

**You must print and complete on this worksheet, no electronic copies, or answers on any other sheets of paper thank you.**

1. How many Btu per hour per square foot will be lost through the wall when the outside temperature is: 50 degrees F colder than the inside? (Disregard the inside temperature where 3 cats are sleeping...)

a. List the following  $R_{\text{values}}$  for the following wall construction materials:

| material                    | $R_{\text{value}}$ |
|-----------------------------|--------------------|
| 0.5 inch wood siding lapped |                    |
| 0.5 inch plywood sheathing  |                    |
| 6.0 inch fiberglass         |                    |
| 0.5 inch sheet rock         |                    |

b. Total  $\Sigma R_{\text{value}}$ : \_\_\_\_\_

c. Solve for:  $1 / R_{\text{value}}$ : \_\_\_\_\_

d. ( value from part "c" ) ( 50 degrees F ) = \_\_\_\_\_ Btu/hr/ft<sup>2</sup>

2. A house with the following dimensions: ( 28 ft ) ( 40 ft ) ( 10 ft ) has an outside temperature of: 40 degrees F and is constructed with the following materials:

Walls outside & inside materials:

2-in. hardwood planks  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

0.5 lapped wood siding  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

0.5 sheetrock  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

$\Sigma$  of  $R_{\text{value}}$  \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

Roof is flat with the following materials:

1-in. plywood  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

Asbestos shingles  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

6.0-in. fiberglass insulation  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

$\Sigma$  of  $R_{\text{value}}$  \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

The floor is built with:

25/32 in. wood subfloor  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

0.75 in. hardwood floor over an unheated crawl space  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

$\Sigma$  of  $R_{\text{value}}$  \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

Windows are 25% of the wall areas:

single-pane windows  $R_{\text{value}}$ : \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

$\Sigma$  of  $R_{\text{value}}$  \_\_\_\_\_ (ft<sup>2</sup>-h-°F/Btu)

**Part II. Calculate the heating needs in:  $Btu / h$**

$$1. \quad Q_{walls} = [(\text{area of wall}_1)(2)] + [(\text{area of wall}_2)(2)] (\% \text{ of walls to windows}) (\text{temperature} / \Sigma \text{ R-Value})$$

2.  $Q_{roof}$  ( area of roof ) (temperature /  $\Sigma$  R-value )

3.  $Q_{floor}$  ( area of floor ) (temperature /  $\Sigma$  R-value )

$$4. \quad Q_{\text{window}} = [(\text{area of wall}_1)(2)] + [(\text{area of wall}_2)(2)] (\% \text{ of windows to walls}) (\text{temperature} / \Sigma R\text{-value})$$

**5. Sum of items: 1 – 4:** \_\_\_\_\_ Btu/h