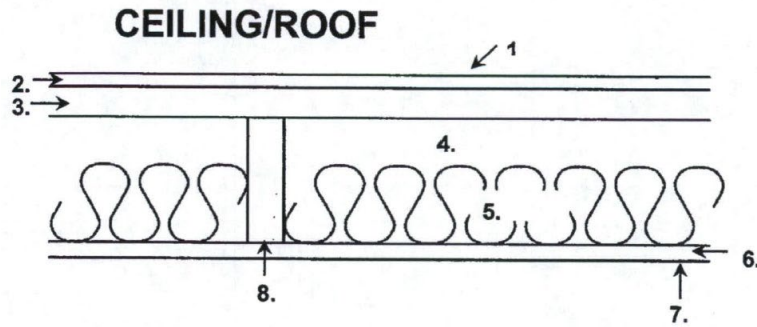


Homework #2 – Calculating Heat Loss in Buildings

Due: 8/30

Name: \_\_\_\_\_

1. Calculate the total heat loss due to transmission during a 24-hour period for a flat roof 90 ft X 135 ft. The roof is constructed per the detail below. The inside temperature is 70 °F and the outside temperature is 52 °F. Assume winter conditions. Show all calculations.



		R (Between joist)	R (At joist)
1.	Air film outside		
2.	3/8 in. Built-up roofing		
3.	5/8 in. Plywood Sheathing		
4.	1 ½ in. Air space		
5.	R-15 Fiberglass Batt Insulation		
6.	5/8 in. Gypsum board		
7.	Air film inside		
8.	Nominal 2-in x 12-in Doug Fir Joist @ 24 in. o.c.		
	$R_{Total}$		
	$R_{Total}$ (Average)		
	U-Factor (Use Three Decimals)		

2. An exterior wall is made up of 8" of stone ( $R = 0.08$  per inch), 3" of foamed-in-place polyurethane, and 0.75" Plywood, and 5/8" gypsum board. Determine the total R-value and U-Factor for the wall. Use the lookup table provided in class. Assume winter.

Component	R-Value
Wall – Outside Air Film	
8" stone	
3" foamed-in-place polyurethane	
¾" plywood	
5/8" gypsum board	
Inside Air Film	
Total Wall Assembly R-Value	
U-Factor (Use Three Decimals)	

3. If the wall in problem 2 is 40 ft long and 12 ft. high what is the heat loss through the wall for an indoor winter design temperature of 78 °F and an outside temperature of 42°F?