640.0	3889	6.4	-1.6	57	5.35	195	6
635.0	3953	6.6	-8.4	33	3.21	199	6
632.0	3992	6.2	-9.8	31	2.89	202	7
616.0	4201	4.2	-6.8	45	3.75	216	8
611.0	4267	3.7	-7.7	43	3.51	220	9
594.0	4495	2.0	-11.0	38	2.79	218	10
586.0	4604	1.0	-7.0	55	3.88	217	11
567.0	4868	-1.5	-4.9	78	4.71	215	12
566.4	4877	-1.6	-5.0	78	4.69	215	12
555.0	5038	-2.9	-6.5	76	4.26	224	13
541.0	5240	-3.9	-7.8	74	3.95	236	13
537.0	5299	-4.1	-9.1	68	3.60	239	13
532.0	5372	-4.5	-8.8	72	3.72	243	14
525.0	5477	-4.1	-13.1	50	2.67	249	14
524.4	5486	-4.1	-13.0	50	2.70	250	14
520.0	5552	-4.1	-12.1	54	2.92	251	14
516.0	5613	-4.7	-9.7	68	3.57	252	14
500.0	5860	-6.3	-11.3	68	3.24	255	14
498.0	5892	-6.5	-11.5	68	3.20	256	14
491.0	6003	-6.9	-17.9	41	1.92	261	13
485.2	6096	-7.4	-19.5	37	1.69	265	13
481.0	6164	-7.7	-20.7	34	1.54	262	13
475.0	6262	-8.1	-30.1	15	0.66	257	13
466.6	6401	-9.2	-26.0	24	0.99	250	13
459.0	6528	-10.3	-22.3	37	1.40	252	14
450.0	6681	-10.9	-30.9	18	0.65	254	14
437.0	6907	-12.7	-22.7	43	1.42	256	16
433.0	6977	-13.1	-27.1	30	0.96	257	16
410.0	7393	-15.5	-26.5	38	1.08	263	18
400.0	7580	-16.3	-29.3	32	0.85	265	19

MR3252: Tropical Meteorology
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3. Assess the stability of the following layers. For each layer, give a brief explanation in the form of temperatures or potential temperatures at the bottom and top of each layer. Additionally, out of the layers shown below, circle the one that is **most unstable.**

   810–790 mb:

   950–900 mb:

   475–400 mb:

   750–500 mb:

   Surface to 1000 mb:

4. What is the approximate pressure level above which no cumuliform clouds will penetrate? How can you tell, and what does this tell you about vertical motion above this level?

5. What is the pressure at the 0°C level?

6. Above the answer you gave to Question 4, at approximately what level would one most likely find cloud?