Salsberry Realty sells homes along the east coast of the U.S. One of the questions most frequently asked by prospective buyers is: If we purchase this home, how much can we expect to pay to heat it during the winter? The research department at Salsbury has been asked to develop some guidelines regarding heating costs for single-family homes. Three variables are thought to relate to the heating costs:

1) the mean daily outside temperature,

2) the number of inches of insulation in the attic, and

3) the age, in years, of the furnace.

To investigage, Salsbury’s research department selected a random sample of 20 recently sold homes. It determined the cost to heat each home last January, as well as the January outside temperature in the region, the number of inches of insulation in the attic, and the age of the furnace. The sample information is reported on the next page:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Home | Heating Cost ($) | Mean Outside Temperature (OF) | Attic Insulation (inches) | Age of Furnace (years) |
| 1 | $250 | 35 | 3 | 6 |
| 2 | 360 | 29 | 4 | 10 |
| 3 | 165 | 36 | 7 | 3 |
| 4 | 43 | 60 | 6 | 9 |
| 5 | 92 | 65 | 5 | 6 |
| 6 | 200 | 30 | 5 | 5 |
| 7 | 355 | 10 | 6 | 7 |
| 8 | 290 | 7 | 10 | 10 |
| 9 | 230 | 21 | 9 | 11 |
| 10 | 120 | 55 | 2 | 5 |
| 11 | 73 | 54 | 12 | 4 |
| 12 | 205 | 48 | 5 | 1 |
| 13 | 400 | 20 | 5 | 15 |
| 14 | 320 | 39 | 4 | 7 |
| 15 | 72 | 60 | 8 | 6 |
| 16 | 272 | 20 | 5 | 8 |
| 17 | 94 | 58 | 7 | 3 |
| 18 | 190 | 40 | 8 | 11 |
| 19 | 235 | 27 | 9 | 8 |
| 20 | 139 | 30 | 7 | 5 |

1. What is the dependent variable? What are the independent variables?
2. Using SPSS to analyze the data and the corresponding output, what is the regression equation?
3. If the mean outside temperature for the month of January is 30 degrees, there are 5 inches of insulation in the attic, and the furnace is 10 years old, what is the estimated heating cost for January?
4. What is the regression coefficient for mean outside temperature? What relationship does it have with heating cost? Explain what happens to heating cost as the outside temperature increases.
5. If we increase temperature by 1 degree and hold the other variables constant, what can we expect will happen to the heating cost?
6. If the mean temperature in Boston is 25 degrees and it is 35 degrees in Philadelphia, all other things being the same, what can we expect the difference to be in heating cost?
7. What is the regression coefficient for attic insulation? What relationship does it have with heating cost?
8. What is the regression coefficient for age of furnace? What relationship does it have with heating cost?